

ΚΕΦΑΛΑΙΟ 1

Καρδιακή Ανακοπή και Καρδιοαναπνευστική Αναζωογόνηση

Βιβλιογραφία

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Ερωτήσεις Ανασκόπησης

1. Ο συνιστώμενος ρυθμός θωρακικών συμπίεσεων κατά την καρδιοπνευμονική αναζωογόνηση είναι (συμπίεσεις/λεπτό):
- α. >100
 - β. >120
 - γ. 100-120
 - δ. 100-140

Απάντηση: γ. 100-120 συμπίεσεις/λεπτό είναι ο ισχύων συνιστώμενος ρυθμός θωρακικών συμπίεσεων.⁷⁻⁹

2. Κατά τη διάρκεια της καρδιοπνευμονικής αναζωογόνησης, μόλις τοποθετηθεί ένας μόνιμος αεραγωγός (π.χ. ενδοτραχειακός σωλήνας), η συνιστώμενη στρατηγική αερισμού είναι:
- α. 1 αναπνοή κάθε 3 δευτερόλεπτα
 - β. 1 αναπνοή κάθε 6 δευτερόλεπτα
 - γ. 2 αναπνοές κάθε 30 θωρακικές συμπίεσεις
 - δ. 2 αναπνοές κάθε 15 θωρακικές συμπίεσεις

Απάντηση: β. Μόλις εξασφαλιστεί μόνιμος αεραγωγός, η συνιστώμενη στρατηγική αερισμού είναι 1 αναπνοή κάθε 6 δευτερόλεπτα.⁷⁻⁹

3. Ο αντιαρρυθμικός παράγοντας εκλογής για την καρδιακή ανακοπή με ανθεκτική κοιλιακή μαρμαρυγή/άσφυγμη κοιλιακή ταχυκαρδία είναι:
- α. Αμιωδαρόνη
 - β. Λιδοκαΐνη
 - γ. Προκαϊναμίδη
 - δ. β-αναστολέας

Απάντηση: α. Η αμιωδαρόνη είναι ο αντιαρρυθμικός παράγοντας εκλογής για ανθεκτική κοιλιακή μαρμαρυγή/ άσφυγμη κοιλιακή ταχυκαρδία.^{8,26,28}

4. Κατά την καρδιοαναπνευστική αναζωογόνηση ποιο από τα κάτωθι επίπεδα τελοεκπνευστικού διοξειδίου του άνθρακα (ETCO₂) αποτελούν προγνωστικό δείκτη θνητότητας;
- α. 25 mm Hg αμέσως μετά την επιστροφή της αυτόματης κυκλοφορίας
 - β. 25 mm Hg μετά από 20 λεπτά υψηλής ποιότητας θωρακικών συμπίεσεων
 - γ. 9 mm Hg αμέσως μετά την αποκατάσταση της αυτόματης κυκλοφορίας
 - δ. 9 mm Hg μετά από 20 λεπτά θωρακικών συμπίεσεων υψηλής ποιότητας

Απάντηση: δ. Μια ETCO₂ μικρότερη από 10 mm Hg μετά από 20 λεπτά υψηλής ποιότητας θωρακικών συμπίεσεων μπορεί να είναι προγνωστικό της θνητότητας. Ωστόσο, αυτό το κριτήριο δεν πρέπει να χρησιμοποιείται μόνο του για να αποφασιστεί ο τερματισμός των προσπαθειών ανάνηψης.^{36,37}

5. Μετά την επιτυχή ανάνηψη από καρδιακή ανακοπή, το συνιστώμενο εύρος και η διάρκεια για τη στοχευμένη διαχείριση της θερμοκρασίας είναι:
- α. 32°C-36°C για 12-24 ώρες
 - β. 34°C-36°C για 12-24 ώρες
 - γ. 32°C-36°C για τουλάχιστον 24 ώρες
 - δ. 34°C-36°C για τουλάχιστον 24 ώρες

Απάντηση: γ. Το συνιστώμενο εύρος και η διάρκεια για τη στοχευμένη διαχείριση της θερμοκρασίας είναι 32°C-36°C για τουλάχιστον 24 ώρες.^{45,54,88}

6. Μετά την επιτυχή αναζωογόνηση από καρδιακή ανακοπή, σαφής ένδειξη για επείγουσα στεφανιογραφία αποτελεί:
- α. Ηλεκτροκαρδιογράφημα (ΗΚΓ) που συνάδει με έμφραγμα του μυοκαρδίου με ανάσπαση ST (STEMI)
 - β. Κοιλιακή μαρμαρυγή/άσφυγμη κοιλιακή ταχυκαρδία ως αρχικός ρυθμός καρδιακής ανακοπής
 - γ. Καρδιακή ανακοπή εκτός νοσοκομείου
 - δ. Άσφυγμη ηλεκτρική δραστηριότητα ως αρχικός ρυθμός καρδιακής ανακοπής

Απάντηση: α. Μόνο τα ΗΚΓ ευρήματα που συνάδουν με STEMI αποτελούν σαφή ένδειξη για επείγουσα στεφανιογραφία. Προς το παρόν δεν υπάρχουν επαρκή στοιχεία για να συστήσουμε τη διενέργεια στεφανιογραφίας ρουτίνας με βάση τον αρχικό ρυθμό καρδιακής ανακοπής ή την τοποθεσία της καρδιακής ανακοπής. Για τους ασθενείς με καρδιακή ανακοπή χωρίς STEMI η απόφαση να προχωρήσουν σε επείγουσα στεφανιογραφία θα πρέπει να λαμβάνεται σε συνεργασία με έναν επεμβατικό καρδιολόγο.⁵⁴

7. Ποιο από τα παρακάτω ισχύει για τα SSEPs όταν χρησιμοποιούνται για τη νευρολογική πρόγνωση μετά από καρδιακή ανακοπή:
- α. Η απουσία αμφοτερόπλευρων φλοιωδών αποκρίσεων (N20s) δεν έχει αποδειχθεί ότι αποτελεί προγνωστικό παράγοντα κακής έκβασης, αλλά η παρουσία φλοιωδών αποκρίσεων προβλέπει την καλή έκβαση.
 - β. Η απουσία αμφοτερόπλευρων φλοιωδών αποκρίσεων (N20s) έχει αποδειχθεί ότι αποτελεί προγνωστικό παράγοντα κακής έκβασης, αλλά η παρουσία φλοιωδών αποκρίσεων δεν προβλέπει την καλή έκβαση.
 - γ. Η απουσία αμφοτερόπλευρων φλοιωδών αποκρίσεων (N20s) έχει αποδειχθεί ότι αποτελεί προγνωστικό παράγοντα κακής έκβασης, ενώ η παρουσία φλοιωδών αποκρίσεων προβλέπει την καλή έκβαση.
 - δ. Ούτε η απουσία ούτε η παρουσία αμφοτερόπλευρων φλοιωδών αποκρίσεων (N20s) έχει αποδειχθεί ότι αποτελεί προγνωστικό παράγοντα για την έκβαση.

Απάντηση: β. Η απουσία αμφοτερόπλευρων φλοιωδών αποκρίσεων (N20s) έχει αποδειχθεί ότι αποτελεί ισχυρό προγνωστικό παράγοντα κακής έκβασης (ποσοστό ψευδώς θετικών αποτελεσμάτων 0% σε πολλαπλές μελέτες), αλλά η παρουσία φλοιωδών αποκρίσεων δεν προβλέπει την καλή έκβαση.^{72,83}

ΚΕΦΑΛΑΙΟ 2

Διαχείριση Αεραγωγού στον Βαρέως Πάσχοντα Ενήλικα

Βιβλιογραφία

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Ερωτήσεις Ανασκόπησης

1. Γυναίκα 36 ετών εισάγεται από το τμήμα επειγόντων περιστατικών με έντονο πονοκέφαλο και επηρεασμένο επίπεδο συνείδησης. Κατά την άφιξή σας παρουσιάζει επεισόδια εμέτων, απώλεια αισθήσεων και αδυναμία προστασίας του αεραγωγού της. Ποια από τις ακόλουθες δηλώσεις είναι η πιο σωστή;

- α. Η απομάκρυνση του εμετού μπορεί να πραγματοποιηθεί μόνο με τη χρήση εύκαμπτου καθετήρα αναρρόφησης μέσω της μύτης και του ρινοφάρυγγα.
- β. Ο τριπλός χειρισμός του αεραγωγού είναι η καταλληλότερη παρέμβαση εάν υπάρχουν ανησυχίες σχετικά με τη σταθερότητα της αυχενικής μοίρας της σπονδυλικής στήλης.
- γ. Η δακτυλική σάρωση του φάρυγγα μπορεί να είναι χρήσιμη για τον καθαρισμό του αεραγωγού σε ασθενή με άθικτο αντανakλαστικό κατάποσης.
- δ. Ο τριπλός χειρισμός του αεραγωγού αποτελείται από ανάκλιση της κεφαλής/έκταση του λαιμού, ώθηση της γνάθου προς τα επάνω/ανάσπαση της κάτω γνάθου προς τα εμπρός και άνοιγμα του στόματος.

Απάντηση: δ. Ο εμετός μπορεί να απομακρυνθεί με τη χρήση εύκαμπτου καθετήρα αναρρόφησης και λαρυγγοσκοπίου, εάν απαιτείται. Ο τριπλός χειρισμός του αεραγωγού δεν πρέπει να χρησιμοποιείται εάν υπάρχουν ανησυχίες σχετικά με την αστάθεια του αυχένα και πρέπει να χρησιμοποιείται μια προσέγγιση με διατήρηση της ακινητοποίησης σε ευθεία γραμμή. Η δακτυλική σάρωση συνιστάται μόνο σε ασθενείς με επηρεασμένο αντανakλαστικό κατάποσης. Ο τριπλός χειρισμός του αεραγωγού μπορεί να είναι επωφελής για την πρόιμη διαχείριση του αεραγωγού σε έναν ασθενή με απώλεια αισθήσεων.

2. Ποιο από τα ακόλουθα δεν αποτελεί αντένδειξη για την τοποθέτηση στοματοφαρυγγικού αεραγωγού;

- α. Οίδημα του αεραγωγού
- β. Εμετός
- γ. Κάταγμα της βάσης του κρανίου
- δ. Τραυματισμός από εισπνοή

Απάντηση: γ. Αντένδειξη για στοματοφαρυγγικό αεραγωγό αποτελεί η δυσκολία ανοχής, η οποία περιλαμβάνει τον εμετό και οποιαδήποτε αιτία οιδήματος των αεραγωγών. Το κάταγμα της βάσης του κρανίου αποτελεί αντένδειξη για ρινοφαρυγγικό αεραγωγό (βλ. Πλαίσιο 2.1).

3. Αποφασίζεται ότι απαιτείται τραχειακή διασωλήνωση καθώς η κατάσταση του ασθενούς συνεχίζει να επιδεινώνεται. Οι αρ-χικές εικόνες από τη λαρυγγοσκόπηση δεν είναι οι βέλτιστες. Ποια από τις ακόλουθες δηλώσεις είναι πιο σωστή;

- α. Ο νευρομυϊκός αποκλεισμός μπορεί να είναι επιζήμιος.
- β. Πρέπει να διατηρείται η κατάλληλη οξυγόνωση και αναισθησία.
- γ. Πρέπει να γίνουν τέσσερις προσπάθειες άμεσης λαρυγγοσκόπησης.
- δ. Ο βοηθητικός εξοπλισμός διασωλήνωσης (bougie) αντενδείκνυται στον δύσκολο αεραγωγό.

Απάντηση: β. Η κατάλληλη οξυγόνωση και αναισθησία είναι ζωτικής σημασίας για τη διαχείριση μιας απρόβλεπτης δύσκολης τραχειακής διασωλήνωσης. Η έλλειψη πλήρους νευρομυϊκού αποκλεισμού μπορεί να αποτελεί αιτία της μη βέλτιστης απεικόνισης κατά τη λαρυγγοσκόπηση. Συνιστώνται τρεις προσπάθειες άμεσης λαρυγγοσκόπησης σύμφωνα με τις κατευθυντήριες οδηγίες της Εταιρείας Δύσκολου Αεραγωγού. Ο βοηθητικός εξοπλισμός διασωλήνωσης (bougie) μπορεί να αποτελέσει χρήσιμο εργαλείο σε αυτές τις περιπτώσεις (βλ. Εικ. 2.5).

4. Τοποθετείται ενδοτραχειακός σωλήνας. Ποια είναι η καλύτερη μέθοδος ρουτίνας για να βεβαιωθείτε ότι ο σωλήνας βρίσκεται στη σωστή θέση;

- α. Κίνηση του θωρακικού τοιχώματος με τον αερισμό θετικής πίεσης
- β. Παρακολούθηση του τελοεκπνευστικού διοξειδίου του άνθρακα (ETCO₂)
- γ. Ορατή υγραποίηση στον ενδοτραχειακό σωλήνα
- δ. Ακρόαση των αναπνευστικών ήχων αμφοτερόπλευρα

Απάντηση: β. Η παρακολούθηση του ETCO₂ είναι ο πιο αντικειμενικός και αξιόπιστος τρόπος επιβεβαίωσης της θέσης του σωλήνα. Η βρογχοσκόπηση μέσω του τραχειακού σωλήνα μπορεί να χρησιμοποιηθεί, αλλά δεν είναι πάντα διαθέσιμη και μπορεί να είναι χρονοβόρα. Η κίνηση του θωρακικού τοιχώματος με τον αερισμό θετικής πίεσης δεν είναι αξιόπιστη σε ορισμένες πνευμονικές καταστάσεις, συμπεριλαμβανομένου του πνευμοθώρακα. Μπορεί να μην υπάρχει υγραποίηση στον ενδοτραχειακό σωλήνα, ακόμη και αν έχει τοποθετηθεί σωστά. Οι πνευμονικοί ήχοι μπορεί να είναι μειωμένοι σε περίπτωση υπεζωκοτικής συλλογής, ατελεκτασίας ή πνευμοθώρακα.

ΚΕΦΑΛΑΙΟ 3

Εκτίμηση της Καρδιακής Πλήρωσης και της Αιματικής Ροής

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Ερωτήσεις Ανασκόπησης

1. Ποια από τις παρακάτω μεταβλητές θεωρείται καλύτερη στην πρόβλεψη της αύξησης του όγκου παλμού μετά από ενδοφλέβια χορήγηση υγρών;

- α. Κεντρική φλεβική πίεση.
- β. Πίεση ενσφήνωσης πνευμονικής αρτηρίας.
- γ. Διακυμάνσεις της πίεσης σφυγμού.
- δ. Καρδιακή συχνότητα.
- ε. Παραγωγή ούρων.

Απάντηση: γ. Οι στατικοί δείκτες της κυκλοφορίας διαθέτουν πολύ πτωχή προβλεπτική ικανότητα όσον αφορά την ανταποκρισιμότητα στη χορήγηση υγρών. Οι δυναμικές παράμετροι, όπως π.χ. η ανταπόκριση της πίεσης σφυγμού στον μηχανικό αερισμό, όταν χρησιμοποιούνται κατάλληλα, αποτελούν αξιόπιστους προβλεπτικούς παράγοντες της ανταποκρισιμότητας στη χορήγηση υγρών.

2. Ποια από τις ακόλουθες παραμέτρους δεν σχετίζεται άμεσα με την προσφορά O_2 ;

- α. Συγκέντρωση αιμοσφαιρίνης
- β. Μέση αρτηριακή πίεση
- γ. Καρδιακή παροχή
- δ. Καρδιακή συχνότητα
- ε. Κορεσμός αρτηριακού αίματος σε O_2

Απάντηση: β. Η προσφορά O_2 ισούται με το γινόμενο της περιεκτικότητας του αρτηριακού αίματος σε O_2 με την καρδιακή παροχή. Η μέση αρτηριακή πίεση δεν σχετίζεται άμεσα με την προσφορά O_2 .

3. Ποια από τις ακόλουθες μεταβλητές δεν μπορεί να χρησιμοποιηθεί ως δείκτης επαρκούς ανταπόκρισης του καρδιαγγειακού συστήματος στην αναπλήρωση υγρών;

- α. Καρδιακή παροχή
- β. Κορεσμός μικτού φλεβικού αίματος σε O_2
- γ. Κορεσμός κεντρικού φλεβικού αίματος σε O_2
- δ. Φλεβοαρτηριακή διαφορά της μερικής πίεσης CO_2
- ε. Επίπεδα γαλακτικού οξέος στο αίμα

Απάντηση: α. Δεν μπορεί να οριστεί μια «φυσιολογική» τιμή καρδιακής παροχής για κανέναν ασθενή, οπότε η ανταπόκριση του καρδιαγγειακού συστήματος στην αναπλήρωση υγρών θα πρέπει να εκτιμάται με άλλους δείκτες.

ΚΕΦΑΛΑΙΟ 4

Αρτηριακοί, Κεντρικοί Φλεβικοί και Καθετήρες Πνευμονικής Αρτηρίας

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Ερωτήσεις Ανασκόπησης

1. Η επεμβατική μέτρηση της αρτηριακής πίεσης χρειάζεται σε όλες τις παρακάτω καταστάσεις εκτός από
- α.** Σοβαρή υπόταση
 - β.** Σοβαρή υπέρταση
 - γ.** Επαγόμενη υπέρταση
 - δ.** Θεραπεία με ινóτροπα

Απάντηση: δ. Ο σκοπός της θεραπείας με ινóτροπα είναι η αύξηση της καρδιακής παροχής και της παροχής οξυγόνου. Μπορεί να έχει κάποια επίδραση στην αρτηριακή πίεση, αλλά όχι αρκετά σημαντική ώστε να χρειάζεται επεμβατική παρακολούθηση (βλ. ενότητα Μέτρηση Αρτηριακής Πίεσης).

2. Πώς σχετίζονται μεταξύ τους η κεντρική φλεβική πίεση (central venous pressure-CVP) και η πίεση του δεξιού κόλπου (right atrial pressure-RAP);
- α.** Η CVP είναι ελαφρώς υψηλότερη από την RAP.
 - β.** Η CVP είναι ελαφρώς χαμηλότερη από την RAP.
 - γ.** Οι δύο τιμές είναι ίσες.
 - δ.** Μπορεί να διαφέρει ανάλογα με την κατάσταση του αναπνευστικού συστήματος.

Απάντηση: γ. (βλ. Ενότητα Μέτρηση της Κεντρικής Φλεβικής Πίεσης)

3. Ένας χαμηλός SvO_2 μπορεί να οφείλεται σε όλα τα παρακάτω εκτός από
- α.** Καταστολή
 - β.** Αναιμία
 - γ.** Υπογκαιμία
 - δ.** Μαζική πνευμονική εμβολή

Απάντηση: α. Οι μειωμένες ανάγκες οξυγόνου συνεπάγονται φυσιολογικές ή αυξημένες τιμές SvO_2 (μειωμένη απόληση οξυγόνου) (βλ. ενότητα Κορεσμός Οξυγόνου Μικτού Φλεβικού Αίματος).

ΚΕΦΑΛΑΙΟ 5

Καρδιακή Βηματοδότηση

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Ερωτήσεις Ανασκόπησης

1. Ένας 40χρονος με ελεύθερο ατομικό αναμνηστικό προσέρχεται στο Τμήμα Επειγόντων Περιστατικών (ΤΕΠ) με ήπια αδυναμία από 3ημέρου. Αρνείται τη χρήση ευφοριστικών και αναφέρει ότι είναι σε «πολύ καλή φόρμα» επειδή είναι δεινός αναρριχτής και ορειβάτης. Αποκαλύπτει ότι το κλιματιστικό του υπέστη βλάβη στη διάρκεια του τελευταίου καύσωνα και ότι δεν καταναλώνει αρκετά υγρά. Διαπιστώνεται ότι είναι αφυδατωμένος. Η αρτηριακή του πίεση ισούται με 100/60 mm Hg. Το ΗΚΓ του αποκαλύπτει πλήρη κολποκοιλιακό αποκλεισμό με κοιλιακή συχνότητα 40 bpm και στενό QRS. Εισάγεται για παρακολούθηση. Ποιο από τα παρακάτω ισχύει;

- α. Η ενδοφλέβια χορήγηση υγρών είναι πιθανό να αναστρέψει αυτή την επαγόμενη από αφυδάτωση ηλεκτροκαρδιογραφική ανωμαλία.
- β. Απαιτείται προσωρινή βηματοδότηση από την κορυφή της δεξιάς κοιλίας.
- γ. Απαιτούνται ορολογικές εξετάσεις.
- δ. Απαιτείται μόνιμη βηματοδότηση.

Απάντηση: γ. Το παραπάνω κλινικό σενάριο-νεαρός αθλητής, που ασχολείται με αθλήματα εξωτερικού χώρου ιδίως κατά τους καλοκαιρινούς μήνες-παραπέμπει σε νόσο Lyme επιπλεγμένη από καρδίτιδα και πλήρη κολποκοιλιακό αποκλεισμό. Η κατάσταση του ασθενούς είναι αναστρέψιμη και ο ρυθμός διαφυγής του είναι σταθερός με στενό QRS, και τις περισσότερες φορές δεν χρειάζεται μόνιμη βηματοδότηση. Η παρουσία αφυδάτωσης είναι εντελώς συμπτωματική. Προσωρινή βηματοδότηση ενδείκνυται μόνο επί έντονων συμπτωμάτων ή αιμοδυναμικής αστάθειας. Θα πρέπει να διενεργηθεί δειγματοληψία αίματος για ορολογικές εξετάσεις. Επίσης, θα πρέπει να διενεργηθεί λοιμωξιολογική εκτίμηση. Η αντιμετώπιση συνίσταται σε παρακολούθηση και αντιβιοθεραπεία.

2. Μια 67χρονη φέρει μόνιμο βηματοδότη για κολποκοιλιακό αποκλεισμό υψηλού βαθμού λόγω σαρκοείδωσης. Αρκετά χρόνια μετά την εμφύτευση του βηματοδότη παρουσίασε ένα συγκοπτικό επεισόδιο, και η καταγραφή τηλεμετρίας κατά τη διάρκεια της νοσηλείας της αναδεικνύει διαλείποντα κολποκοιλιακό αποκλεισμό υψηλού βαθμού με κοιλιακή συχνότητα 30 bpm. Στην καταγραφή τηλεμετρίας διαπιστώνεται η παρουσία βηματοδοτικών αιχμών (spikes) αλλά χωρίς κοιλιακή σύλληψη. Ποιο από τα παρακάτω ισχύει;

- α. Το πρόβλημα οφείλεται σε αστοχία ηλεκτροδίου και συγκεκριμένα σε αστοχία μόνωσης.
- β. Θα πρέπει να μειωθεί η ευαισθησία και ο βηματοδότης να παραμείνει στη θέση του.
- γ. Αυτή είναι η τυπική κλινική εικόνα της ενδοκαρδίτιδας βηματοδότη.
- δ. Η εφαρμογή μαγνήτη θα λύσει το πρόβλημα.

Απάντηση: α. Η αστοχία ηλεκτροδίου συνήθως εμφανίζεται χρόνια μετά την αρχική εμφύτευση και η βλάβη του ηλεκτροδίου συνήθως εντοπίζεται κοντά στο σημείο παρακέντησης στην υποκλείδια χώρα. Τα σημεία της αστοχίας μόνωσης περιλαμβάνουν υποαίσθηση και μειωμένη εμπέδηση ηλεκτροδίων. Η αστοχία ηλεκτροδίου θα πρέπει να αντιμετωπίζεται με αναθεώρηση του ηλεκτροδίου και όχι με τροποποίηση της ευαισθησίας. Η ενδοκαρδίτιδα αποτελεί μια από τις χειρότερες επιπλοκές της εμφύτευσης βηματοδότη, αλλά είναι πολύ σπάνια. Κατά κανόνα εκδηλώνεται με σημεία και συμπτώματα βακτηριαιμίας. Η εφαρμογή μαγνήτη πάνω σε έναν μόνιμο βηματοδότη πυροδοτεί ασύγχρονη βηματοδότηση, δηλαδή βηματοδότηση σταθερής συχνότητας ανεξάρτητα από τον υποκείμενο ρυθμό. Επειδή παρατηρείται ήδη αποτυχία σύλληψης, η ασύγχρονη βηματοδότηση δεν θα προσφέρει κανένα όφελος.

3. Μια 32χρονη διακομίζεται στο ΤΕΠ γιατί βρέθηκε λιπόθυμη σε ένα πάρκο στη διάρκεια μιας ψυχρής χειμωνιάτικης νύχτας. Τα ζωτικά της σημεία είναι: καρδιακή συχνότητα 30 bpm, αρτηριακή πίεση 85/30 mm Hg και θερμοκρασία ορθού 30.2 °C. Ποιο από τα παρακάτω ισχύει;

- α. Θα πρέπει να τοποθετηθεί αμέσως προσωρινός βηματοδότης με όσο το δυνατόν υψηλότερο ουδό βηματοδότησης.
- β. Απαιτείται αμέσως διαδερμική βηματοδότηση με όσο το δυνατόν υψηλότερη βηματοδοτική συχνότητα.
- γ. Ο ρόλος της βηματοδότησης σε αυτό το περιστατικό είναι περιορισμένος, και το κύριο θεραπευτικό μέτρο είναι η αναθέρμανση.
- δ. Η προσπάθεια βηματοδότησης δεν ενέχει κίνδυνο.

Απάντηση: γ. Η εν λόγω ασθενής παρουσιάζει απειλητική για τη ζωή υποθερμία λόγω περιβαλλοντικής έκθεσης. Είναι γνωστό ότι η υποθερμία προκαλεί έντονες ηλεκτροκαρδιογραφικές αλλοιώσεις που τελικά οδηγούν σε λειτουργικές διαταραχές. Η υποθερμία μπορεί να προκαλέσει παράταση του PR, διεύρυνση του QRS και παράταση του QT σε συνδυασμό με κοιλιακές και υπερκοιλιακές αρρυθμίες. Η αντιμετώπιση θα πρέπει να επικεντρωθεί στην αναθέρμανση γιατί η σοβαρή υποθερμία μειώνει την ανταποκρισιμότητα στα ηλεκτρικά ερεθίσματα, και η προσωρινή βηματοδότηση μπορεί να πυροδοτήσει κοιλιακές αρρυθμίες.

4. Αμέσως μετά την τοποθέτηση προσωρινού διαφλέβιου βηματοδότη σε έναν ασθενή, εμφανίζεται αποτυχία σύλληψης που οδηγεί σε ασυστολία. Όλα τα παρακάτω ενδείκνυνται σε επείγουσα βάση εκτός από

- α. Καρδιοπνευμονική αναζωογόνηση.
- β. Τοποθέτηση του ασθενούς στη δεξιά πλάγια κατακεκλιμένη θέση.
- γ. Αύξηση της έντασης του βηματοδοτικού ερεθίσματος στο υψηλότερο δυνατό επίπεδο.
- δ. Έναρξη διαδερμικής βηματοδότησης.

Απάντηση: β. Τα επείγοντα μέτρα σε έναν ασθενή με ασυστολία και αστοχία βηματοδότησης περιλαμβάνουν (1) καρδιοπνευμονική αναζωογόνηση (2) αύξηση της έντασης του βηματοδοτικού ερεθίσματος στο υψηλότερο δυνατό επίπεδο, (3) έλεγχο και αποκατάσταση της σύσφιξης όλων των ηλεκτρικών συνδέσεων, (4) τοποθέτηση του ασθενούς στην αριστερή (όχι τη δεξιά) πλάγια κατακεκλιμένη θέση, (5) αναστροφή της πολικότητας (εάν έχουν τοποθετηθεί επικαρδιακά ηλεκτρόδια) και (6) εφαρμογή άλλων μέτρων υποστήριξης της καρδιακής συχνότητας (δηλαδή, διαδερμική βηματοδότηση) ή χορήγηση φαρμάκων (δηλαδή, ατροπίνης και ισοπροτερενόλης).

ΚΕΦΑΛΑΙΟ 6

Καρδιακός Επιπωματισμός: Κλινική Εικόνα, Διάγνωση και Επεμβατική Αντιμετώπιση

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Ερωτήσεις Ανασκόπησης

1. Η παρουσία του καθετήρα εντός της περικαρδιακής κοιλότητας συνήθως επιβεβαιώνεται

- α.** Εγχέοντας σκιαγραφικό εντός της περικαρδιακής κοιλότητας στη διάρκεια ακτινοσκόπησης.
- β.** Αναρροφώντας αιματηρό υγρό με τη σύριγγα
- γ.** Εγχέοντας αναδευμένο φυσιολογικό ορό αναμεμιγμένο με αίμα ή με σκιαγραφικό Definity υπό υπερηχοκαρδιογραφική καθοδήγηση
- δ.** Εισάγοντας ένα σύρμα μέσω της βελόνας και ελέγχοντας την πορεία του με ακτινοσκόπηση.

Απάντηση: γ. Η παρουσία του καθετήρα εντός της περικαρδιακής κοιλότητας συνήθως επιβεβαιώνεται εγχέοντας αναδευμένο φυσιολογικό ορό αναμεμιγμένο με σκιαγραφικό Definity (Lathaus Medical Imaging, North Billerica, MA), το οποίο είναι ένα εναιώρημα λιπιδίων που περιέχει μικροσφαιρίδια περφλουτρένης και χρησιμοποιείται ως παράγοντας ηχοαντίθεσης. Αξίζει να σημειωθεί ότι ο παράγοντας αυτός μπορεί να προκαλέσει καρδιοαναπνευστικές παρενέργειες (1.1%), και για αυτό οι ασθενείς θα πρέπει να παρακολουθούνται για 30 min μετά τη χορήγησή του.

2. Σε περίπτωση περικαρδιοκέντησης με εισαγωγή της βελόνας στην περιοχή της καρδιακής ώσης, χρειάζεται προσοχή ώστε να μην προκληθεί τραυματισμός

- α.** Της περισπώμενης αρτηρίας της καρδιάς.
- β.** Του αριστερού λοβού ήπατος.
- γ.** Του πρόσθιου κατιόντα κλάδου της καρδιάς.
- δ.** Του αριστερού φρενικού νεύρου.

Απάντηση: γ. Ο πρόσθιος κατιόντας κλάδος πορεύεται προς τα κάτω εντός της πρόσθιας μεσοκοιλιακής αύλακας και αιματώνει το πρόσθιο τοίχωμα και την κορυφή της αριστερής κοιλίας. Συνιστάται υπερηχοκαρδιογραφική καθοδήγηση και αποφυγή προώθησης βελόνας μετά την αναρρόφηση περικαρδιακού υγρού.

3. Ποια είναι η κύρια επιπλοκή της περικαρδιοτομής με μπαλόνι στους ασθενείς με μεγάλες περικαρδιακές συλλογές

- α.** Περικαρδίτιδα.
- β.** Κάκωση αριστερού φρενικού νεύρου.
- γ.** Μεγάλη υπεζωκοτική συλλογή.
- δ.** Τρώση δεξιάς στεφανιαίας αρτηρίας.

Απάντηση: γ. Επειδή η επιπλοκή αυτή είναι συχνή, μαζί με τον καθετήρα παροχέτευσης περικαρδιακής συλλογής τοποθετείται κατά ρουτίνα και ένας σωλήνας θωρακικής παροχέτευσης.

ΚΕΦΑΛΑΙΟ 7

Διαδερμικές Συσκευές Υποβοήθησης

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Ερωτήσεις Ανασκόπησης

1. Ένας άνδρας 75 ετών με γνωστή στεφανιαία νόσο μετά από αορτοστεφανιαία παράκαμψη έχει ισχαιμική καρδιομυοπάθεια και κλάσμα εξώθησης αριστερής κοιλίας 20%. Προσέρχεται στο εργαστήριο καθετηριασμού λόγω οξέος θωρακικού άλγους και εμφράγματος του μυοκαρδίου με ανάσπαση του ST (STEMI). Η διάρκεια του θωρακικού άλγους στο σπίτι προτού καλέσει ασθενοφόρο ήταν 5 ώρες. Τοποθετήθηκαν δύο stent σε μια ένοχη στενωτική βλάβη σε μόσχευμα αορτοστεφανιαίας παράκαμψης στον πρόσθιο κατιόντα κλάδο της αριστερής στεφανιαίας αρτηρίας (left anterior descending-LAD). Στα άλλα αγγεία είχε μη αποφρακτικές βλάβες που δεν ήταν κατάλληλες για την τοποθέτηση stent. Ακολούθως στην καρδιολογική μονάδα εμφανίζει ψυχρό και υγρό δέρμα, χαμηλή αρτηριακή πίεση (90/50 mmHg) και τιμή γαλακτικού 3,5 mEq/L (φυσιολογικά 0,5-2,2 mEq/L). Γίνεται δεξιός καρδιακός καθετηριασμός που δείχνει κεντρική φλεβική πίεση (CVP) 15 mm Hg, πίεση πνευμονικής αρτηρίας (PAP) 40/20 mm Hg, πίεση ενσφήνωσης 18 mm Hg και καρδιακό δείκτη 1,8 L/min ανά m². Επιστρέφει στο εργαστήριο καθετηριασμού και τοποθετείται ενδοαορτική αντλία (intra-aortic balloon pump-IABP). Ο καρδιακός του δείκτης στη μονάδα εντατικής θεραπείας αυξάνεται σε 2,2, η παραγωγή ούρων αυξάνεται σε 100 ml/h, τα επίπεδα γαλακτικού ομαλοποιούνται και δεν φαίνεται πλέον να βρίσκεται σε καταπληξία. Το επόμενο πρωί ο καρδιακός του δείκτης βελτιώνεται σε 2,3, το επίπεδο γαλακτικού είναι φυσιολογικό, η τιμή της κρεατινίνης στις πρωινές εργαστηριακές εξετάσεις είναι φυσιολογική, αλλά η παραγωγή ούρων πέφτει από 100 mL/h σε 5 mL/h στις 5 π.μ. μετά το μπάνιο και την αλλαγή των σεντονιών του. Ποια είναι η πιο πιθανή διάγνωση;

- α. Ρήξη του μπαλονιού της IABP
- β. Σφάλμα συγχρονισμού της IABP
- γ. Κακή τοποθέτηση της IABP
- δ. Υποτροπή της καρδιογενούς καταπληξίας

Απάντηση: γ. Οι εργαστηριακές τιμές του ασθενούς δείχνουν ότι οι δείκτες της καταπληξίας έχουν βελτιωθεί από την προηγούμενη ημέρα με υψηλότερο καρδιακό δείκτη, ομαλοποίηση των επιπέδων γαλακτικού οξέος και στις πρωινές εργαστηριακές εξετάσεις βελτιώνεται ακόμη και η κρεατινίνη του. Μια οξεία μείωση της παραγωγής ούρων σε ασθενή με IABP θα πρέπει να διερευνηθεί. Θα πρέπει να ζητηθεί ακτινογραφία θώρακος για να εξακριβωθεί ότι το άκρο του IABP βρίσκεται ακριβώς άνω της υποκλειδιάς αρτηρίας. Η ακτινογραφία σε αυτόν τον ασθενή θα αποκάλυπτε μια μετακίνηση της IABP που βρίσκεται τώρα στο ύψος των νεφρικών αρτηριών και επηρεάζει την αιμάτωση των νεφρών, προκαλώντας ουσιαστικά μια προνεφρική νεφρική ανεπάρκεια σε έναν ασθενή με βελτιούμενο αιμοδυναμικό προφίλ. Η θέση της IABP θα πρέπει να ρυθμιστεί εκ νέου. Η ρήξη του μπαλονιού (επιλογή α) θα είχε ως αποτέλεσμα αίμα στο εσωτερικό του θηκαρίου και απώλεια της πίεσης πλήρωσης του μπαλονιού. Το σφάλμα συγχρονισμού (επιλογή β) θα προκαλούσε μείωση του καρδιακού δείκτη. Η υποτροπή της καρδιογενούς καταπληξίας (επιλογή δ) είναι λανθασμένη, διότι ο καρδιακός δείκτης βελτιώνεται. Η οξεία νεφρική βλάβη είναι πιθανή και μπορεί να μην ήταν εμφανής στις πρωινές εργαστηριακές εξετάσεις, οπότε η νεφρική λειτουργία θα πρέπει να συνεχίσει να παρακολουθείται και στη συνέχεια.

2. Άνδρας 52 ετών με πρόσθιο STEMI και κοιλιακή ταχυκαρδία (ventricular tachycardia-VT), παθαίνει ανακοπή δύο φορές στο τραπέζι του εργαστηρίου καθετηριασμού κατά τη διάρκεια της επαναγγείωσης με διαδερμική στεφανιαία παρέμβαση και τοποθέτηση δύο φαρμακο-εκλυόντων stent στον LAD. Μετά την επάνοδο της αυτόματης κυκλοφορίας ο ασθενής χρήζει έγχυσης επινεφρίνης 30 μg/min, νορεπινεφρίνης 50 μg/min και βαζοπρεσίνης 0,04 μονάδες/min. Οι δόσεις των φαρμάκων συ-

νεχίζουν να κλιμακώνονται γρήγορα. Παρατηρούνται ροζ αφρώδεις εκκρίσεις από τον ενδοτραχειακό σωλήνα και το επίπεδο γαλακτικού είναι 18 mEq/L (φυσιολογικά 0,5-2,2 mEq/L). Ποιο από τα παρακάτω είναι το επόμενο κατάλληλο βήμα;

- α. Δοκιμή ενός δεύτερου ινοτρόπου για να δούμε αν αυτό βελτιώνει την καταπληξία.
- β. Εκτέλεση υπερηχοκαρδιογραφήματος και τοποθέτηση καθετήρα πνευμονικής αρτηρίας για περαιτέρω ταξινόμηση του τύπου της καρδιογενούς καταπληξίας.
- γ. Τοποθέτηση μιας συσκευής Impella CP αριστερής πλευράς και μιας συσκευής Impella RP δεξιάς πλευράς για την παροχή αμφικοιλιακής υποστήριξης.
- δ. Δέσμευση της χειρουργικής αίθουσας για τοποθέτηση μιας συσκευής Impella 5.0.
- ε. Απευθείας τοποθέτηση φλεβοαρτηριακής εξωσωματικής οξυγόνωσης μέσω μεμβράνης (venoarterial extracorporeal membrane oxygenation/VA-ECMO).

Απάντηση: ε. Αυτός ο ασθενής παρουσιάζει προχωρημένη αιμομεταβολική καταπληξία και έχει περιορισμένο χρόνο προτού υποστεί μη αναστρέψιμη βλάβη των τελικών οργάνων ή πάθει ανακοπή. Το πιο σημαντικό είναι να αποκατασταθεί η αιμάτωση, να διορθωθούν οι μεταβολικές διαταραχές, να αποκατασταθεί η φυσιολογική οξεοβασική ισορροπία και να απαλλαγεί το εξασθενημένο μυοκάρδιο από το τοξικό περιβάλλον των υψηλών δόσεων αγγειοσπαστικών και ινóτροπων. Το ροζ αφρώδες εξίδρωμα δείχνει ότι υπάρχει υψηλή πίεση του αριστερού κόλπου και ανεπάρκεια της αριστερής κοιλίας. Ο καλύτερος και απλούστερος τρόπος για την ταχεία αποκατάσταση της αιμάτωσης είναι η VA-ECMO (επιλογή ε), η οποία προσφέρει τις υψηλότερες ροές από όλες τις συσκευές οξείας μηχανικής υποβοήθησης της κυκλοφορίας. Η ταξινόμηση της καταπληξίας και η εκτίμηση της λειτουργίας της αριστερής κοιλίας/δεξιάς κοιλίας σε αυτόν τον ασθενή μπορεί να γίνει μετά την αποκατάσταση της αιμάτωσης και κατά τη διάρκεια του απογαλακτισμού. Εφόσον βρίσκεται ήδη στο τραπέζι του εργαστηρίου καθετηριασμού με διαθέσιμη ακτινοσκόπηση, η τοποθέτηση της VA-ECMO θα πρέπει να είναι ταχεία. Αυτός ο προχωρημένος βαθμός καταπληξίας είναι πολύ σοβαρός για να αντιμετωπιστεί φαρμακευτικά (επιλογή α). Η διενέργεια υπερηχοκαρδιογραφήματος και η τοποθέτηση πνευμονικού καθετήρα, αν και επιθυμητές για τη μελλοντική διαχείριση (επιλογή β), μπορεί να καθυστερήσουν τη θεραπεία και δεν θα πρέπει να είναι το επόμενο βήμα, το οποίο είναι και το ερώτημα που τίθεται. Ωστόσο, θα πρέπει να τοποθετηθεί καθετήρας δεξιάς καρδιάς μόλις τεθεί σε λειτουργία η ECMO. Θα πρέπει να σημειωθεί ότι ο καθετηριασμός της δεξιάς καρδιάς είναι πιο δύσκολος όσο ο ασθενής υποστηρίζεται από ECMO, αλλά θα διευκολυνθεί από τη διαθεσιμότητα της ακτινοσκόπησης ενώ ο ασθενής βρίσκεται ακόμη στο τραπέζι καθετηριασμού. Η συσκευή Impella CP ενδέχεται να μην παρέχει επαρκώς υψηλά επίπεδα παροχής για την αναστροφή αυτής της καταπληξίας και δεν αντιμετωπίζει την υποξαιμία (επιλογή γ). Η τοποθέτηση της συσκευής Impella 5 (επιλογή δ) απαιτεί πολύ χρόνο για να πραγματοποιηθεί και επίσης δεν θα αντιμετωπίσει άμεσα την υποξαιμία.

3. Μια 35χρονη, προηγουμένως υγιής γυναίκα προσέρχεται στην αίθουσα επείγοντων περιστατικών με δύσπνοια από 3 εβδομάδων μετά από ιογενή νόσο του ανώτερου αναπνευστικού πριν από ένα μήνα. Η αξονική τομογραφία δείχνει πληρότητα των πυλών και αμφοτερόπλευρο πνευμονικό οίδημα. Το υπερηχοκαρδιογράφημα δείχνει διάχυτη υποκινησία με κλάσμα εξώθησης της αριστερής κοιλίας 10%, διάταση της αριστερής κοιλίας και του αριστερού κόλπου και μόνο ήπια δυσλειτουργία της δεξιάς κοιλίας. Ξεκινούν εμπειρικά δοβουταμίνη και μιλρινόνη. Τα αποτελέσματα του εργαστηριακού ελέγχου δείχνουν επίπεδο γαλακτικού 5 mEq/L

(φυσιολογικά 0,5-2,2 mEq/L) και αυξημένη τιμή κρεατινίνης 3,1 mg/dL (φυσιολογικά 0,57-1,3 mg/dL). Ο έλεγχος των αερίων του αρτηριακού αίματος δείχνει μερική πίεση του αρτηριακού οξυγόνου (PaO₂) 80 mm Hg με χορήγηση οξυγόνου μέσω ρινικού καθετήρα στα 4 L/min. Ο καθετηριασμός της δεξιάς καρδιάς αποκαλύπτει κεντρική φλεβική πίεση (CVP) 22 mm Hg, πίεση της πνευμονικής αρτηρίας (PAP) 48/29, με πίεση ενσφύωσης 28 mm Hg, συστηματική αγγειακή αντίσταση (SVR) 1280 dynes/s ανά cm⁻⁵ και καρδιακή παροχή 3,0 (L/min) και καρδιακό δείκτη 1,7 L/min ανά m². Η στεφανιογραφία δεν αποκαλύπτει στεφανιαία νόσο. Ποιο από τα παρακάτω αποτελεί την επόμενη θεραπευτική παρέμβαση;

- α. Ξεκινήστε ως τρίτο ινóτροπο επινεφρίνη, και συμβουλευτείτε το νεφρολογικό τμήμα για οξεία νεφρική βλάβη.
- β. Ξεκινήστε σιλδεναφίλη για τη μείωση της πνευμονικής υπέρτασης.
- γ. Τοποθετήστε τη συσκευή Impella CP αριστερής πλευράς και ξεκινήστε bolus έγχυση φουροσεμίδης.
- δ. Τοποθετήστε δεξιά και αριστερή μικροαξονική διαδερμική συσκευή υποβοήθησης κοιλίας Impella (VADs, BiPella).
- ε. Προχωρήστε άμεσα σε VA ECMO επειδή η ασθενής παρουσιάζει ανεπάρκεια τελικών οργάνων.

Απάντηση: γ. Ο ασθενής έχει κλινική εικόνα ιογενούς μυοκαρδίτιδας με επακόλουθη μη ισχαιμική μυοκαρδιοπάθεια. Έχει βλάβη τελικών οργάνων και πνευμονική συμφόρηση. Ο καθετηριασμός της δεξιάς καρδιάς και τα ηχοκαρδιογραφικά ευρήματα κατατάσσουν την κατάσταση σε καταπληξία από ανεπάρκεια της αριστερής καρδιάς με σχετικά διατηρούμενη οξυγόνωση (αν και σίγουρα όχι φυσιολογική). Ο ασθενής χρειάζεται υποστήριξη του καρδιακού δείκτη και δεν ανταποκρίνεται στη φαρμακευτική αντιμετώπιση. Η καλύτερη πιθανότητα ανάρρωσης είναι η διερεύνηση και η θεραπεία της υποκείμενης μυοκαρδίτιδας σε συνδυασμό με την υποστήριξη του καρδιακού δείκτη για τον περιορισμό της βλάβης των τελικών οργάνων και την αντιμετώπιση της πνευμονικής συμφόρησης με διουρητικά. Η επιλογή α θα εξέθετε την ασθενή σε πιθανή πρόσθετη τοξικότητα της επινεφρίνης χωρίς ουσιαστική βελτίωση της συνολικής εικόνας της και η επιλογή β δεν θα βοηθούσε σημαντικά δεδομένης της σχετικά μη εντυπωσιακής PAP και πνευμονικής αγγειακής αντίστασης. Αυτή η ασθενής δεν φαίνεται να χρειάζεται στρατηγική BiPella (επιλογή δ) αυτή τη στιγμή, δεδομένης της ήπιας δυσλειτουργίας της δεξιάς κοιλίας από το περηχοκαρδιογράφημα και της διατηρούμενης πίεσης παλμού της πνευμονικής αρτηρίας. Η VA-ECMO (επιλογή ε) εκθέτει τον ασθενή στους κινδύνους της ECMO, θα εξακολουθούσε να απαιτεί στρατηγική αποφόρτισης της αριστερής κοιλίας για να προωθήσει την αποκατάσταση αυτής και θα μπορούσε ενδεχομένως να αυξήσει τις πιέσεις του αριστερού κόλπου και να επιδεινώσει το πνευμονικό οίδημα.

4. Ένας άνδρας 45 ετών και 70 κιλών καταρρέει στο 22ο χιλιόμετρο ενώ τρέχει σε μαραθώνιο. Παρέχεται άμεση καρδιοπνευμονική αναζωογόνηση (ΚΑΡΠΑ) από παρευρισκόμενο και έχει ρυθμό κοιλιακής ταχυκαρδίας (VT) που απινιδώνεται δύο φορές και ο ρυθμός στη συνέχεια μετατρέπεται σε άσφυγμη ηλεκτρική δραστηριότητα καθ' οδόν προς ένα νοσοκομείο που απέχει 5 λεπτά. Το νοσοκομείο διαθέτει εργαστήριο καρδιακού καθετηριασμού με προηγμένες θεραπείες καρδιακής ανεπάρκειας, συμπεριλαμβανομένων δυνατοτήτων ECMO τόσο στο εργαστήριο καθετηριασμού όσο και στο τμήμα επειγόντων περιστατικών. Η ΚΑΡΠΑ συνεχίζεται στο τμήμα επειγόντων περιστατικών με συνολικό χρόνο ΚΑΡΠΑ 20 λεπτά μετά την καρδιακή ανακοπή.

Τα αποτελέσματα των εργαστηριακών εξετάσεων στο σημείο της περίθαλψης αποκαλύπτουν φυσιολογικό νάτριο, αυξημένη κρεατινίνη 2,0 mg/dL (φυσιολογικά 0,57-1,3 mg/dL) και αυξημένα επίπεδα γαλακτικού 13 mEq/dL και PaO₂ 35 mm Hg ενώ είναι διασωληνωμένος με κλάσμα εισπνεόμενου οξυγόνου (FIO₂) 100%. Ποια από τις ακόλουθες ενέργειες αποτελεί την επόμενη βέλτιστη θεραπεία;

- α. Μεταβείτε στο εργαστήριο καθετηριασμού, συνεχίζοντας την ΚΑΡΠΑ, για τον προγραμματισμένο καθετηριασμό της αριστερής καρδιάς.
- β. Συνεχίστε την ΚΑΡΠΑ και εάν ο ασθενής έχει επιστροφή της αυτόματης κυκλοφορίας, τότε προχωρήστε αμέσως στο εργαστήριο καθετηριασμού για θεραπευτικό καθετηριασμό της αριστερής καρδιάς.
- γ. Προχωρήστε στο εργαστήριο καθετηριασμού, συνεχίζοντας την ΚΑΡΠΑ, για προγραμματισμένη τοποθέτηση BiPella.
- δ. Προσπαθήστε να επικοινωνήσετε τηλεφωνικά με ένα μέλος της οικογένειας για να συζητήσετε τις θεραπευτικές επιλογές για οξεία μηχανική υποστήριξη της κυκλοφορίας πριν προχωρήσετε.
- ε. Ξεκινήστε ECMO στο τμήμα επειγόντων περιστατικών και στη συνέχεια προχωρήστε απευθείας στο εργαστήριο καθετηριασμού για προγραμματισμένο καθετηριασμό αριστερής καρδιάς και πιθανή διαδερμική στεφανιαία παρέμβαση.

Απάντηση: ε. Ο χρόνος «από την πόρτα στο μπαλόνι» ήταν ένα τυπικό μέτρο της ποιότητας. Ωστόσο, αυτό έχει αλλάξει σε σχέση με τους ασθενείς σε καρδιογενή καταπληξία. Τώρα η έμφαση μετατοπίζεται στους χρόνους από την πόρτα έως την αποφόρτιση (της κοιλίας) ή από την πόρτα έως τη μηχανική υποστήριξη. Ενδείκνυται ταχεία δράση. Οι κατευθυντήριες οδηγίες της Αμερικανικής Καρδιολογικής Εταιρείας για την αναζωογόνηση του 2015 αναφέρουν ότι η ECMO μπορεί να αξιοποιηθεί όταν είναι άμεσα διαθέσιμη και η πιθανολογούμενη αιτιολογία μπορεί να αντιμετωπιστεί με μια σύντομης διάρκειας μηχανική υποστήριξη. Αν και η αιτιολογία της κατάρρευσης αυτού του ασθενούς είναι άγνωστη, είναι λογικό να πιστεύουμε ότι είναι δυνητικά αναστρέψιμη. Μελέτες έχουν δείξει ότι η ECMO αυξάνει την επιβίωση με ακέραια νευρολογική κατάσταση σε σύγκριση με τη συμβατική ΚΑΡΠΑ, ακόμη και σε εξωνοσοκομειακή ανακοπή όταν αυτή είναι καρδιολογικής προέλευσης. Η πλήρης μηχανική υποστήριξη με ECMO θα επιτρέψει τη διατήρηση των τελικών οργάνων, την αναστροφή της καταπληξίας και θα δώσει χρόνο για την ασφαλή διάγνωση και θεραπεία της υποκείμενης πάθησης. Επιπλέον, ο ασθενής είναι υποξαιμικός και ακόμη και αν η ΚΑΡΠΑ είναι αποτελεσματική στην προώθηση της ροής του αίματος, δεν έχει επαρκή περιεκτικότητα σε οξυγόνο (PaO₂ = 35) για τη διατήρηση της λειτουργίας των τελικών οργάνων. Η επιλογή α θα ήταν λογική εάν δεν υπήρχε διαθέσιμο πρόγραμμα ECMO. Η επιλογή β δεν αντιμετωπίζει την υποκείμενη αιτία της ανακοπής και, εάν υπάρχουν διαθέσιμοι πόροι για την υποστήριξη του ασθενούς, θα πρέπει να εφαρμοστούν. Η επιλογή γ είναι ακατάλληλη, γιατί η τοποθέτηση BiPella είναι χρονοβόρα και δεν εφαρμόζεται εύκολα όσο διεξάγεται υψηλής ποιότητας ΚΑΡΠΑ. Επιπλέον, η θεραπεία με BiPella δεν αντιμετωπίζει επαρκώς την υποξαιμική συνιστώσα της καταπληξίας. Η επιλογή δ είναι ακατάλληλη λόγω της οξύτητας της κατάστασης. Δεν πρέπει να χάνεται χρόνος για συζήτηση θεραπευτικών επιλογών ή για λήψη συγκατάθεσης καθώς τα οργανικά συστήματα αρχίζουν να ανεπαρκούν. Μετά τη σταθεροποίηση και τη διάσωση του ασθενούς, μπορεί να πραγματοποιηθεί διεξοδική ενημέρωση της οικογένειας και του υπευθύνου λήψης ιατρικών αποφάσεων.

ΚΕΦΑΛΑΙΟ 8

Ηχοκαρδιογραφία

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1. Η στοχευμένη (εστιασμένη) ηχοκαρδιογραφία

- α. Πρέπει να παρέχει μια ολοκληρωμένη αξιολόγηση της ενδοκαρδιακής αιμοδυναμικής κατάστασης τόσο της αριστερής όσο και της δεξιάς καρδιάς.
- β. Πρέπει να προσδιορίζει τη μορφολογία και την κίνηση των καρδιακών βαλβίδων.
- γ. Πρέπει να παρέχει αξιολόγηση σχετική με την άμεση κλινική κατάσταση.
- δ. Μπορεί να προσδιορίσει με βεβαιότητα τους ασθενείς που θα ωφεληθούν από την παρέμβαση μετά από οξεία πνευμονική εμβολή.

Απάντηση: γ. Η στοχευμένη δισδιάστατη απεικόνιση (focus cardiac ultrasound-FOCUS) περιορίζεται συνήθως στην αξιολόγηση του μεγέθους και της λειτουργίας αμφοτέρων των κοιλιών, της παρουσίας ή απουσίας περικαρδιακής συλλογής και στην αξιολόγηση της κατάστασης του όγκου, δηλαδή πρόκειται για μια μελέτη που γίνεται για να παρέχει αξιολόγηση σχετική με την άμεση κλινική κατάσταση. Μια εστιασμένη μελέτη 2D που γίνεται από ένα εκπαιδευμένο άτομο με φορητή συσκευή έχει μεγάλες δυνατότητες για την ταχεία διαλογή ασθενών στα επείγοντα περιστατικά ή στον χώρο εντατικής θεραπείας.¹⁴⁻¹⁷ Είναι σημαντικό να τονιστεί ότι τα ασαφή ή διφορούμενα ευρήματα της εξέτασης με φορητή συσκευή θα πρέπει να ακολουθούνται από μια πλήρη ηχοκαρδιογραφική μελέτη για την ακριβή και ολοκληρωμένη διάγνωση.

2. Το σύνδρομο Takotsubo (ή μυοκαρδιοπάθεια)

- α. Εμφανίζεται μόνο σε γυναίκες άνω των 50 ετών.
- β. Εκδηλώνεται μόνο με την εμφάνιση της κορυφής δίκης «μπαλονιού» στο υπερηχοκαρδιογράφημα και την αγγειογραφία.
- γ. Χαρακτηρίζεται από υποστροφή των διαταραχών της τοιχωματικής κινητικότητας, συνήθως εντός 3 μηνών.
- δ. Παρουσιάζει αυξημένη επιβίωση με τη χρήση β-αποκλειστών κατά τη διάρκεια της νοσηλείας στο νοσοκομείο.

Απάντηση: γ. Σύμφωνα με τις πρώτες εμπειρίες, εντοπιζόταν συχνότερα σε γυναίκες ηλικίας άνω των 50 ετών, εμφανιζόταν μετά από συναισθηματικό ή σωματικό στρεσογόνο παράγοντα και παρουσιαζόταν με ανάσπαση των τμημάτων ST και διαταραχές της συσπαστικότητας της αριστερής κοιλίας (ΑΚ) με μορφολογία μπαλονιού στην καρδιακή κορυφή. Πλέον αναγνωρίζεται ότι έχει πιο ποικίλη κλινική εικόνα, εμφανίζεται και σε άνδρες και νεότερα άτομα και είναι σημαντικό ότι αναγνωρίζονται πλέον ποικίλα μοτίβα της κινητικότητας της ΑΚ πέραν του κλασικού μοτίβου μπαλονιού της καρδιακής κορυφής (75%-80%), συμπεριλαμβανομένου και της μορφολογίας μπαλονιού του μέσου τμήματος της κοιλίας (10%-20%) και των βασικών τμημάτων (ανάστροφο μπαλόνι- ασυνήθιστο και εμφανίζεται μόνο σε 1%-2%).^{52,53} Μπορεί να εμφανιστεί κατά τη διάρκεια διαγνωστικών δοκιμασιών ή κατά τη διάρκεια της νοσηλείας για οξεία νόσο, ενώ πρόσφατα στοιχεία υποδηλώνουν συσχέτιση με τη σήψη. Αν και κανένα μεμονωμένο χαρακτηριστικό δεν διακρίνει το σύνδρομο Takotsubo από άλλες καταστάσεις με παρόμοια οξεία εικόνα, τα χαρακτηριστικά συμπτώματα περιλαμβάνουν θωρακικό άλγος, ισχαιμικές αλλαγές στο ΗΚΓ με αύξηση της τροπονίνης και διαταραχή της κινητικότητας του τοιχώματος της ΑΚ σε τμήμα που τροφοδοτείται από φυσιολογική στεφανιαία αρτηρία. Η αναστροφή των διαταραχών της κινητικότητας του τοιχώματος της ΑΚ αναμένεται εντός 3 μηνών. Αιμοδυναμική αστάθεια που απαιτεί

παρέμβαση με αγγειοσπαστικούς παράγοντες ή ενδοαορτική αντλία αντιώθησης εμφανίζεται σε ποσοστό έως 15% των ασθενών και η ενδονοσοκομειακή θνητότητα ανέρχεται στο 5%. Το ποσοστό υποτροπής μπορεί να ανέλθει στο 20%. Τα αυξημένα επίπεδα κατεχολαμινών μπορεί να εμπλέκονται στην παθοφυσιολογία του Takotsubo. Τα τρέχοντα στοιχεία δεν υποδεικνύουν όφελος επιβίωσης με τη χρήση β αποκλειστών στο νοσοκομείο, αν και η επιβίωση στο 1 έτος έδειξε οριακή βελτίωση με τη χρήση αναστολέων του μετατρεπτικού ενζύμου της αγγιολογίνης.^{54,55} Έχει δημιουργηθεί ένα μητρώο (το Διεθνές Μητρώο Takotsubo) για τη βελτίωση της διάγνωσης, της θεραπείας και των αποτελεσμάτων.⁵⁶

3. Οι παράμετροι της λειτουργίας της δεξιάς κοιλίας που μπορεί να σχετίζονται με τη θνητότητα σε ασθενείς που παρουσιάζουν οξεία πνευμονική εμβολή περιλαμβάνουν όλες τις ακόλουθες παραμέτρους εκτός από:

- α. Αναλογία τελοδιαστολικής διαμέτρου δεξιάς κοιλίας/αριστερής κοιλίας
- β. Το σημείο «60/60»
- γ. Φυσιολογικός χρόνος επιτάχυνσης της εξώθησης προς την πνευμονική αρτηρία
- δ. Θρόμβος δεξιάς καρδιάς

Απάντηση: γ. Αν και είναι αλήθεια ότι το 70% των ασθενών με αποδεδειγμένη πνευμονική εμβολή (ΠΕ) δεν έχουν σημαντικές ηχοκαρδιογραφικές ανωμαλίες, πρόσφατα δεδομένα δείχνουν ότι διάφορες παράμετροι της λειτουργίας της δεξιάς κοιλίας (ΔΚ) σχετίζονται με τη θνητότητα σε αυτούς τους ασθενείς.⁶⁵ Αυτές οι παράμετροι περιλαμβάνουν: (1) το λόγο της τελοδιαστολικής διαμέτρου της ΔΚ προς την τελοδιαστολική διάμετρο της αριστερής κοιλίας (ΑΚ) ($\geq 0,9$), (2) τη συστολική πίεση της ΔΚ που προκύπτει από την ταχύτητα του πίδακα ανεπαρκείας της τριγλώχινας βαλβίδας (≥ 50 mm Hg), (3) τη συστολική μετακίνηση του δακτυλίου της τριγλώχινας βαλβίδας (tricuspid annular plane systolic excursion-TAPSE) (< 15 mm) και (4) την συμπίεσιμότητα της κάτω κοίλης φλέβας.⁶⁴ Μια άλλη μελέτη πρότεινε ότι (1) το σημείο McConnell (υποκινητικότητα του ελεύθερου τοιχώματος της ΔΚ με φυσιολογική συστολή της κορυφής της), (2) το σημείο 60/60, το οποίο είναι η συνύπαρξη ενός μειωμένου χρόνου επιτάχυνσης της πνευμονικής εξώθησης (AccT) (< 60 msec) με επιβράδυνση της μεσοσυστολικής ταχύτητας («εγκοπή») και μια μέγιστη κλίση πίεσης της ανεπάρκειας της τριγλώχινας < 60 mm Hg και (3) η παρουσία θρόμβου της δεξιάς καρδιάς, υποδηλώνουν όλα ισχυρά πνευμονική εμβολή.⁶⁵ Οι Dahhan και συν. διαπίστωσαν συσχέτιση της συνολικής παραμόρφωσης (strain) του ελεύθερου τοιχώματος της ΔΚ και του δείκτη RV Tei με τη θνητότητα.^{66,67} Δεν βρήκαν τέτοια σχέση μεταξύ άλλων μετρήσεων, όπως η TAPSE, το μέγεθος της ΔΚ και ο λόγος ΔΚ/ΑΚ- στην πραγματικότητα, η TAPSE, η υποκειμενική διάταση της ΔΚ και η υποκειμενική δυσλειτουργία της ΔΚ δεν διέφεραν στατιστικά μεταξύ επιζώντων και μη επιζώντων.⁶⁷ Όλες οι μελέτες συμφωνούν, ωστόσο, ότι υπάρχει έλλειψη δεδομένων από μεγάλες κλινικές μελέτες που να καθορίζουν ποιες ηχοκαρδιογραφικές παράμετροι είναι πραγματικά χρήσιμες στην εκτίμηση του κινδύνου στην οξεία ΠΕ και κατά πόσο οι παράμετροι αυτές έχουν χρησιμότητα στον εντοπισμό ασθενών που θα μπορούσαν να ωφεληθούν από μια παρέμβαση.

ΚΕΦΑΛΑΙΟ 9

Γενικές Αρχές του Μηχανικού Αερισμού

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Ερωτήσεις Ανασκόπησης

- Ένας ασθενής ενεργοποιεί τον αναπνευστήρα και αερίζεται με μια ελεγχόμενη πίεση, διακοπτόμενη με κριτήριο το χρόνο αναπνοή, χρησιμοποιώντας ένα επιβραδυνόμενη ροής μοτίβο εισπνευστικής κυματομορφής. Αναπτύσσεται αιφνίδιο πνευμονικό οίδημα. Ποιες από τις ακόλουθες δηλώσεις είναι αληθείς;
 - Λόγω της μείωσης της διατασιμότητας, η πίεση του αεραγωγού θα αυξηθεί έως ότου επιτευχθεί το όριο κινδύνου.
 - Λόγω της μείωσης της διατασιμότητας, η ροή και ο αναπνεόμενος όγκος θα μειωθούν και η πίεση των αεραγωγών θα παραμείνει η ίδια.
 - Λόγω αλλαγής της μηχανικής, θα αναπτυχθεί ενδογενής θετική τελική εκπνευστική πίεση (PEEP), καθώς η εκπνοή θα παραταθεί.
 - Ο αναπνεόμενος όγκος θα παραμείνει ο ίδιος, αλλά η ροή θα αυξηθεί λόγω του αυξημένου αναπνευστικού έργου.

Απάντηση: β. Ο ασθενής αερίζεται με ελεγχόμενο υποβοηθούμενο αερισμό ελεγχόμενης πίεσης. Αυτός ο τρόπος αερισμού ενεργοποιείται από τον ασθενή (με πυροδότηση πίεσης ή ροής). Κατά τη διάρκεια της εισπνοής, ο αναπνευστήρας στοχεύει στην πίεση-στόχο που έχει οριστεί από τον κλινικό ιατρό και το μοντέλο αερισμού χρησιμοποιεί πάντα τον χρόνο ως μεταβλητή διακοπής της εισπνοής και έχει μοτίβο επιβραδυνόμενη ροής στην κυματομορφή της εισπνοής. Στις αναπνοές με στόχο συγκεκριμένη πίεση, εάν αλλάξει η μηχανική, θα αλλάξει η ροή και ο όγκος. Στην περίπτωση του πνευμονικού οιδήματος, το πρόβλημα έγκειται στη μειωμένη διατασιμότητα. Ως εκ τούτου, η ροή και ο αναπνεόμενος όγκος θα μειωθούν. Η απάντηση α θα ήταν σωστή εάν ο ασθενής βρισκόταν σε υποβοηθούμενο αερισμό ελεγχόμενου όγκου, καθώς ο αναπνεόμενος όγκος θα παρέμενε ο ίδιος, αλλά η πίεση θα αυξανόταν. Η μείωση της διατασιμότητας δεν θα προκαλέσει μείωση της εκπνευστικής ροής-επομένως, η απάντηση γ είναι λανθασμένη. Όσον αφορά την απάντηση δ, επειδή πρόκειται για αναπνοή με στόχο συγκεκριμένη πίεση, η ροή μπορεί πράγματι να αυξηθεί εάν αυξηθεί το έργο της αναπνοής και η εισπνευστική προσπάθεια του ασθενούς. Ωστόσο, ο αναπνεόμενος όγκος θα μειωθεί ως αποτέλεσμα της μειωμένης διατασιμότητας.

- Ποιο από τα ακόλουθα είναι το πιο σωστό όσον αφορά τις αιμοδυναμικές επιδράσεις του αερισμού θετικής πίεσης;
 - Μια αναπνοή θετικής πίεσης συνδέεται πάντα με πτώση της αρτηριακής πίεσης.
 - Κατά τη διάρκεια του υποβοηθούμενου αερισμού ελεγχόμενου όγκου, η αυξημένη ενδοθωρακική πίεση που προκαλείται από την ενδογενή θετική τελοεκπνευστική πίεση (PEEP) μπορεί να ελαχιστοποιηθεί με τη μείωση της εισπνευστικής ροής.
 - Το άμεσο αποτέλεσμα του αερισμού με θετική πίεση είναι η μείωση της φλεβικής επιστροφής δευτερογενώς λόγω της αυξημένης πίεσης του δεξιού κόλπου και η αύξηση του όγκου παλμού της αριστερής κοιλίας δευτερογενώς λόγω της αυξημένης φλεβικής επιστροφής από τις πνευμονικές φλέβες.
 - Αυξάνοντας την υπεζωκοτική πίεση, ο μηχανικός αερισμός αυξάνει το μεταφορτίο της αριστερής κοιλίας.

Απάντηση: γ. Η φυσιολογία της αναπνοής με θετική πίεση είναι προβλέψιμη: η αύξηση της ενδοθωρακικής πίεσης προκαλεί αύξηση της πίεσης παρακαρδιακά και στον δεξιό κόλπο. Καθώς η πίεση του δεξιού κόλπου αποτελεί την πίεση αντίστασης στη φλεβική

επιστροφή, η επιστροφή αίματος προς τη δεξιά κοιλία μειώνεται. Ταυτόχρονα, η συμπίεση των πνευμονικών φλεβών προκαλεί αύξηση της επιστροφής προς την αριστερή κοιλία και ο όγκος παλμού στην αριστερή πλευρά της καρδιάς αυξάνεται. Αρκετούς καρδιακούς κύκλους αργότερα, η μειωμένη φλεβική επιστροφή από τη δεξιά πλευρά παρουσιάζεται τώρα στην αριστερή πλευρά (συνήθως κατά την εκπνοή) και ο όγκος παλμού της αριστερής πλευράς μειώνεται. Αυτό είναι ένα παράδειγμα κοιλιακής αλληλεξάρτησης και είναι αυτό που δημιουργεί τη διακύμανση της πίεσης σφυγμού. Οι συνολικές αιμοδυναμικές επιδράσεις, όπως η αρτηριακή υπόταση, εξαρτώνται συνήθως από την κατάσταση όγκου και τη βασική λειτουργία της αριστερής κοιλίας. Η μείωση της ροής κατά τον αερισμό ελεγχόμενου όγκου θα αυξήσει τον εισπνευστικό χρόνο και θα επιδεινώσει την ενδογενή PEEP. Ο αερισμός με θετική πίεση μειώνει πάντα το μεταφορτίο της αριστερής κοιλίας.

- Όλες οι ακόλουθες δηλώσεις σχετικά με τον μηχανικό αερισμό είναι σωστές εκτός από:
 - Η μείωση της διαφοράς του τελοεκπνευστικού διοξειδίου του άνθρακα (ETCO₂) και της μερικής πίεσης του αρτηριακού διοξειδίου του άνθρακα (PaCO₂) υποδηλώνει αύξηση του νεκρού χώρου.
 - Η σύζευξη μιας δοκιμής αυτόματης αφύπνισης (SAT) με μια δοκιμή αυτόματης αναπνοής (SBT) μειώνει αποτελεσματικά τον χρόνο μηχανικού αερισμού και τις ημέρες στη μονάδα εντατικής θεραπείας.
 - Μια SBT μπορεί να διεξαχθεί μέσω ενός T-piece ή με υποστήριξη χαμηλής πίεσης.
 - Ο μηχανικός αερισμός στο σύνδρομο οξείας αναπνευστικής δυσχέρειας (ARDS) προσεγγίζεται με τη γνώση ότι η υπερβολική διάταση μπορεί να οδηγήσει σε κυψελιδική βλάβη.

Απάντηση: α. Μια φυσιολογική διαφορά ETCO₂-PaCO₂ είναι περίπου 5 mm Hg, με την ETCO₂ να είναι μικρότερη από την PaCO₂. Μια αύξηση αυτής της διαφοράς είναι συνήθως ενδεικτική μιας αύξησης του ανατομικού νεκρού χώρου, είτε λόγω αλλαγής των σχέσεων αερισμού-αιμάτωσης είτε λόγω οξείας πτώσης της καρδιακής παροχής. Η καθημερινή αξιολόγηση της ετοιμότητας αποδέσμευσης από τον αναπνευστήρα, σε συνδυασμό με τις προβλεπόμενες από τα πρωτόκολλα SAT και SBT και τις στοχευμένες πρακτικές καταστολής, είναι τα πιο αποτελεσματικά μέσα για την ασφαλή διακοπή του μηχανικού αερισμού. Η βιβλιογραφία υποστηρίζει το γεγονός ότι οι SBTs μπορούν να διεξάγονται μέσω ενός T-piece, χαμηλών επιπέδων υποστήριξης πίεσης ή συνεχούς θετικής πίεσης των αεραγωγών (CPAP), μία ή δύο φορές ημερησίως και για 30 έως 120 λεπτά.

Η βιβλιογραφία υποστηρίζει ότι η PEEP έχει μεγαλύτερη ευεργετική επίδραση όταν εφαρμόζεται αμέσως μετά την έναρξη του ARDS. Η υπερδιάταση στο τέλος της εισπνοής παράγει μια περιοχή λειτουργίας πάνω από το άνω σημείο καμψής στην καμπύλη πίεσης-όγκου. Ο μηχανικός αερισμός στο ARDS προσεγγίζεται με τη γνώση ότι η υπερδιάταση μπορεί να οδηγήσει σε βαρότραυμα, ενώ το να επιτραπεί η κατάρρευση των κυψελίδων στο τέλος κάθε εκπνοής (κάτω από το κατώτερο σημείο έκπτυξης) μπορεί να οδηγήσει σε τραυματισμό των αεραγωγών και των κυψελίδων τύπου διάτμησης. Η υπερδιάταση είναι ο κύριος παράγοντας πνευμονικής βλάβης που σχετίζεται με τον αναπνευστήρα.

ΚΕΦΑΛΑΙΟ 10

Διαχείριση του Αερισμού στην Αποφρακτική Νόσο των Αεραγωγών

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Ερωτήσεις Ανασκόπησης

1. Για τους ασθενείς με χρόνια αποφρακτική πνευμονοπάθεια (ΧΑΠ), η δύσπνοια κατά την άσκηση σχετίζεται περισσότερο με:
- α.** Βαρύ φορτίο εκκρίσεων
 - β.** Δυναμική υπερδιάταση
 - γ.** Αυξημένη αντίσταση των αεραγωγών
 - δ.** Υψηλή οδηγό πίεση του αναπνεόμενου όγκου

Απάντηση: β. Πολλοί ασθενείς με απόφραξη της ροής του αέρα εμφανίζουν χαμηλά επίπεδα δύσπνοιας έως ότου ο αναπνεόμενος όγκος πλησιάσει την εισπνευστική χωρητικότητα. Οι αναπνοές που ξεκινούν από υψηλούς όγκους θώρακα απαιτούν μεγαλύτερη εισπνευστική προσπάθεια και οι εισπνευστικοί μύες μειονεκτούν μηχανικά. Η δυναμική υπερδιάταση μειώνει την εφεδρεία όγκου μεταξύ της τελοεκπνευστικής και της συνολικής πνευμονικής χωρητικότητας. Περαιτέρω αυξήσεις του πνευμονικού όγκου δεν μπορούν να επιτευχθούν χωρίς “παραβίαση” της συνολικής πνευμονικής χωρητικότητας. Παρόλο που το φορτίο εκκρίσεων, η αυξημένη αντίσταση των αεραγωγών και οι υψηλή οδηγός πίεση του αναπνεόμενου όγκου αυξάνουν το αναπνευστικό έργο, η δύσπνοια εξαρτάται πιο άμεσα από την αναλογία φορτίου έργου προς χωρητικότητα.

2. Για τους νοσηλεύμενους ασθενείς με μαζική παχυσαρκία ποιο από τα ακόλουθα είναι το πιο σωστό;
- α.** Ο πνευμονικός όγκος είναι προβλέψιμα αυξημένος.
 - β.** Η παγίδευση αέρα μειώνεται με την όρθια θέση.
 - γ.** Η εξωτερική θετική τελοεκπνευστική πίεση (PEEP) αυξάνει την περιοχική παγίδευση αέρα στην ύπτια θέση.
 - δ.** Η παγίδευση αέρα σπάνια εμφανίζεται σε άτομα χωρίς ΧΑΠ ή άσθμα.

Απάντηση: β. Σε ασθενείς με μαζική παχυσαρκία οι αεραγωγοί τείνουν να συμπίπτουν και να παγιδεύεται αέρας στην ύπτια θέση. Η προς τα πάνω ώθηση της κοιλιακής πίεσης μειώνεται με την όρθια στάση, με αποτέλεσμα να εκτονώνεται η τάση για εκπνευστική σύμπτωση. Η προσθήκη PEEP στον ύπτιο ασθενή βοηθά στη διατήρηση ανοικτών αεραγωγών και επίσης ανακουφίζει από την παγίδευση αέρα κατά την αναπνοή. Παρόλο που μπορεί να συμβεί παγίδευση αέρα λόγω θέσης, η γενική τάση είναι να μειώνεται ο συνολικός όγκος των πνευμόνων (όπως μετράται από το FRC).

3. Σε ασθενείς με παθητική εισπνοή σε μηχανικό αερισμό ελεγχόμενου όγκου, οι μεταβολές στην παγίδευση αέρα αποτυπώνονται καλύτερα με ποιο από τα ακόλουθα;

- α.** Διαφορά μεταξύ της μέγιστης δυναμικής και στατικής πίεσης των αεραγωγών
- β.** Τελοεκπνευστική οισοφαγική πίεση
- γ.** Τελοεισπνευστική πίεση plateau
- δ.** Τελοεκπνευστικός ρυθμός ροής

Απάντηση: γ. Η έκταση και βαρύτητα της περιοχικής auto-PEEP ποικίλλουν από περιοχή σε περιοχή, επηρεαζόμενες από τις τοπικές μεταβολές της πλευριτικής πίεσης. Έτσι, ορισμένοι αεραγωγοί αποφράσσονται σε σχετικά υψηλές πιέσεις, ενώ άλλοι παραμένουν ανοικτοί καθ' όλη τη διάρκεια του αναπνευστικού κύκλου. Οι μετρήσεις που πραγματοποιούνται στο τέλος της εκπνοής τείνουν να υποεκτιμούν τις πιέσεις στις μονάδες που έκλεισαν νωρίτερα στον εκπνευστικό κύκλο. Κατά τη διάρκεια της διάτασης, οι αναστρέψιμα κλειστές μονάδες ξαναανοίγουν καθώς αυξάνεται η πίεση του αεραγωγού. Επομένως, η πίεση του τελικού εισπνευστικού plateau κατά τη διάρκεια του αερισμού ελεγχόμενου όγκου επηρεάζεται από τις πιέσεις σε όλες τις πνευμονικές μονάδες και θα αντικατοπτρίζει καλύτερα τη δυσκολία της έκπτυξης λόγω της δυναμικής υπερδιάτασης. Η τελική εκπνευστική ροή επηρεάζεται από την αντίσταση του αεραγωγού στις μονάδες που παραμένουν σε επικοινωνία με το άνοιγμα του αεραγωγού, καθώς και από την auto-PEEP σε αυτές τις μονάδες. Η τελοεισπνευστική διαφορά μεταξύ της μέγιστης δυναμικής πίεσης και της πίεσης plateau θα αντικατοπτρίζει την τελοεισπνευστική αντίσταση των ανοικτών διαύλων, αλλά δεν θα δείχνει την auto-PEEP.

ΚΕΦΑΛΑΙΟ 11

Ο Μηχανικός Αερισμός στο Σύνδρομο Οξείας Αναπνευστικής Δυσχέρειας

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Ερωτήσεις Ανασκόπησης

1. Ένας άνδρας 55 ετών εισάγεται στη μονάδα εντατικής θεραπείας με αναπνευστική ανεπάρκεια. Ο ασθενής έχει πιθανή βακτηριακή πνευμονία, η ακτινογραφία θώρακος δείχνει αμφοτερόπλευρα διάχυτα διηθήματα και το υπερηχοκαρδιογράφημα δείχνει φυσιολογική καρδιακή λειτουργία χωρίς σημεία που να υποδηλώνουν καρδιακή ανεπάρκεια. Ο ασθενής υποστηρίζεται με μηχανικό αερισμό και ο λόγος της μερικής πίεσης του αρτηριακού οξυγόνου προς το κλάσμα του εισπνεόμενου οξυγόνου ($\text{PaO}_2/\text{FIO}_2$) είναι μικρότερος από 200. Λαμβάνοντας υπόψη το τρέχον κλινικό σενάριο, ποια από τις ακόλουθες δηλώσεις σχετικά με την τάση (stress) και τη σχετική παραμόρφωση (strain) των πνευμόνων είναι πιο σωστή για τον ασθενή αυτό;

- α. Το stress αναφέρεται στη βλάβη που προκαλείται από τις υψηλές πιέσεις των αεραγωγών.
- β. Το strain είναι η εφαρμοζόμενη δύναμη στον πνεύμονα και συσχετίζεται περισσότερο με τις οισοφαγικές πιέσεις.
- γ. Η ειδική πνευμονική ελαστικότητα είναι ο λόγος μεταξύ κυψελιδικού stress και strain.
- δ. Σε αυτόν τον ασθενή η ειδική πνευμονική ελαστικότητα θα είναι σημαντικά χαμηλότερη από ό,τι σε έναν φυσιολογικό πνεύμονα.

Απάντηση: γ. Οι έννοιες του stress και του strain εισήχθησαν από τους Gattinoni et al.²⁸ και συμβάλλουν στην παροχή ενός εννοιολογικού πλαισίου για την καλύτερη κατανόηση της πνευμονικής βλάβης που προκαλείται από τον αναπνευστήρα στο σύνδρομο οξείας αναπνευστικής δυσχέρειας (ARDS). Το stress είναι η εφαρμοζόμενη δύναμη και το strain είναι η γραμμική παραμόρφωση του υλικού (πνευμονικός ιστός). Στο σύνολο του πνεύμονα η καλύτερη προσέγγιση του stress είναι η διαπνευμονική πίεση και η καλύτερη προσέγγιση του μέσου strain είναι η μεταβολή του όγκου σε σχέση με τον όγκο ηρεμίας του πνεύμονα. Η ειδική πνευμονική ελαστικότητα ορίζεται από τον λόγο μεταξύ κυψελιδικού stress και strain και είναι η διαπνευμονική πίεση που απαιτείται για να διπλασιαστεί ο όγκος ηρεμίας του πνεύμονα. Στο ARDS η ειδική πνευμονική ελαστικότητα είναι παρόμοια με τη φυσιολογική, ενισχύοντας την έννοια του παιδικού πνεύμονα-baby lung (ο φυσιολογικός πνεύμονας είναι μικρός και όχι δύσκαμπτος). Επιπλέον, η έννοια αυτή εγείρει ερωτήματα σχετικά με την κανονικοποίηση του αναπνεόμενου όγκου ως προς το ιδανικό σωματικό βάρος. Ανάλογα με τη βαρύτητα του ARDS και το μέγεθος του υπολειπόμενου φυσιολογικού πνεύμονα (baby lung), ένας δεδομένος αναπνεόμενος όγκος μπορεί να οδηγήσει σε ένα ευρύ φάσμα επιπέδων strain.

2. Ποια από τις ακόλουθες μεταβλητές σχετίζεται περισσότερο με πτωχή έκβαση σε ασθενείς με ARDS;

- α. Αρτηριακή πίεση του οξυγόνου (PaO_2)
- β. Αναλογία $\text{PaO}_2/\text{FIO}_2$ με 100% οξυγόνο
- γ. Λόγος $\text{PaO}_2/\text{FIO}_2$ με PEEP πάνω από 5 cm H_2O
- δ. Αρχική ποσότητα ανατομικού νεκρού χώρου

Απάντηση: δ. Αν και οι περισσότεροι κλινικοί ιατροί (και οι ισχύοντες ορισμοί) αντιστοιχίζουν τη σοβαρότητα της νόσου ARDS με την $\text{PaO}_2/\text{FIO}_2$ και άλλες μεταβλητές που σχετίζονται με την οξυγόνωση, μελέτες έχουν δείξει πτωχή συσχέτιση μεταξύ αυτών και των εκβάσεων στο ARDS. Τα περισσότερα δεδομένα υποδηλώνουν ότι η χρήση μόνο των μεταβλητών οξυγόνωσης για τον προσδιορισμό της βαρύτητας της κατάστασης των πνευμόνων μπορεί να είναι παραπλανητική. Από την άλλη πλευρά, οι μεταβλητές που προέρχονται από το διοξείδιο του άνθρακα (CO_2) όπως ο ολικός κυψελιδικός ανατομικός νεκρός χώρος φαίνεται να έχουν μεγαλύτερη αξία για την εκτίμηση της βαρύτητας της κατάστασης των πνευμόνων. Μελέτες έχουν δείξει ότι στο ARDS ο ανατομικός νεκρός χώρος κατά την εισαγωγή αποτελεί ισχυρό προγνωστικό παράγοντα της έκβασης.

3. Ποια από τις ακόλουθες παρεμβάσεις έχει συσχετιστεί με βελτίωση της θνητότητας σε κλινικές δοκιμές ασθενών με ARDS;

α. Αερισμός με χαμηλό αναπνεόμενο όγκο (6 ml/kg ιδανικού σωματικού βάρους)

β. Αερισμός με υψηλή PEEP (>10 cm H_2O)

γ. Αερισμός με λόγο εισπνοής προς εκπνοή (λόγος I:E) μεγαλύτερο από 2:1

δ. Αερισμός με ψίσυχο ταλαντωτή (HFOV)

Απάντηση: α. Πολλαπλές κλινικές δοκιμές έχουν αξιολογήσει θεραπευτικές στρατηγικές στο ARDS. Μέχρι σήμερα η μόνη θεραπεία που έχει αποδειχθεί ότι σχετίζεται με σημαντική βελτίωση της επιβίωσης σε ένα ευρύ φάσμα ασθενών με ARDS είναι η χρήση χαμηλού αναπνεόμενου όγκου (6 ml/kg ιδανικού σωματικού βάρους). Άλλες στρατηγικές, όπως η υψηλότερη θετική τελική εκπνευστική πίεση (PEEP), μπορεί να είναι χρήσιμες σε επιλεγμένες ομάδες ασθενών. Η HFOV δεν έχει αποδειχθεί ότι βελτιώνει την έκβαση. Δεν υπάρχουν κλινικά δεδομένα που να υποστηρίζουν τη χρήση αερισμού αντίστροφης αναλογίας (αυξημένος λόγος I:E) στο ARDS.

4. Ποιος από τους ακόλουθους ασθενείς είναι πιθανότερο να έχει όφελος όσον αφορά τη θνητότητα από τον αερισμό σε πρηνή θέση;

α. Γυναίκα 54 ετών με σοβαρό καρδιογενές πνευμονικό οίδημα που υποστηρίζεται από μηχανικό αερισμό που απαιτεί υψηλό FIO_2 .

β. Άνδρας 45 ετών με πολυεστιακή πνευμονία και ARDS που υποστηρίζεται από μηχανικό αερισμό (FIO_2 0,7, PEEP 10, $\text{PaO}_2/\text{FIO}_2$ 90).

γ. Γυναίκα 35 ετών με ARDS μετά από πνευμονία από εισρόφηση που υποστηρίζεται με μηχανικό αερισμό (FIO_2 1,0, PEEP 5, $\text{PaO}_2/\text{FIO}_2$ 250).

δ. Άνδρας 76 ετών με σοβαρή γρίπη και ARDS που υποστηρίζεται με μηχανικό αερισμό (FIO_2 0,8, PEEP 12, $\text{PaO}_2/\text{FIO}_2$ 180).

Απάντηση: β. Η τοποθέτηση σε πρηνή θέση χρησιμοποιείται στο ARDS εδώ και αρκετές δεκαετίες. Έχει αποδειχθεί ότι η τοποθέτηση σε πρηνή θέση βελτιώνει την οξυγόνωση σε ποσοστό έως και 70% των ασθενών με ARDS. Ωστόσο, αρκετές κλινικές δοκιμές που αξιολόγησαν ένα ευρύ φάσμα ασθενών με ARDS δεν κατάφεραν να αποδείξουν βελτιωμένη επιβίωση με την τοποθέτηση σε πρηνή θέση. Πιο πρόσφατες μετα-αναλύσεις και κλινικές δοκιμές έδειξαν κάποιο πλεονέκτημα με τον αερισμό σε πρηνή θέση σε ασθενείς με σοβαρό ARDS. Με βάση τα παραπάνω και λαμβάνοντας υπόψη τους πιο πρόσφατους ορισμούς για το ARDS (βλ. Πίνακα 11.1), ο ασθενής της επιλογής β είναι πιθανότερο να ωφεληθεί από τον αερισμό σε πρηνή θέση.

ΚΕΦΑΛΑΙΟ 12

Βρογχοσκόπηση και Βιοψία Πνεύμονα σε Βαρέως Πάσχοντες Ασθενείς

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Ερωτήσεις Ανασκόπησης

1. Ποιο από τα παρακάτω είναι το πιο σωστό αναφορικά με την ενσυνείδητη καταστολή στη διάρκεια βρογχοσκόπησης;
 - α. Δεν προκαλεί υποξαιμία σε υγιείς εθελοντές.
 - β. Προκαλεί υποξαιμία σε υγιείς εθελοντές μόνο επί παρατεταμένης βρογχοσκόπησης (> 30 min).
 - γ. Προκαλεί υποξαιμία σε υγιείς εθελοντές ακόμα και πριν την εισαγωγή του βρογχοσκοπίου.
 - δ. Προκαλεί υποξαιμία μόνο σε ασθενείς με υποκείμενη πνευμονοπάθεια.
3. Συγκριτικά με τη συμβατική διαβρογχική βιοψία πνεύμονα για διάμεση πνευμονοπάθεια, η κρυοβιοψία
 - α. Έχει συσχετιστεί με αυξημένο κίνδυνο αιμορραγίας.
 - β. Είναι ασφαλέστερη και συλλέγει δείγματα μεγαλύτερου μεγέθους.
 - γ. Θα πρέπει να διενεργείται μόνο με άκαμπτο βρογχοσκόπιο.
 - δ. Βασίζεται στην αρχή του Pascal για τη μετάδοση των πιέσεων στα ρευστά.

Απάντηση: γ. Η ενσυνείδητη καταστολή στη διάρκεια βρογχοσκόπησης χρησιμοποιώντας βενζοδιαζεπίνες και ναρκωτικά φάρμακα μπορεί να προκαλέσει υποξαιμία σε υγιείς εθελοντές ακόμα και πριν την εισαγωγή του βρογχοσκοπίου. Συνιστούμε τη χορήγηση συμπληρωματικού οξυγόνου σε όλους του ασθενείς που υποβάλλονται σε βρογχοσκόπηση, ακόμα και αν δεν πάσχουν από κάποια υποκείμενη πνευμονοπάθεια.

2. Σας καλούν να διενεργήσετε θεραπευτική βρογχοσκόπηση στη ΜΕΘ σε έναν ασθενή με σοβαρή ατελεκτασία του δεξιού πνεύμονα. Μετά την ανασκόπηση των κλινικών πληροφοριών παρατηρείτε ότι ο ασθενής δεν έχει υποβληθεί καθόλου σε αναπνευστική φυσικοθεραπεία. Ενημερώνετε τον θεράποντα ιατρό για τα εξής:
 - α. Συμφωνείτε να διενεργήσετε βρογχοσκόπηση επειδή έχει αποδειχθεί ότι υπερτερεί της αναπνευστικής φυσικοθεραπείας στους ασθενείς της ΜΕΘ με ατελεκτασία.
 - β. Η βρογχοσκόπηση είναι εφάμιλλη της αναπνευστικής φυσικοθεραπείας και προκαλεί παρόμοιες επιπλοκές.
 - γ. Η αναπνευστική φυσικοθεραπεία αποτελεί την αρχική μέθοδο αντιμετώπισης επειδή η βρογχοσκόπηση μπορεί να προκαλέσει επιπλοκές.
 - δ. Η βρογχοσκόπηση δεν διαδραματίζει κανέναν ρόλο στους ασθενείς της ΜΕΘ με ατελεκτασία επειδή η κατάστασή τους είναι υπερβολικά βεβαρημένη για να υποβληθούν σε μια τέτοια επεμβατική πράξη.

Απάντηση: γ. Η ατελεκτασία αποτελεί συχνό φαινόμενο στη ΜΕΘ, ιδίως στους μηχανικά αεριζόμενους ασθενείς. Η αναπνευστική φυσικοθεραπεία αποτελεί τη μέθοδο πρώτης γραμμής επειδή έχει αποδειχθεί ότι είναι εξίσου αποτελεσματική με τη βρογχοσκόπηση ως αρχική παρέμβαση. Η βρογχοσκόπηση έχει συσχετιστεί με σημαντικότερη πτώση της οξυγόνωσης. Συνιστούμε την έναρξη αναπνευστικής φυσικοθεραπείας προτού διενεργηθεί βρογχοσκόπηση. Σε ορισμένους ασθενείς επιλέγεται αρχικά η βρογχοσκόπηση επειδή παρουσιάζουν αντενδείξεις στην αναπνευστική φυσικοθεραπεία, όπως π.χ. θωρακικό τραύμα, κάκωση νωτιαίου μυελού ή πρόσφατη θωρακοτομία.

Απάντηση: α. Το τελευταίο διάστημα η χρήση της κρυοβιοψίας για διάμεση πνευμονοπάθεια διευρύνεται ολοένα και περισσότερο επειδή συλλέγει δείγματα μεγαλύτερου μεγέθους συγκριτικά με τη διαβρογχική βιοψία. Ωστόσο, προκαλεί περισσότερες αιμορραγικές επιπλοκές κατά την ανάσυρση του δείγματος, αφού ο κρυοχειρουργικός καθετήρας, το βρογχοσκόπιο και το δείγμα αποσύρονται ταυτόχρονα, επειδή η «παγωμένη μπάλα» δεν χωράει στον αυλό του βρογχοσκοπίου. Η κρυοβιοψία μπορεί να διενεργηθεί με εύκαμπτο βρογχοσκόπιο και δεν προϋποθέτει άκαμπτο βρογχοσκόπιο. Βασίζεται στο φαινόμενο Joule-Thomson.

ΚΕΦΑΛΑΙΟ 13

Μη Επεμβατική Παρακολούθηση του Αναπνευστικού Συστήματος

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Ερωτήσεις Ανασκόπησης

1. Ένας 56χρονος με ατομικό αναμνηστικό κατάχρησης εξαρτησιογόνων ουσιών εισήχθη στη ΜΕΘ για αναπνευστική ανεπάρκεια και βακτηριαίμια. Ο ασθενής συνέχισε να πυρέσσει παρά την αγωγή με αντιβιοτικά ευρέος φάσματος. Την πέμπτη μέρα χορηγήθηκαν στον ασθενή μιδαζολάμη, φαιτανύλη και γέλη βενζοκαΐνης προκειμένου να υποβληθεί σε διοισοφάγειο υπερηχοκαρδιογράφημα ώστε να αποκλειστεί η παρουσία εκβλαστήσεων στις καρδιακές βαλβίδες. Μια ώρα αργότερα σας κάλεσαν γιατί ο κορεσμός σε οξυγόνο μέσω παλμικής οξυμετρίας (SpO_2) ήταν 86% με καλή κυματομορφή αρτηριακού σφυγμού. Κατά την εξέταση, ο ασθενής αναπνέει άνετα με συχνότητα 18 αναπνοές/λεπτό με τις εξής ρυθμίσεις αναπνευστήρα: υποβοηθούμενος-ελεγχόμενος αερισμός, αναπνεόμενος όγκος 500 mL, ελάχιστη αναπνευστική συχνότητα 12 αναπνοές/min και θετική τελοεκπνευστική πίεση 5 cm H_2O . Τα ζωτικά σημεία του είναι σταθερά. Φυσιολογικό αναπνευστικό ψιθύρισμα άμφω. Η ανάλυση αερίων αρτηριακού αίματος ανέδειξε pH 7.34, μερική πίεση διοξειδίου το άνθρακα 46 mm Hg, μερική πίεση οξυγόνου 72 mm Hg, και κορεσμός σε οξυγόνο 94%. Ποια θα πρέπει να είναι η επόμενη σας ενέργεια;
 - α. Αύξηση της ελάχιστης αναπνευστικής συχνότητας στις 16 αναπνοές/min.
 - β. Μέτρηση του κορεσμού σε οξυγόνο με οξυμετρία πολλαπλών μηκών κύματος.
 - γ. Αύξηση της κλασματικής συγκέντρωσης εισπνεόμενου οξυγόνου στο 100% και ανάλυση αερίων αρτηριακού αίματος μετά από 1 ώρα.
 - δ. Διενέργεια αξονικής πνευμονικής αγγειογραφίας.
 - ε. Χορήγηση ναλοξόνης.

Απάντηση: β. Σε περίπτωση που ο SpO_2 είναι σημαντικά χαμηλότερος από τον υπολογιζόμενο κορεσμό σε οξυγόνο των αερίων αίματος, όπως συμβαίνει στον συγκεκριμένο ασθενή, θα πρέπει να εγείρεται η υποψία μεθαιμοσφαιριναιμίας. Στον ασθενή αυτόν χορηγήθηκε βενζοκαΐνη η οποία προκαλεί συχνά μεθαιμοσφαιριναιμία. Η οξυμετρία πολλαπλών μηκών κύματος θα επιβεβαιώσει ότι η αιτία των λανθασμένων τιμών της παλμικής οξυμετρίας είναι η μεθαιμοσφαιριναιμία.
2. Η επιπέδωση της κυματομορφής στην καπνογραφία υποδηλώνει όλα τα παρακάτω εκτός από
 - α. Παρατεταμένη καρδιακή ανακοπή.
 - β. Απόφραξη αεραγωγού από ξένο σώμα.
 - γ. Βρογχόσπασμο.
 - δ. Διασωλήνωση οισοφάγου.

Απάντηση: γ. Η επιπέδωση της κυματομορφής στην καπνογραφία υποδηλώνει ότι ο τραχειοσωλήνας έχει τοποθετηθεί εντός του οισοφάγου. Άλλες καταστάσεις που προκαλούν αυτό το φαινόμενο είναι η απόφραξη εντός του τραχειοσωλήνα ή περιφερικά αυτού, η παρατεταμένη καρδιακή ανακοπή και η βλάβη της συσκευής καπνογραφίας. Ο βρογχόσπασμος θα οδηγήσει στην παραγωγή ανιχνεύσιμων επιπέδων τελοεκπνευστικού διοξειδίου του άνθρακα.
3. Ένας 76χρονος που είχε εμφανίσει σύνδρομο οξείας αναπνευστικής δυσχέρειας (ARDS) λόγω σήψης, παρουσιάζει πλέον κλινική βελτίωση με υποβοηθούμενο-ελεγχόμενο αερισμό. Οι ρυθμίσεις του αναπνευστήρα είναι αναπνεόμενος όγκος 600 mL, κλασματική συγκέντρωση εισπνεόμενου οξυγόνου 40%, εισπνευστική ροή 60 L/min, ελάχιστη αναπνευστική συχνότητα 20 αναπνοές/λεπτό και θετική τελοεκπνευστική πίεση 8 cm H_2O . Η ανάλυση αερίων αρτηριακού αίματος ανέδειξε pH 7.42, μερική πίεση διοξειδίου του άνθρακα 37 mm Hg, μερική πίεση οξυγόνου 70 mm Hg. Η μέγιστη πίεση αεραγωγών ήταν 35 cm H_2O και η πίεση plateau 32 cm H_2O . Ξαφνικά ενεργοποιείται το σύστημα ηχητικής προειδοποίησης λόγω υψηλής μέγιστης πίεσης αεραγωγών. Η μέγιστη πίεση αεραγωγών είναι 65 cm H_2O και η πίεση plateau 34 cm H_2O . Διαπιστώνεται ελαφριά εξάσθénηση του αναπνευστικού ψιθυρίσματος αριστερά. Ο ασθενής παραμένει αιμοδυναμικά σταθερός. Διενεργήθηκε αμέσως ακτινογραφία θώρακος. Ποια είναι η πιθανότερη αιτία του προβλήματος;
 - α. Συστροφή του τραχειοσωλήνα.
 - β. Διασωλήνωση του δεξιού κύριου βρόγχου.
 - γ. Πνευμοθώρακας.
 - δ. Ενδογενής θετική τελοεκπνευστική πίεση λόγω δυναμικής υπερδιάτασης.

Απάντηση: α. Ο εν λόγω ασθενής παρουσίασε αύξηση της μέγιστης πίεσης αεραγωγών χωρίς ανάλογη αύξηση της πίεσης plateau, γεγονός που υποδηλώνει στένωση των αεραγωγών. Οι άλλες επιλογές που παρατίθενται σχετίζονται με μείωση της ενδοτικότητας του θωρακικού τοιχώματος για αυτό θα έπρεπε να προκαλέσουν αύξηση της μέγιστης πίεσης αεραγωγών μαζί με ανάλογη αύξηση της πίεσης plateau.

ΚΕΦΑΛΑΙΟ 14

Παρακλίνια Τραχειοστομία στη Μονάδα Εντατικής Θεραπείας

Βιβλιογραφία

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Ερωτήσεις Ανασκόπησης

1. Επιτηρείτε έναν έμπειρο συνάδελφό σας που εκτελεί παρακλίνια διαδερμική τραχειοστομία με τη μέθοδο Ciaglia, ενώ ένας εξειδικευόμενος διενεργεί βρογχοσκόπηση. Ο ιατρός που εκτελεί την τραχειοστομία σας ενημερώνει ότι συναντά αντίσταση κατά την προώθηση του σωλήνα τραχειοστομίας εντός της τραχείας. Η παρουσία του οδηγού σύρματος εντός της τραχείας έχει ήδη επιβεβαιωθεί βρογχοσκοπικά. Ποιο είναι το επόμενο καλύτερο βήμα;

α. Ζητήστε αμέσως έναν σωλήνα τραχειοστομίας μικρότερου διαμετρήματος.

β. Ματαιώστε τη διαδικασία και προχωρήστε σε σύγκλιση του τραύματος.

γ. Ζητήστε από τον συνάδελφό σας να ασκήσει μεγαλύτερη πίεση για να καταφέρει να προωθήσει τον σωλήνα τραχειοστομίας εντός της τραχείας.

δ. Αφαιρέστε ταυτόχρονα τον σωλήνα τραχειοστομίας, τον διαστολέα και το οδηγό σύρμα, γιατί το τελευταίο μπορεί να έχει συστραφεί δημιουργώντας έναν ψευδή αυλό μπροστά από την τραχεία.

Απάντηση: δ. Η πιο συχνή αιτία δημιουργίας ψευδούς αυλού είναι η μη χρήση της πραγματικής τεχνικής Seldinger. Όπως στην τοποθέτηση ενός κεντρικού φλεβικού καθετήρα, εάν η συσκευή προωθηθεί ταυτόχρονα με το οδηγό σύρμα, αντί το τελευταίο να κρατηθεί σταθερό και η συσκευή να προωθηθεί πάνω από αυτό, το οδηγό σύρμα πολλές φορές συστρέφεται με αποτέλεσμα να προκύψει η προαναφερόμενη κλινική περίπτωση. Η λύση είναι να αφαιρεθεί η συσκευή, να αποσυρθεί το οδηγό σύρμα προς το εσωτερικό του διαστολέα και να προωθηθεί η συσκευή και ο διαστολέας πάνω από το οδηγό σύρμα. Η άσκηση μεγαλύτερης πίεσης θα επιδεινώσει την κατάσταση. Εάν η επιπλοκή αυτή οδηγήσει σε πτώση του κορεσμού σε οξυγόνο ή σε αιμοδυναμική αστάθεια ίσως είναι προτιμότερο να ματαιωθεί η διαδικασία και να εκτελεστεί ανοικτή τραχειοστομία. Σύγκλιση τραύματος δεν συνιστάται. Ο σωλήνας μικρότερου διαμετρήματος θα επιφέρει το ίδιο αποτέλεσμα εάν δεν διορθωθεί η τεχνική.

2. Σας καλούν να εκτιμήσετε έναν ασθενή για αφαίρεση τραχειοσωλήνα μετά από τραχειοστομία λόγω παρατεταμένου μηχανικού αερισμού (περίπου 4 εβδομάδες υπό στοματοτραχειακή διασωλήνωση). Το προσωπικό της μονάδας έχει ήδη προβεί σε διαδοχική τοποθέτηση σωλήνων τραχειοστομίας ολοένα και μικρότερου διαμετρήματος (downsizing) και ο ασθενής φέρει πλέον σωλήνα Shiley No. 6 χωρίς αεροθάλαμο. Επιπλέον, ο ασθενής έχει απογαλακτιστεί από τον μηχανικό αερισμό εδώ και 10 ημέρες. Εκτελείτε τη δοκιμασία «δακτυλικής απόφραξης» του σωλήνα τραχειοστομίας και διαπιστώνετε έντονη αναπνευστική δυσχέρεια μετά από μόλις 10 έως 15 sec. Ποιο είναι το επόμενο βήμα;

α. Συνεχίστε την αφαίρεση τραχειοσωλήνα.

β. Συνεχίστε το downsizing τοποθετώντας έναν σωλήνα Shiley No. 5 χωρίς αεροθάλαμο.

γ. Διενεργήστε διαγνωστική βρογχοσκόπηση διαμέσου της τραχειοστομίας και των φωνητικών χορδών για τυχόν στένωση της ανώτερης αεροφόρου οδού λόγω παρατεταμένης στοματοτραχειακής διασωλήνωσης.

δ. Ζητήστε μια βαλβίδα μονής κατεύθυνσης.

Απάντηση: γ. Η αναπνευστική δυσχέρεια λόγω (πλήρους ή μερικής) απόφραξης των αεραγωγών αποτελεί απόλυτη αντένδειξη της αφαίρεσης του τραχειοσωλήνα σε αυτόν τον ασθενή. Μετά από παρατεταμένη διασωλήνωση η συχνότερη αιτία είναι μάλλον η ουλοποίηση ή το λαρυγγικό οίδημα. Άλλες πιθανές αιτίες είναι η παράλυση των φωνητικών χορδών ή το λαρυγγικό κοκκίωμα. Η υπογλωττιδική στένωση λόγω παρατεταμένης διασωλήνωσης με υψηλές πιέσεις αεροθάλαμου είναι λιγότερο πιθανή αλλά το ενδεχόμενο της παρουσίας της θα πρέπει να εξετάζεται με ενδοσκόπηση.

3. Σας καλούν να εκτιμήσετε μια 34χρονη με σύνδρομο οξείας αναπνευστικής δυσχέρειας (ARDS) λόγω πνευμονίας, για «πρώιμη τραχειοστομία». Έχει παραμείνει διασωληνωμένη μόνο 4 ημέρες. Ο θεράπων ιατρός σας ενημερώνει ότι λόγω σοβαρότητας της κατάστασής της αναμένεται ότι η ασθενής θα παραμείνει διασωληνωμένη για μεγάλο χρονικό διάστημα και ως εκ τούτου θα πρέπει να υποβληθεί σε τραχειοστομία. Πρόσφατα παρουσίασε πτώση της τελοεκπνευστικής πίεσης (PEEP) (12 cm H₂O) και των απαιτήσεων σε οξυγόνο (κλασματικής συγκέντρωσης εισπνεόμενου οξυγόνου 50%). Ο θεράπων ιατρός θέλει να αξιοποιήσει την ευκαιρία και να διενεργηθεί τραχειοστομία γιατί η κατάσταση της ασθενούς μπορεί να επιδεινωθεί καθιστώντας αδύνατη τη διενέργεια τραχειοστομίας αργότερα. Ποιοι είναι παράγοντες που πρέπει να ληφθούν υπόψη κατά τη λήψη απόφασης για διενέργεια τραχειοστομίας;

α. Στους ασθενείς με ARDS που χρειάζονται υψηλή PEEP η διενέργεια τραχειοστομίας θα πρέπει να αναβάλλεται γιατί μπορεί να οδηγήσει σε απώλεια επιστρατευμένων κυψελίδων και σοβαρή μείωση του κορεσμού σε οξυγόνο.

β. Η τραχειοστομία υπό υπερηχογραφική καθοδήγηση αντενδείκνυται στους ασθενείς με PEEP > 10 cm H₂O, γιατί η εισαγωγή του τραχειοσωλήνα μπορεί οδηγήσει σε μεγάλη αύξηση πιέσεων των αεραγωγών.

γ. Δεν είναι δυνατό να προβλεφθεί με ακρίβεια η ανάγκη για μακροχρόνιο μηχανικό αερισμό. Η ασθενής αυτή μπορεί να αποσωληνωθεί χωρίς να χρειαστεί τεχνητό αεραγωγό για μεγάλο χρονικό διάστημα.

δ. Απαιτείται άμεση διενέργεια τραχειοστομίας όπως ζητήθηκε, γιατί τα πλεονεκτήματα αυτής της μεθόδου είναι επαρκώς τεκμηριωμένα και μπορεί να περιορίσει τον κίνδυνο θανάτου σε αυτή την ασθενή.

Απάντηση: γ. Έχουν διεξαχθεί πολλές μελέτες για να εντοπιστούν οι κλινικοί παράγοντες που είναι προβλεπτικοί της διάρκειας του μηχανικού αερισμού στους βαρέως πάσχοντες. Καμία δεν εντόπισε παράγοντες με προβλεπτική ικανότητα αρκετά υψηλή ώστε να μπορεί να αξιοποιηθεί σε μεμονωμένους ασθενείς. Από την πρώιμη τραχειοστομία ωφελούνται λίγοι συγκεκριμένοι πληθυσμοί ασθενών στους οποίους δεν περιλαμβάνονται οι ασθενείς με ARDS.

ΚΕΦΑΛΑΙΟ 15

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Ερωτήσεις Ανασκόπησης

1. Ποιο από τα παρακάτω δεν ισχύει στους ασθενείς με αυτόματο πρωτοπαθή πνευμοθώρακα;
- α. Ένας μικρός σταθερός πνευμοθώρακας μπορεί να αντιμετωπιστεί με αναρρόφηση δια βελόνης ή παροχέτευση με έναν σωλήνα μικρού διαμετρήματος.
 - β. Η πρώτη παρέμβαση στον πνευμοθώρακα υπό τάση με αιμοδυναμική αστάθεια είναι η θωρακοστομία
 - γ. Οι σωλήνες θωρακικής παροχέτευσης μεγάλου διαμετρήματος είναι εξίσου αποτελεσματικοί με τους σωλήνες μικρού διαμετρήματος όσον αφορά την ανάταξη του πνευμοθώρακα.
 - δ. Ορισμένα περιστατικά με αυτόματο πρωτοπαθή πνευμοθώρακα μπορούν να αντιμετωπιστούν με υποστηρικτική φροντίδα και ακτινογραφική παρακολούθηση.

Απάντηση: β. Βλέπε ενότητα «Ενδείξεις Θωρακοστομίας».

2. Ποιο από τα παρακάτω βήματα δεν περιλαμβάνεται στη χειρουργική τοποθέτηση σωλήνα θωρακικής παροχέτευσης;
- α. Λήψη συγκατάθεσης, ακτινολογικός έλεγχος, ενημέρωση όλων των επαγγελματιών υγείας που πρόκειται να λάβουν μέρος στη διαδικασία και έλεγχος του εξοπλισμού.
 - β. Διήθηση του επιλεγμένου μεσοπλευρίου διαλύματος και της τομής με διάλυμα λιδοκαΐνης.
 - γ. Εισαγωγή του σωλήνα στο 7ο μεσοπλευρίο διάστημα.
 - δ. Τοποθέτηση του άνω άκρου του ασθενούς επί του κορμού.
 - ε. Τοποθέτηση του άνω άκρου σε θέση απαγωγής.

Απάντηση: γ. Βλέπε ενότητα «Τεχνική Θωρακοστομίας».

3. Ποιο από τα παρακάτω δεν αποτελεί πιθανή επιπλοκή της θωρακοστομίας;
- α. Τρώση σπλήνα ή ήπατος.
 - β. Κάκωση πνευμονικού παρεγχύματος και αιμοθώρακας.
 - γ. Πνευμονικό οίδημα από επανέκπτυξη.
 - δ. Ατελής παροχέτευση της πλευριτικής συλλογής
 - ε. Εμβολή από πλευριτικό υγρό.

Απάντηση: ε. Βλέπε ενότητα «Επιπλοκές».

4. Ποιο από τα παρακάτω δεν ισχύει όσον αφορά την επιλογή μεγέθους του σωλήνα θωρακικής παροχέτευσης;

- α. Εάν η διάμετρος ενός σωλήνα διπλασιαστεί, η ροή αυξάνεται 16 φορές.
- β. Σημαντικές παράμετροι είναι τα χαρακτηριστικά του παροχετευόμενου υλικού, ο ρυθμός παραγωγής του, η διατήρηση της βατότητας του σωλήνα και η επικοινωνία ολόκληρης ή του μεγαλύτερου μέρους της παροχετευόμενης συλλογής με τον σωλήνα.
- γ. Θα πρέπει να λαμβάνονται υπόψη η ασφάλεια και η άνεση του ασθενούς.
- δ. Οι σωλήνες μικρού διαμετρήματος δεν είναι εξίσου αποτελεσματικοί με τους σωλήνες μεγάλου διαμετρήματος για τις περισσότερες ενδείξεις

Απάντηση: δ. Βλέπε ενότητα «Βέλτιστο Μέγεθος Σωλήνα Θωρακικής Παροχέτευσης».

5. Ποιο από τα παρακάτω δεν ισχύει όσον αφορά την αφαίρεση των σωλήνων θωρακικής παροχέτευσης;

- α. Στο τέλος της εκπνοής, η διαφορά πίεσης ανάμεσα στην υπεζωκοτική κοιλότητα και στην ατμόσφαιρα είναι ελάχιστη, οπότε η πιθανότητα εισροής αέρα εντός της υπεζωκοτικής κοιλότητας είναι μικρή.
- β. Στο τέλος της εισπνοής, ο πνεύμονας βρίσκεται σε πλήρη έκπτυξη, γεγονός που κάνει τα πέταλα του υπεζωκότα να συμπλησιάζουν μεταξύ τους και μπορεί να συρρικνώσει τον πνευμοθώρακα μετά την αφαίρεση του σωλήνα.
- γ. Οι σωλήνες θωρακικής παροχέτευσης δεν θα πρέπει να αφαιρούνται στο τέλος της εκπνοής.
- δ. Το θωρακικό επίθεμα θα πρέπει να παραμένει στη θέση του για τουλάχιστον 24 ώρες μετά την αφαίρεση του σωλήνα.

Απάντηση: γ. Βλέπε ενότητα «Διαχείριση Θωρακοστομίας και Αντιμετώπιση Προβλημάτων»

ΚΕΦΑΛΑΙΟ 16

Πολυπαραμετρική Παρακολούθηση του Κεντρικού Νευρικού Συστήματος

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Ερωτήσεις Ανασκόπησης

1. Ποιο από τα παρακάτω είναι το πιο σωστό αναφορικά με τις ινοπτικές συσκευές παρακολούθησης της ενδοκράνιας πίεσης (intracranial pressure-ICP) και τις κοιλιостоμίες;
 - α. Και οι δύο μέθοδοι παρέχουν τη δυνατότητα παροχέτευσης του εγκεφαλονωτιαίου υγρού (ENY).
 - β. Και οι δύο μέθοδοι έχουν συσχετιστεί με παρόμοια ποσοστά λοιμώξεων.
 - γ. Και οι δύο μέθοδοι παρουσιάζουν την ίδια απόκλιση στις μετρήσεις.
 - δ. Η κοιλιостоμία αποτελεί τη μέθοδο αναφοράς για την παρακολούθηση της ICP.

Απάντηση: δ. Η κοιλιостоμία αποτελεί τη μέθοδο αναφοράς για την παρακολούθηση της ICP, και επιπλέον παρέχει τη δυνατότητα παροχέτευσης του ENY με στόχο τη μείωση της ICP. Ωστόσο, έχει συσχετιστεί με ελαφρώς υψηλότερο κίνδυνο λοιμώξεων. Για τον λόγο αυτόν θα πρέπει να τηρείται ένα πρωτόκολλο ελέγχου λοιμώξεων με προφυλακτική ενδοφλέβια χορήγηση αντιβιοτικών, εξωτερίκευση της παροχέτευσης σε απόσταση 5 cm από το σημείο εισόδου του καθετήρα και χρήση καθετήρων εμβαπτισμένων σε αντιβιοτικά με στόχο τη μείωση του ποσοστού λοιμώξεων. Η ινοπτική συσκευή παρουσιάζει μέση ημερήσια διακύμανση ± 0.6 mm Hg, οπότε οι μετρήσεις της ICP μπορεί να καταστούν ανακριβείς μερικές ημέρες μετά την εισαγωγή της συσκευής.

2. Ποιο από τα παρακάτω είναι περισσότερο σωστό;
 - α. Πίεση εγκεφαλικής αιμάτωσης (cerebral perfusion pressure-CPP) = Μέση αρτηριακή πίεση (MAP) ενδοκράνια πίεση (ICP)
 - β. Η εγκεφαλική αιματική ροή (cerebral blood flow-CBF) μπορεί να εκτιμηθεί με ακρίβεια βάσει της CPP ακόμα και επί εγκεφαλικής κάκωσης.
 - γ. Οι κατευθυντήριες οδηγίες που δημοσίευσε το Ίδρυμα για τα Εγκεφαλικά Τραύματα (Brain Trauma Foundation) το 2016 αναφέρουν ότι στους ασθενείς με τραυματική εγκεφαλική κάκωση η CPP θα πρέπει να διατηρείται σε επίπεδα 80 έως 90 mm Hg.
 - δ. Το τοπικό εγκεφαλικό οίδημα αυξάνει την αιματική ροή στη συγκεκριμένη περιοχή.

Απάντηση: α. Η CPP υπολογίζεται αφαιρώντας την ICP από τη MAP. Η CBF μπορεί να εκτιμηθεί με ακρίβεια βάσει της CPP, μόνο υπό φυσιολογικές συνθήκες. Στους ασθενείς με κρανιοεγκεφαλική κάκωση, οι μηχανισμοί αυτορρύθμισης δυσλειτουργούν, οπότε η CBF μπορεί να είναι σημαντικά αυξημένη για δεδομένη CPP, ή να είναι σημαντικά μειωμένη σε περίπτωση τοπικού οιδήματος. Οι εν λόγω κατευθυντήριες οδηγίες αναφέρουν ότι η CPP θα πρέπει να διατηρείται σε επίπεδα 60 έως 70 mm Hg.

3. Σε έναν 26χρονο με σοβαρή κρανιοεγκεφαλική κάκωση και Κλίμακα Κώματος Γλασκώβης ίση με 7, μια επείγουσα αξονική τομογραφία ανέδειξε επεκτεινόμενες θλάσεις εγκεφάλου στον αριστερό μετωπιαίο και κροταφικό λοβό με πλάγιο διασκηνιδιακό εγκολεασμό (του αγκίστρου), και ο ασθενής υποβλήθηκε σε επείγουσα κρανιοτομία αριστερά. Πλέον φέρει δεξιά κοιλιостоμία. Ποιο από τα παρακάτω ισχύει;
 - α. Τα κύματα της ICP μπορεί να αποσβεστούν ή να απολέσουν τον τριφασικό χαρακτήρα τους.
 - β. Στους ασθενείς με κρανιοτομία, δεχόμαστε υψηλότερες τιμές ICP προτού παρέμβουμε.
 - γ. Το οίδημα στην περιοχή της κρανιοτομίας αποτελεί αξιόπιστο δείκτη της ICP.
 - δ. Ο κίνδυνος λοίμωξης στην περιοχή της κοιλιостоμίας είναι υψηλός σε αυτόν τον ασθενή και συνιστάται προφυλακτική αντιβιοθεραπεία διαρκείας.

Απάντηση: α. Στους ασθενείς με κρανιοτομία, τα κύματα της ICP μπορεί να αποσβεστούν ή να απολέσουν τον τριφασικό χαρακτήρα τους. Ωστόσο, οι μέσες τιμές της ICP θεωρούνται αξιόπιστες και μπορούν να χρησιμοποιηθούν για την καθοδήγηση της θεραπείας. Τα πρωτόκολλα για τη διαχείριση της ICP και της CPP δεν αλλάζουν μετά από κρανιοτομία, και οι υψηλές τιμές ICP θα πρέπει να αντιμετωπίζονται κατάλληλα. Το δέρμα του τριχωτού της κεφαλής και οι παρακείμενοι μαλακοί ιστοί μπορεί να εξοιδηθούν μετά την εγχείρηση, και το οίδημα από μόνο του δεν αποτελεί αξιόπιστη ένδειξη αυξημένης ICP. Επί του παρόντος δεν υπάρχουν επιστημονικά δεδομένα που να υποστηρίζουν ότι η προφυλακτική αντιβιοθεραπεία διαρκείας μπορεί να αποτρέψει τις λοιμώξεις στο σημείο της κοιλιостоμίας.

ΚΕΦΑΛΑΙΟ 17

Ενδοσκόπηση Πεπτικού Συστήματος

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Ερωτήσεις Ανασκόπησης

1. Μια 25χρονη που το ατομικό αναμνηστικό της περιλαμβάνει μόνο δυο τελειόμηνες κυήσεις προσέρχεται με διαλείπον άλγος στο δεξιό υποχόνδριο κατά τις τελευταίες 3 εβδομάδες. Επί του παρόντος διανύει την 20^η εβδομάδα της τρίτης κύησής της. Η φυσική εξέταση αναδεικνύει ήπιο άλγος κατά την ψηλάφηση του δεξιού υποχονδρίου. Το υπερηχογράφημα στην ίδια περιοχή αναδεικνύει χολολιθίαση και δυο μικρά ελλείμματα πλήρωσης εντός του κοινού χοληδόχου πόρου, το μεγαλύτερο από τα οποία έχει διάμετρο 0,5 cm. Ο αιματολογικός έλεγχος αποκαλύπτει τα εξής: ασπαρτική αμινοτρανσφεράση 62 U/L, αλανινική αμινοτρανσφεράση 82 U/L, ολική χολερυθρίνη 4,1 g/dL, άμεση χολερυθρίνη 1,2 g/dL, και αλκαλική φωσφατάση 60 U/L. Ποιο θα πρέπει να είναι το επόμενο βήμα της αντιμετώπισης;

- α. Διενέργεια ενδοσκοπικής *ανάδρομης* χολαγγειοπαγκρεατογραφίας (endoscopic retrograde cholangiopancreatography-ERCP) με σφιγκτηροτομή και αφαίρεση των λίθων του κοινού χοληδόχου πόρου.
- β. Διενέργεια ERCP με τοποθέτηση πλαστικής ενδοπρόθεσης και στη συνέχεια επανάληψη της ERCP με σφιγκτηροτομή και αφαίρεση των λίθων του κοινού χοληδόχου πόρου, μετά την παρέλευση έξι εβδομάδων από τον τοκετό.
- γ. Κλινική παρακολούθηση και σε περίπτωση επιδεινούμενων σημείων, διενέργεια ERCP με σφιγκτηροτομή και αφαίρεση των λίθων του κοινού χοληδόχου πόρου
- δ. Δεν χρειάζεται καμία παρέμβαση επειδή οι λίθοι αυτοί θα αποβληθούν αυτόματα.

Απάντηση: α. Η απόφραξη ή η μετατόπιση της ενδοπρόθεσης ενδέχεται να προκαλέσει χολαγγειίτιδα με αποτέλεσμα να καταστεί αναγκαία και μια δεύτερη επεμβατική πράξη στη διάρκεια της κύησης. Η θεραπευτική σφιγκτηροτομή με αφαίρεση των λίθων υπό ακτινοσκόπηση περιορισμένου χρόνου μπορεί να διευκολύνει την αυτόματη αποβολή των λίθων μειώνοντας ενδεχομένως τον κίνδυνο περαιτέρω επιπλοκών της κύησης.

2. Ποιο από τα παρακάτω δεν αποτελεί αντένδειξη της ενδοσκόπησης με ασύρματη κάψουλα;

- α. Νόσος Crohn με διαγνωσμένες συμφύσεις στο λεπτό έντερο.
- β. Κύηση.
- γ. Διαγνωσμένο ή πιθανολογούμενο συρίγγιο λεπτού εντέρου.
- δ. Βραχύς χρόνος διάβασης λεπτού εντέρου.

Απάντηση: δ. Ο χρόνος διέλευσης της κάψουλας δεν επηρεάζει τη διαγνωστική ικανότητα της μεθόδου.

3. Ένας 63χρονος με υπέρταση, διαβήτη τύπου 2, παχυσαρκία και αποφρακτική άπνοια του ύπνου προσέρχεται στο ΤΕΠ αιτιώμενος οξύ διαξιφιστικό άλγος στο επιγάστριο με πρωτοεμφανιζόμενη γαστροοισοφαγική παλινδρόμηση τον τελευταίο μήνα. Λαμβάνει μη στεροειδή αντιφλεγμονώδη για οσφυαλγία τους 3 τελευταίους μήνες. Κατά την προσέλευση τα ζωτικά του σημεία είναι: καρδιακή συχνότητα 110/λεπτό, αρτηριακή πίεση 90/60 mm Hg και αναπνευστική συχνότητα 28 αναπνοές/λεπτό. Είναι ελαφρά ληθαργικός και κάθιδρος. Όταν προσεγγίζετε τον ασθενή αρχίζει να αποβάλλει ερυθρής χροιάς αίμα δια του έμετου (αιματέμεση). Ποια είναι η ορθή πρακτική αναφορικά με τη διασωλήνωση αυτού τους ασθενούς;

- α. Θα πρέπει να διασωληνωθεί μετά την ενδοσκόπηση.
- β. Θα πρέπει να του χορηγηθεί αμέσως ένας αναστολέας αντλίας πρωτονίων και οκτρεοτίδη και στη συνέχεια να υποβληθεί σε *οισοφαγογαστροδωδεκαδακτυλοσκόπηση*.
- γ. Η προφυλακτική διασωλήνωση της τραχείας πριν από ενδοσκόπηση μπορεί να διευκολύνει την είσοδο του ενδοσκοπίου και συνιστάται στα περισσότερα περιστατικά οξείας αιμορραγίας του ανώτερου πεπτικού.
- δ. Η προφυλακτική διασωλήνωση της τραχείας πριν από ενδοσκόπηση για αιμορραγία του ανώτερου πεπτικού μπορεί να οδηγήσει σε αύξηση των ποσοστών πνευμονίας στους διασωληνωμένους ασθενείς.

Απάντηση: δ. Σε μια μετα-ανάλυση για την προφυλακτική διασωλήνωση της τραχείας πριν από ενδοσκόπηση για αιμορραγία του ανώτερου πεπτικού, διαπιστώθηκαν υψηλότερα ποσοστά εισρόφησης και πνευμονίας καθώς και αυξημένη διάρκεια νοσηλείας στην ομάδα ασθενών που υποβλήθηκαν σε διασωλήνωση της τραχείας. Τα οφέλη της διασωλήνωσης θα πρέπει να σταθμίζονται έναντι των κινδύνων για τον κάθε ασθενή χωριστά.

ΚΕΦΑΛΑΙΟ 18

Παρακλίνιο Υπερηχογράφημα σε Βαρέως Πάσχοντες Ασθενείς

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Ερωτήσεις Ανασκόπησης

1. Ποιο από τα παρακάτω ισχύει;

- α. Για την παραστερνική τομή κατά τον επιμήκη άξονα (parasternal long-axis-PSLAX), ο ηχοβολέας τοποθετείται στο έκτο μεσοπλεύριο διάστημα κατά τη μεσοκλειδική γραμμή.
- β. Στην κορυφαία τομή τεσσάρων κοιλοτήτων το τομογραφικό επίπεδο τροποποιείται ώστε το μεσοκοιλιακό διάφραγμα να διατρέχει κάθετα το κέντρο της οθόνης.
- γ. Η υποξιφοειδική τομή τεσσάρων κοιλοτήτων είναι αυτή που συνήθως καταγράφεται πιο δύσκολα στους μηχανικά αεριζόμενους ασθενείς.
- δ. Για την παραστερνική τομή κατά τον βραχύ άξονα (parasternal short axis view-PSSAX), ο ηχοβολέας στρέφεται ωρολογιακά κατά 90° από την κορυφαία τομή τεσσάρων κοιλοτήτων.

Απάντηση: β. Για την κορυφαία τομή τεσσάρων κοιλοτήτων, ο ηχοβολέας τοποθετείται στο έκτο μεσοπλεύριο διάστημα κατά τη μεσοκλειδική γραμμή. Για την PSLAX, ο ηχοβολέας τοποθετείται αριστερά παραστερνικά κάθετα προς την επιφάνεια του δέρματος κατά το τρίτο έως πέμπτο μεσοπλεύριο διάστημα ενώ η εγκόπη του ηχοβολέα είναι στραμμένη προς τον δεξιό ώμο. Η υποξιφοειδική τομή είναι αυτή που συνήθως καταγράφεται πιο εύκολα στους μηχανικά αεριζόμενους ασθενείς λόγω της αλληλεπίδρασης καρδιάς-πνευμόνων. Η PSSAX προκύπτει από την PSLAX στρέφοντας τον ηχοβολέα ωρολογιακά κατά 90°. Στην κορυφαία τομή τεσσάρων κοιλοτήτων το μεσοκοιλιακό διάφραγμα πρέπει να είναι κατακόρυφο.

2. Ποιο εύρημα δεν αποκλείει τον πνευμοθώρακα;

- α. Σημείο πνευμονικού σφυγμού
- β. Γραμμές A
- γ. Γραμμές B
- δ. Σημείο ολίσθησης

Απάντηση: β. Η πλευριτική γραμμή αντιπροσωπεύει τον υπεζωκότα. Το σημείο ολίσθησης συνίσταται στη μετακίνηση της πλευριτικής γραμμής συγχρόνως με την αναπνοή, και η παρουσία του αρκεί για να αποκλειστεί ο πνευμοθώρακας. Ένα σχετικό εύρημα είναι το σημείο πνευμονικού σφυγμού όπου η πλευριτική γραμμή κινείται με καρδιοφασικό τρόπο λόγω μετάδοσης των καρδιακών σφυγμών, και η παρουσία του αρκεί για να αποκλειστεί ο πνευμοθώρακας. Οι γραμμές B εκπορεύονται από την πλευριτική γραμμή και είναι κάθετες προς αυτήν, και η παρουσία τους αρκεί για να αποκλειστεί ο πνευμοθώρακας. Οι γραμμές A είναι οριζόντιες και εντοπίζονται βαθύτερα από την πλευριτική γραμμή, αλλά η παρουσία τους δεν αρκεί για να αποκλειστεί ο πνευμοθώρακας.

3. Ποιο από τα παρακάτω ισχύει;

- α. Η μέθοδος «σημαδεύω και τρυπάω» σχετίζεται με υψηλότερα ποσοστά επιτυχίας συγκριτικά με την απεικόνιση σε πραγματικό χρόνο για την εισαγωγή βελόνας στην έσω σφαγίτιδα φλέβα
- β. Η απεικόνιση της έσω σφαγίτιδας κατά τον βραχύ άξονα σχετίζεται με υψηλότερα ποσοστά επιτυχίας συγκριτικά με την απεικόνιση κατά τον επιμήκη άξονα στη διάρκεια τοποθέτησης κεντρικού φλεβικού καθετήρα.
- γ. Η χρήση υπερηχογραφικής καθοδήγησης σε πραγματικό χρόνο δεν βελτιώνει τα ποσοστά επιτυχίας στα περιστατικά δύσκολου καθετηριασμού περιφερικών φλεβών.
- δ. Η χρήση υπερηχογραφικής καθοδήγησης σε πραγματικό χρόνο μειώνει τις επιπλοκές της θωρακοκέντησης σε μηχανικά αεριζόμενους ασθενείς.

Απάντηση: δ. Η χρήση υπερηχογραφικής καθοδήγησης σε πραγματικό χρόνο αυξάνει τα ποσοστά επιτυχίας και μειώνει τα ποσοστά επιπλοκών στη διάρκεια καθετηριασμού της έσω σφαγίτιδας. Η απεικόνιση της έσω σφαγίτιδας κατά τον βραχύ και τον επιμήκη άξονα σχετίζονται με παρόμοια ποσοστά επιτυχίας στη διάρκεια τοποθέτησης κεντρικού φλεβικού καθετήρα. Η χρήση υπερηχογραφικής καθοδήγησης σε πραγματικό χρόνο για τον καθετηριασμό περιφερικών φλεβών αυξάνει τα ποσοστά επιτυχίας. Η χρήση υπερηχογραφικής καθοδήγησης στη διάρκεια θωρακοκέντησης σε μηχανικά αεριζόμενους ασθενείς μειώνει τις σχετικές επιπλοκές.

ΚΕΦΑΛΑΙΟ 19

Θεραπεία Συνεχούς Υποκατάστασης της Νεφρικής Λειτουργίας

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Ερωτήσεις Ανασκόπησης

1. Ένας 63χρονος με βάρος 70 kg προσέρχεται στο ΤΕΠ με πνευμονία κοινότητας και πτώση επιπέδου συνείδησης. Διενεργείται ενδοτραχειακή διασωλήνωση και ο ασθενής παρουσιάζει έντονη αιμοδυναμική αστάθεια. Του χορηγούνται ενδοφλεβίως 10 L κρυσταλλοειδούς διαλύματος μέσω κεντρικού φλεβικού καθετήρα που έχει τοποθετηθεί στην αριστερή σφαγίτιδα φλέβα, καθώς και αγγειοσυσπαστικό φάρμακο σε υψηλή δόση. Μεταφέρεται αμέσως στη ΜΕΘ για συνέχιση της νοσηλείας του. Μετά την εισαγωγή του στη ΜΕΘ, ο ασθενής παραμένει ανουρικός, παρόλο που η έγχυση υγρών συνεχίζεται με ρυθμό 250 mL/ώρα. Ο αιματολογικός έλεγχος αποκαλύπτει τα εξής: Κάλιο 5,6 mEq/L, κρεατινίνη 1,8 mg/dL και διοξειδίο του άνθρακα 20 mmol/L. Αποφασίζεται ότι ο ασθενής πρέπει να υποβληθεί σε θεραπεία υποκατάστασης της νεφρικής λειτουργίας (renal replacement therapy-RRT). Ποιο από τα παρακάτω ισχύει;

- α. Η κύρια ένδειξη της RRT είναι η διαχείριση των υγρών.
- β. Για την RRT απαιτείται τοποθέτηση κεντρικού φλεβικού καθετήρα στη δεξιά υποκλείδια φλέβα.
- γ. Επειδή είναι η πρώτη φορά που ο ασθενής υποβάλλεται σε αιμοκάθαρση, θα πρέπει να χρησιμοποιηθεί διαλειπущα RRT (intermittent renal replacement therapy-IRRT).
- δ. Κατά την τοποθέτηση του καθετήρα δεν απαιτείται υπερηχογραφική καθοδήγηση, γιατί αυτό που έχει προτεραιότητα είναι η έναρξη της RRT.

Απάντηση: α. Η υπερηχογραφική καθοδήγηση αποτελεί την τεχνική αναφοράς για την τοποθέτηση του καθετήρα της RRT. Με τον τρόπο αυτόν μειώνεται ο κίνδυνος αποτυχημένης τοποθέτησης και επιπλοκών. Επιπλέον, παρόλο που θεωρητικά μειώνουν τον κίνδυνο λοιμώξεων, οι προσωρινοί καθετήρες που τοποθετούνται στην υποκλείδια φλέβα θα πρέπει να αποφεύγονται γιατί αυξάνουν τον κίνδυνο φλεβικής στένωσης. Προτιμάται ο καθετηριασμός της μηριαίας ή της σφαγίτιδας φλέβας. Παρόλο που με τους καθετήρες μικρής διαμέτρου το σημείο εισόδου είναι μικρότερο, απαιτούνται καθετήρες μεγαλύτερης διαμέτρου (> 12 F) για να διασφαλιστεί καλύτερη ροή. Η συνεχής RRT (continuous RRT-CRRT) είναι προτιμότερη ως αρχική μέθοδος αντιμετώπισης σε αυτή την κλινική περίπτωση επειδή ο ασθενής λαμβάνει αγγειοσυσπαστικό φάρμακο σε υψηλή δόση. Οι κύριες ενδείξεις της RRT είναι η υπερφόρτωση όγκου, η υπερκαλιαιμία, η μεταβολική οξέωση, η ουραιμία και η δηλητηρίαση από μια υδατοδιαλυτή ουσία. Το γεγονός ότι ο ασθενής παραμένει ανουρικός, παρόλο που η έγχυση υγρών συνεχίζεται (250 mL/ώρα) σημαίνει ότι αδυνατεί να διαχειριστεί ο ίδιος τον όγκο των υγρών του σώματος, και ότι η νεφρική του λειτουργία δεν πρόκειται να αποκατασταθεί αυτόματα. Συνεπώς, θα χρειαστεί RRT.

2. Τη δεύτερη μέρα της νοσηλείας του στη ΜΕΘ, οι καλλιέργειες αίματος θετικοποιήθηκαν για gram-αρνητικούς βάκιλους. Επίσης, οι ανάγκες του ασθενούς σε αγγειοσυσπαστικά αυξήθηκαν και παρουσίασε επιδεινούμενη υποξαιμία με PaO₂/FIO₂ ίσο με 105. Ποιο από τα παρακάτω είναι το πιο σωστό;

- α. Θα πρέπει να ξεκινήσει συνεχής αιμοδιήθηση υψηλού όγκου για να απομακρυνθούν οι φλεγμονώδεις μεσολαβητές και να καταπολεμηθεί η σηπτική καταπληξία.
- β. Θα πρέπει να συνταγογραφηθεί μια δόση των 35 mL/kg/ώρα καθώς πιθανολογείται ότι θα μεσολαβήσουν χρονικά διαστήματα κατά τα οποία η RRT θα τίθεται εκτός λειτουργίας.
- γ. Θα πρέπει να χρησιμοποιηθεί μη κλασματοποιημένη ηπαρίνη επειδή αποτελεί το συχνότερα χρησιμοποιούμενο αντιπηκτικό και δεν βραχύνει τη διάρκεια ζωής των φίλτρων, σε σχέση με τη χρήση κιτρικών στο κύκλωμα.
- δ. Θα πρέπει να ξεκινήσει υπερδιήθηση με ρυθμό 25 mL/kg/ώρα με στόχο την αφαίρεση των υγρών για τη βελτίωση της οξυγόνωσης, προσέχοντας να μην υπερβαίνεται ο ρυθμός αναπλήρωσης υγρών στο πλάσμα.

Απάντηση: δ. Παρόλο που η ενδοτοξίνη και άλλοι φλεγμονώδεις μεσολαβητές μπορούν να απομακρυνθούν με την αιμοδιήθηση υψηλού όγκου, δεν έχει αποδειχθεί ότι η μέθοδος αυτή βελτιώνει τις εκβάσεις των ασθενών. Επιπλέον, οι μελέτες υποστηρίζουν ότι η ελάχιστη χορηγούμενη δόση CRRT θα πρέπει να ισούται με 20 έως 25 mL/kg/ώρα. Για να διασφαλιστεί η χορήγηση της δόσης-στόχου θα πρέπει να συνταγογραφούνται 25 έως 30 mL/kg/ώρα. Η επιλογή αντιπηκτικού στη RRT είναι σημαντική. Η μη κλασματοποιημένη ηπαρίνη έχει βραχύτερο χρόνο ζωής στο φίλτρο από ότι τα κιτρικά που εγχέονται στην αρχή του κυκλώματος. Επιπλέον, έχει αποδειχτεί ότι η χορήγηση κιτρικών στην αρχή του κυκλώματος παρατείνουν τη διάρκεια ζωής των φίλτρων και του κυκλώματος. Η επίτευξη ισοζυγίου υγρών μέσω αφαίρεσης αποτελεί την πιο κοινή ένδειξη της CRRT. Ο ρυθμός της υπερδιήθησης αρχικά θα πρέπει να είναι χαμηλός (π.χ. 25 mL/h) και μπορεί να αυξηθεί ανάλογα με την κατάσταση του ασθενούς. Ο αρχικός βραδύς ρυθμός βελτιώνει την αιμοδυναμική σταθερότητα καθώς δεν ξεπερνά τον ρυθμό αναπλήρωσης πλάσματος.

3. Την πέμπτη μέρα της νοσηλείας του στη ΜΕΘ, ο ασθενής είναι αιμοδυναμικά σταθερός και παράγει διαιτητική ούρα με ρυθμό 30 mL/ώρα, ενώ βελτιώνεται και η ανταλλαγή αερίων του. Υποβάλλεται σε CRRT με ρυθμό αφαίρεσης υγρών 100 mL/ώρα. Ποιο από τα παρακάτω είναι το πιο σωστό;

- α. Με βάση τον ρυθμό παραγωγής ούρων, η νεφρική λειτουργία του ασθενούς πιθανώς αποκαθίσταται.
- β. Ο ασθενής θα πρέπει να συνεχίσει να υποβάλλεται σε CRRT μέχρι η νεφρική του λειτουργία να αποκατασταθεί σε σημαντικό βαθμό και να λάβει εξιτήριο από τη ΜΕΘ.
- γ. Στον ασθενή θα πρέπει να χορηγηθεί φουροσεμίδα για να αυξηθεί η παραγωγή ούρων και να διευκολυνθεί η αποδέσμευση από τη CRRT.
- δ. Θα πρέπει να ελεγχθούν οι βιοδείκτες νέας νεφρικής βλάβης ή αποκατάστασης της νεφρικής λειτουργίας στα ούρα και στο αίμα προκειμένου να ληφθεί η απόφαση για τη βέλτιστη χρονική στιγμή της προσπάθειας αποδέσμευσης από τη CRRT.

Απάντηση: α. Η νεφρική λειτουργία του ασθενούς θα πρέπει να ελέγχεται τακτικά, και η RRT θα πρέπει να διακοπεί αμέσως μόλις διαπιστωθεί ότι δεν είναι πλέον αναγκαία. Υπάρχουν επιστημονικά δεδομένα που υποστηρίζουν ότι συγκεκριμένες παράμετροι είναι προβλεπτικές επιτυχούς διακοπής της CRRT. Οι παράμετροι αυτοί περιλαμβάνουν την αυτόματη παραγωγή ούρων (>500 mL/24ωρο) χωρίς διουρητικά, και την αυξημένη αποβολή κρεατινίνης σε συλλογή ούρων 24ώρου. Δεν έχει αποδειχθεί ότι η χορήγηση φουροσεμίδης διευκολύνει την αποδέσμευση από τη CRRT. Από τα λιγοστά διαθέσιμα επιστημονικά δεδομένα δεν προκύπτει με βεβαιότητα ότι οι βιοδείκτες νέας νεφρικής βλάβης ή αποκατάστασης της νεφρικής λειτουργίας βοηθούν αποτελεσματικά στη λήψη απόφασης για τη βέλτιστη χρονική στιγμή της προσπάθειας αποδέσμευσης από τη CRRT.

ΚΕΦΑΛΑΙΟ 20

Χρήση Κατασταλτικών, Αναλγητικών και Νευρομυϊκών Αποκλειστών

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Ερωτήσεις Ανασκόπησης

1. Ποια από τις παρακάτω παρενέργειες έχει συσχετιστεί με τη δεξμεδετομιδίνη;
- α. Υπερτριγλυκεριδαμία
 - β. Βραδυκαρδία
 - γ. Μεταβολική οξέωση
 - δ. Παρατεταμένη δράση στους ασθενείς με νεφρική ανεπάρκεια.

Απάντηση: β. Η δεξμεδετομιδίνη είναι ένας εκλεκτικός αγωνιστής των α_2 -αδρενεργικών υποδοχέων που προκαλεί μικρή ή μηδενική αναπνευστική καταστολή και έχει συσχετιστεί με χαμηλότερη επίπτωση παραληρήματος συγκριτικά με άλλους παράγοντες. Η συχνότερη παρενέργειά της είναι η βραδυκαρδία, ενώ μπορεί να προκαλέσει και υπόταση. Η προποφόλη διατίθεται με τη μορφή λιπιδικού γαλακτώματος και έχει συσχετιστεί με υπερτριγλυκεριδαμία όταν χορηγείται σε υψηλότερες δόσεις. Τα σκευάσματα λοραζεπάμης περιέχουν γλυκόλες που μπορεί να προκαλέσουν μεταβολική οξέωση, οξεία νεφρική βλάβη και αυξημένο οσμωτικό χάσμα. Η μιδαζολάμη μεταβολίζεται προς δραστικούς μεταβολίτες που συσσωρεύονται στους ασθενείς με επηρεασμένη νεφρική λειτουργία με αποτέλεσμα να παρατείνεται η δράση της.

2. Ποιο από τα παρακάτω οπιοειδή αναλγητικά έχει συσχετιστεί με την ασυνήθιστη παρενέργεια της ακαμψίας του θωρακικού τοιχώματος;
- α. Φαιντανύλη
 - β. Μορφίνη
 - γ. Μεπεριδίνη
 - δ. Υδρομορφόνη

Απάντηση: α. Η φαιντανύλη έχει συσχετιστεί με ακαμψία θωρακικού τοιχώματος-μια ασυνήθιστη παρενέργεια που μπορεί να δυσχεράνει τον αυτόματο αερισμό. Η μορφίνη μπορεί να προκαλέσει υπόταση ή βρογχόσπασμο λόγω απελευθέρωσης ισταμίνης, ενώ μπορεί να σχετίζεται με καθυστερημένη ανάνηψη λόγω συσσωρεύσης δραστικών μεταβολιτών στους ασθενείς με νεφρική δυσλειτουργία. Η μεπεριδίνη μπορεί να προκαλέσει νευροδιεγερτικές παρενέργειες, όπως π.χ. επιληπτικούς σπασμούς, και δεν συνιστάται για χρήση στη ΜΕΘ. Η υδρομορφόνη είναι ένα ισχυρό οπιοειδές αναλγητικό που δεν προκαλεί ακαμψία θωρακικού τοιχώματος.

3. Ποιο από τα παρακάτω ισχύει αναφορικά με την ανταπόκριση στη δοκιμασία τεσσάρων διαδοχικών σύντομων ηλεκτρικών ερεθισμάτων (train-of-four/TOF) στη διάρκεια νευρομυϊκού αποκλεισμού;
- α. Η ανταπόκριση είναι διαφορετική ανάμεσα στους ασθενείς που λαμβάνουν αμινοστεροειδή (π.χ. βεκουρόνιο) και σε εκείνους που λαμβάνουν βενζυλισκοκινολίνη (π.χ. cis-ατρακούριο).
 - β. Η απουσία ανταπόκρισης στη διάρκεια της δοκιμασίας TOF υποδηλώνει υπερδοσολογία νευρομυϊκού αποκλειστή.
 - γ. Η παρουσία 2 μυϊκών συσπάσεων ανά 4 εκφορτίσεις στη διάρκεια της δοκιμασίας TOF υποδηλώνει ότι έχει αποκλειστεί το 75% των υποδοχέων.
 - δ. Η δοκιμασία TOF θα πρέπει να συνδυάζεται με κλινική εκτίμηση.

Απάντηση: δ. Η διέγερση των περιφερικών νεύρων με TOF χρησιμοποιείται για την εκτίμηση του βάθους και της διάρκειας

της παράλυσης που προκαλούν οι νευρομυϊκοί αποκλειστές (neuromuscular blocking agents-NMB) όλων των κατηγοριών οι οποίοι χορηγούνται με συνεχή έγχυση σε μηχανικά αεριζόμενους ασθενείς. Χορηγούνται τέσσερις διαδοχικές σύντομες ηλεκτρικές εκφορτίσεις σε ένα περιφερικό νεύρο (κατά κανόνα το ωλένιο ή το προσωπικό) και παρατηρείται η ανταπόκριση των μυών στους οποίους καταλήγουν τα εν λόγω νεύρα. Η παρουσία 1 μυϊκής σύσπασης ανά 4 εκφορτίσεις υποδηλώνει ότι έχει αποκλειστεί το 75% των υποδοχέων. Η πλήρης απουσία μυϊκών συσπάσεων μπορεί να υποδηλώνει υπερδοσολογία NMB, αλλά ενδέχεται να οφείλεται και σε ανεπαρκή διέγερση του νεύρου λόγω ιστικού οιδήματος ή λανθασμένη τοποθέτηση των δερματικών ηλεκτροδίων. Σε όλα τα περιστατικά η δοκιμασία TOF θα πρέπει να συνδυάζεται με κλινική εκτίμηση, περιλαμβανομένου του ελέγχου των αναπνευστικών και άλλων κινήσεων.

4. Τι αντιπροσωπεύει το C στη δέσμη μέτρων ABCDEF;
- α. Circulatory assessment – Εκτίμηση κυκλοφορικού συστήματος
 - β. Comfort – Άνεση
 - γ. Choice of analgesia and sedation – Επιλογή αναλγησίας και καταστολής
 - δ. Confusion rating scale – Κλίμακα βαθμολόγησης σύγχυσης

Απάντηση: γ. Η δέσμη μέτρων ABCDEF παρέχει ένα περίγραμμα για την αντιμετώπιση του πόνου και του παραληρήματος, τη διαχείριση της καταστολής, του μηχανικού αερισμού και της άσκησης και την εμπλοκή της οικογένειας, ως εξής: A Assess, prevent, and manage pain - Εκτιμήστε, αποτρέψτε και αντιμετωπίστε τον πόνο· B Both spontaneous awakening trials and spontaneous breathing trials - Δοκιμασίες αυτόματης αφύπνισης και δοκιμασίες αυτόματης αναπνοής· C Choice of analgesia and sedation – Επιλογή αναλγησίας και καταστολής· D Delirium: assess, prevent, and manage – Παραληρημα: εκτιμήστε, αποτρέψτε και αντιμετωπίστε· E Early mobility and exercise – Πρώιμη κινητοποίηση και θεραπευτική άσκηση· F Family engagement and empowerment – Εμπλοκή και ενδυνάμωση της οικογένειας.

5. Ποιο από τα παρακάτω ισχύει αναφορικά με το cis-ατρακούριο;
- α. Ο μεταβολισμός του είναι ανεξάρτητος από τη λειτουργία των τελικών οργάνων.
 - β. Έχει συσχετιστεί με υψηλότερη επίπτωση παρατεταμένης υπολειμματικής παράλυσης συγκριτικά με το βεκουρόνιο.
 - γ. Μπορεί να προκαλέσει κλινικά σημαντική απελευθέρωση ισταμίνης.
 - δ. Η δράση του ξεκινά 20 έως 30 sec μετά τη χορήγησή του.

Απάντηση: α. Το cis-ατρακούριο είναι ένα βενζυλισκοκινολίνη που μεταβολίζεται μέσω μιας αντίδρασης που ονομάζεται διάσπαση κατά Hofmann-μια ενζυμική διεργασία που δεν εξαρτάται από τον ηπατικό μεταβολισμό ή τη νεφρική αποβολή. Η δράση του ξεκινά 2 έως 3 min μετά τη χορήγησή του. Σε αντίθεση με μια συναφή του ένωση που ονομάζεται ατρακούριο, το cis-ατρακούριο δεν προκαλεί απελευθέρωση ισταμίνης. Συγκριτικά με το βεκουρόνιο, παρουσιάζει βραχύτερη διάρκεια δράσης και πιο προβλέψιμη αποκατάσταση της νευρομυϊκής λειτουργίας, ιδίως στους ηπατοπαθείς και τους νεφροπαθείς.

ΚΕΦΑΛΑΙΟ 21

Η Επίδραση της Βαριάς Νόσησης στη Φαρμακοκινητική και στη Φαρμακοδυναμική

Βιβλιογραφία

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Ερωτήσεις Ανασκόπησης

1. Ποιο από τα παρακάτω περιγράφει καλύτερα τον όρο επανυξημένη νεφρική κάθαρση (augmented renal clearance-ARC);
- α. Η παρουσία της μπορεί να εξακριβωθεί εύκολα χρησιμοποιώντας τον μαθηματικό τύπο Cockcroft-Gault.
 - β. Δεν αποτελεί σημαντικό πρόβλημα σε έναν 24χρονο τραυματία.
 - γ. Μπορεί να ποσοτικοποιηθεί μετρώντας την κάθαρση κρεατινίνης σε δείγμα ούρων που συλλέγεται για 4 ώρες.
 - δ. Η υψηλή κάθαρση κρεατινίνης επιμένει για αρκετές εβδομάδες.

Απάντηση: γ. Επανυξημένη νεφρική κάθαρση με τιμές που ξεπερνούν την τυπική τιμή των 126 mL/min έχει περιγραφεί σε νέους ασθενείς με υπερδυναμική κυκλοφορία, οι οποίοι νοσηλεύονται για τραύμα, υπαραχνοειδή αιμορραγία ή άλλες κακώσεις/οξείες παθήσεις. Η χρονική πορεία δεν έχει αποσαφηνιστεί πλήρως, αλλά φαίνεται ότι η ARC υποχωρεί εντός 1 εβδομάδας. Συνιστάται ο εντοπισμός των ασθενών, που διατρέχουν κίνδυνο και η μέτρηση της κάθαρσης κρεατινίνης στα ούρα για την ποσοτικοποίηση των μεταβολών.

2. Ποια είναι η καλύτερη στρατηγική για την αύξηση της πιθανότητας επίτευξης στόχου (target attainment) κατά τη χορήγηση ενός αντιμικροβιακού φαρμάκου για την καταπολέμηση ενός πιο ανθεκτικού μικροοργανισμού.
- α. Συνεχής έγχυση κεφεπίμης.
 - β. Συνεχής έγχυση τομπραμυκίνης.
 - γ. Παρατεταμένη έγχυση κεφτριαξόνης διάρκειας 2 ωρών.
 - δ. Αύξηση της δόσης σιπροφλοξασίνης στα 800 mg ανά 12 ώρες.

Απάντηση: α. Σκεπτικό: Για κάθε αντιμικροβιακό φάρμακο υπάρχει ένας συγκεκριμένος θεραπευτικός στόχος όσον αφορά τη συγκέντρωση. Στους χρονοεξαρτώμενους παράγοντες, η συγκέντρωση φαρμάκου πρέπει να είναι μεγαλύτερη από την MIC για ένα συγκεκριμένο χρονικό διάστημα ($T > MIC$) προκειμένου να βελτιστοποιηθεί η αποτελεσματικότητα, αλλά μπορεί να εκδηλωθούν παρενέργειες λόγω υψηλών μέγιστων συγκεντρώσεων. Η σιπροφλοξασίνη σε δόσεις άνω των 600 mg ανά 12 ώρες μπορεί να μη γίνει καλά ανεκτή, και η τομπραμυκίνη θα πρέπει να χορηγείται διαλειπόντως, με μεγάλα μεσοδιαστήματα μεταξύ των δόσεων ώστε να υπάρχει αρκετός χρόνος για να αποβληθεί το φάρμακο και να ελαχιστοποιηθεί ο κίνδυνος νεφρικής βλάβης. Οι μέθοδοι επίτευξης επαρκούς $T > MIC$ περιλαμβάνουν τη συνεχή έγχυση β-λακταμικών αντιβιοτικών, όπως π.χ. η κεφεπίμη ή η παρατεταμένη έγχυση (3 έως 4 ώρες) β-λακταμικών αντιβιοτικών με βραχύ χρόνο ημίσειας ζωής.

3. Ποια είναι η καλύτερη θεραπευτική επιλογή για τη διατήρηση της αντιεπιληπτικής δράσης σε έναν ασθενή με πολυμικροβιακή λοίμωξη που λαμβάνει χρόνια αγωγή με βαλπροϊκό οξύ;
- α. Έναρξη μεροπενέμης και διπλασιασμός της δόσης βαλπροϊκού.
 - β. Έναρξη πιπερακιλλίνης/ταζομπακτάμης χωρίς τροποποίηση της δόσης βαλπροϊκού.
 - γ. Έναρξη κεφεπίμης και μετρονιδαζόλης και διπλασιασμός της δόσης βαλπροϊκού.
 - δ. Έναρξη μεροπενέμης χωρίς τροποποίηση της δόσης βαλπροϊκού.

Απάντηση: β. Οι συγκεντρώσεις βαλπροϊκού μειώνονται δραστικά όταν συγχωρηγείται με μονοβακτάμες. Η αύξηση της δόσης βαλπροϊκού δεν είναι αποτελεσματική για να αντισταθμιστεί αυτή η αλληλεπίδραση. Σε περίπτωση που η συγχωρήγηση των δυο αυτών φαρμάκων είναι αναπόφευκτη, ο ιατρός θα πρέπει να προσθέσει άλλο ένα αντιεπιληπτικό φάρμακο.

4. Μετά από γενναιόδωρη αναπλήρωση υγρών σε έναν ασθενή με σηπτική καταπληξία, ποια τροποποίηση δόσης χρειάζεται σε μια υδρόφιλη κεφαλοσπορίνη;
- α. Χορήγηση του αντιβιοτικού με συνεχή έγχυση.
 - β. Χορήγηση του αντιβιοτικού σε δόσεις bolus.
 - γ. Χορήγηση μιας δόσης φόρτισης ακολουθούμενης από παρατεταμένη έγχυση.
 - δ. Χορήγηση με διαλείπουσες εγχύσεις διάρκειας 1 ώρας.

Απάντηση: γ. Η αύξηση του ολικού ύδατος του σώματος λόγω αναπλήρωσης υγρών θα οδηγήσει σε μείωση της συγκέντρωσης των υδατοδιαλυτών φαρμάκων, και με την πάροδο του χρόνου θα παρατείνει τον χρόνο ημίσειας ζωής τους. Η δόση φόρτισης θα επιτύχει την επιθυμητή συγκέντρωση του υδρόφιλου φαρμάκου και η παρατεταμένη έγχυσή του θα διευκολύνει την επίτευξη του στόχου. Η συνεχής έγχυση θα μπορούσε να γίνει αποδεκτή, αλλά το ιδανικό θα ήταν να είχε προηγηθεί μια δόση φόρτισης. Η ταχεία έγχυση β-λακταμικών αντιβιοτικών δυσχεραίνει την επίτευξη του $T > MIC$.

5. Ποια μέθοδος είναι καλύτερη για την καταστολή ενός ασθενούς στον οποίο έχει εφαρμοστεί θεραπευτική υποθερμία (32°C - 34°C) για 24 ώρες;
- α. Έγχυση προποφόλης γιατί το φάρμακο αυτό δεν συσσωρεύεται στον οργανισμό στη διάρκεια της υποθερμίας.
 - β. Έγχυση μιδαζολάμης σε μειωμένη δόση για να αποτραπεί η συσσώρευσή της.
 - γ. Δεν απαιτείται φαρμακευτική καταστολή γιατί η λειτουργία του κεντρικού νευρικού συστήματος έχει ήδη κατασταλεί λόγω της υποθερμίας.
 - δ. Έγχυση μιδαζολάμης στην καθιερωμένη δόση επειδή η συσσώρευση δεν αποτελεί πρόβλημα.

Απάντηση: δ. Η φαρμακοκινητική των ηπατικά μεταβολιζόμενων φαρμάκων, όπως π.χ. η μιδαζολάμη, επηρεάζεται στη διάρκεια μέτριας υποθερμίας ($< 35^{\circ}\text{C}$). Ο ηπατικός μεταβολισμός επιβραδύνεται σημαντικά, και παρόλο που ένα φάρμακο όπως η μιδαζολάμη συσσωρεύεται στον οργανισμό στη διάρκεια σύντομων περιόδων υποθερμίας, οι συγκεντρώσεις πλάσματος μειώνονται μετά την αναθέρμανση ελαχιστοποιώντας τον κλινικό αντίκτυπο. Η προποφόλη χρησιμοποιείται για καταστολή αλλά μπορεί να προκαλέσει παρενέργειες, όπως π.χ. βραδυκαρδία. Παρόλο που δεν είναι βέβαιο ότι η θεραπευτική υποθερμία καθιστά αναγκαία τη χορήγηση καταστολής, η τελευταία συνιστάται για λόγους άνεσης του ασθενούς.

ΚΕΦΑΛΑΙΟ 22

Κυκλοφορική Καταπληξία: Ταξινόμηση, Παθοφυσιολογία και Θεραπευτική Προσέγγιση

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Ερωτήσεις Ανασκόπησης

1. Μια 33χρονη εισάγεται στη ΜΕΘ λόγω δύσπνοιας και οξείας ηπατικής δυσπραγίας. Τα συμπτώματά της (βήχας και πυρετός) εμφανίστηκαν πριν από 2 εβδομάδες μετά από μια λοίμωξη αναπνευστικού. Στη συνέχεια παρουσίασε προιούσα καταβολή, αδυναμία και δύσπνοια. Η αποσταθεροποίηση της συνεχίστηκε μετά την εισαγωγή της στη ΜΕΘ με επιδεινούμενη δύσπνοια και υποξαιμία που κατέστησαν αναγκαία την ενδοτραχειακή διασωλήνωση. Παρουσίασε υπόταση και ολιγουρία παρά τα επαναλαμβανόμενα bolus υγρών. Το ΗΚΓ ανέδειξε φλεβοκομβική ταχυκαρδία με μη ειδικές αλλοιώσεις του διαστήματος ST. Τα επίπεδα των τρανσαμινασών ήταν αυξημένα (ασπαρτική αμινοτρανσφεράση 689 U/L και αλανινική αμινοτρανσφεράση 580 U/L). Διενεργήθηκε καθετηριασμός πνευμονικής αρτηρίας: πίεση δεξιού κόλπου 43/26 mm Hg, πίεση ενσφύνωσης πνευμονικών τριχοειδών 22 mm Hg, καρδιακός δείκτης 1,3 L/min/m² και συστηματικές αγγειακές αντιστάσεις 1250 dyne/sec/cm⁵. Ποια είναι η πιο πιθανή διάγνωση;

- α. Πνευμονική εμβολή
- β. Σηπτική καταπληξία
- γ. Οξύ έμφραγμα μυοκαρδίου
- δ. Οξεία μυοκαρδίτιδα
- ε. Αναφυλακτική καταπληξία

Απάντηση: δ. Η ασθενής αυτή προσεβλήθη από μια ιογενή λοίμωξη που εξελίχθηκε σε οξεία ιογενή μυοκαρδίτιδα με καρδιογενή καταπληξία. Η ήπια τρανσαμινασαιμία οφείλεται στο σύνδρομο χαμηλής καρδιακής παροχής. Στα περιστατικά πνευμονικής εμβολής, ο καθετήρας πνευμονικής αρτηρίας αναδεικνύει μειωμένη καρδιακή παροχή/καρδιακό δείκτη, αυξημένη πίεση δεξιού κόλπου και αυξημένη διαφορά ανάμεσα στη διαστολική πίεση πνευμονικής αρτηρίας και την πίεση ενσφύνωσης πνευμονικών τριχοειδών (κατά κανόνα > 10 mm Hg). Σε περίπτωση καταπληξίας λόγω πνευμονικής εμβολής, η πίεση ενσφύνωσης πνευμονικών τριχοειδών θα είναι μειωμένη λόγω επηρεασμένης πλήρωσης της αριστερής κοιλίας. Η αναφυλακτική και η σηπτική καταπληξία είναι τύποι καταπληξίας ανακατανομής. Σε αυτούς τους «υπερδυναμικούς» τύπους καταπληξίας η καρδιακή παροχή και ο καρδιακός δείκτης είναι κατά κανόνα αυξημένα. Η κεντρική φλεβική πίεση και η πίεση ενσφύνωσης πνευμονικών τριχοειδών είναι συνήθως μειωμένες λόγω τριχοειδικής διαρροής που προκαλεί απώλεια ενδαγγειακού όγκου, και λόγω αγγειοδιαστολής των αρτηριδίων που προκαλεί μείωση των συστηματικών αγγειακών αντιστάσεων. Η υποογκαιμική καταπληξία συνήθως χαρακτηρίζεται μειωμένο καρδιακό δείκτη, μειωμένη κεντρική φλεβική πίεση, μειωμένη πίεση ενσφύνωσης πνευμονικών τριχοειδών και πολύ υψηλές συστηματικές αγγειακές αντιστάσεις. Η καρδιογενής καταπληξία συνήθως χαρακτηρίζεται από μειωμένη καρδιακή παροχή/καρδιακό δείκτη, αυξημένη κεντρική φλεβική πίεση και πίεση ενσφύνωσης πνευμονικών τριχοειδών και αυξημένες συστηματικές αγγειακές αντιστάσεις, όπως συμβαίνει στον συγκεκριμένο ασθενή. Όμως, στο εν λόγω περιστατικό δεν υπάρχει ανάσπαση του διαστήματος ST ή κύμα Q που να υποδηλώνουν έμφραγμα μυοκαρδίου.

2. Ποιο από τα παρακάτω αντιπροσωπεύει την κατανάλωση O₂; (CaO₂, Περικτικότητα αρτηριακού αίματος σε O₂, CnO₂, περικτικότητα μικτού φλεβικού αίματος σε O₂, Hb, συγκέντρωση αιμοσφαιρίνης, Q, καρδιακή παροχή, SaO₂, κορεσμός αρτηριακού αίματος σε O₂, SvO₂, κορεσμός μικτού φλεβικού αίματος σε O₂)

- α. $Q \times \text{CaO}_2$
- β. $\text{SaO}_2 - \text{SvO}_2/\text{SvO}_2$
- γ. $Q \times (\text{SaO}_2 - \text{SvO}_2)$
- δ. $(1.34 \times \text{Hb} \times \text{SaO}_2) + (0.0031 \times \text{PaO}_2)$

Απάντηση: γ. Με τον μαθηματικό τύπο της επιλογής α υπολογίζεται η προσφορά O₂. Με τον μαθηματικό τύπο της επιλογής β υπολογίζεται ο δείκτης απόληξης O₂, που υπό φυσιολογικές συνθήκες ισούται

με 20-25%. Με τον μαθηματικό τύπο της επιλογής δ υπολογίζεται η περιεκτικότητα αρτηριακού αίματος σε O₂.

3. Ταίριαζτε κάθε ένα από τα παρακάτω κλινικά σενάρια με την καλύτερη επιλογή αγγειοδραστικού φαρμάκου (α. έως δ.).

Σενάριο 1: Ένας 58χρονος με ατομικό αναμνηστικό υπέρτασης και διαβήτη εισάγεται στη ΜΕΘ μετά από επιτυχή αγγειοπλαστική στεφανιαίων αρτηριών με εμφύτευση stent λόγω πρόσφατου εμφράγματος μυοκαρδίου. Ο καρδιακός του δείκτης είναι πολύ χαμηλός (1,5 L/min/m²). Η αρτηριακή του πίεση ισούται με 120/70 mm Hg και η καρδιακή του συχνότητα με 115 bpm.

Σενάριο 2: Μια 24χρονη με ελεύθερο ατομικό αναμνηστικό προσέρχεται με σηπτική καταπληξία και παραμένει υποτασική παρά τις ικανοποιητικές πιέσεις πλήρωσης και την υψηλό ρυθμό έγχυσης ντοπαμίνης.

Σενάριο 3: Ένας 67χρονος προσέρχεται σε κατάσταση καταπληξίας μετά από τροχαίο ατύχημα στο οποίο υπέστη συμπίεση του νωτιαίου μυελού στο επίπεδο του 4ου και 5ου αυχενικού σπονδύλου.

- α. Ντοπαμίνη
- β. Νορεπινεφρίνη
- γ. Μιλρινόνη
- δ. Φαινυλεφρίνη

Απάντηση: Σενάριο 1: γ. Σενάριο 2: β. Σενάριο 3: δ. Η ντοπαμίνη διεγείρει τους ντοπαμινεργικούς, τους β-αδρενεργικούς και τους α-αδρενεργικούς υποδοχείς. Σε χαμηλές δόσεις, η διέγερση των υποδοχέων ντοπαμίνης βοηθά στη βελτίωση της νεφρικής άρδευσης. Σε μέτριες δόσεις (5-10 μg/kg/min), η διέγερση των β1-αδρενεργικών υποδοχέων οδηγεί σε αύξηση της καρδιακής παροχής. Σε υψηλές δόσεις (10-20 μg/kg/min) η διέγερση των α-αδρενεργικών υποδοχέων προκαλεί περιφερική αγγειοσύσπαση. Η διέγερση των β1-αδρενεργικών υποδοχέων από τη ντοπαμίνη μπορεί να προκαλέσει έντονη ταχυκαρδία. Για τον λόγο αυτόν η νορεπινεφρίνη, που διεγείρει κυρίως τους α-αδρενεργικούς υποδοχείς και λιγότερο τους β-αδρενεργικούς υποδοχείς, μπορεί να αυξήσει την αρτηριακή πίεση χωρίς να ασκήσει τη χρονότροπη δράση της ντοπαμίνης. Η φαινυλεφρίνη που διεγείρει αποκλειστικά τους α-αδρενεργικούς υποδοχείς, μπορεί να χρησιμοποιηθεί ως αγγειοσυσπαστικό για το φλεβικό και το αρτηριακό σκέλος της κυκλοφορίας σε αμιγώς αγγειοδιασταλτικές καταστάσεις, όπως π.χ. η νευρογενής και η αναφυλακτική καταπληξία. Η μιλρινόνη αναστέλλει τη διάσπαση της κυκλικής μονοφωσφορικής αδενοσίνης (cAMP). Αυξάνει τη μυοκαρδιακή συσταλτικότητα και προκαλεί περιφερική και πνευμονική αγγειοδιαστολή. Όπως με τη δοβουταμίνη, η επαγόμενη από τη μιλρινόνη αγγειοδιαστολή μπορεί να προκαλέσει υπόταση. Για τον λόγο αυτόν, η μιλρινόνη θα πρέπει να χρησιμοποιείται με προσοχή στους ασθενείς με οριακή αρτηριακή πίεση.

Το πρώτο σενάριο αφορά έναν ασθενή με σύνδρομο χαμηλής καρδιακής παροχής και φυσιολογική αρτηριακή πίεση, οπότε η μιλρινόνη θα αποτελούσε σωστή επιλογή επειδή η ντοπαμίνη θα μπορούσε να επιδεινώσει την ταχυκαρδία. Στο δεύτερο σενάριο, η καλύτερη επιλογή θα ήταν η νορεπινεφρίνη προκειμένου να αυξηθεί η αρτηριακή πίεση. Το τρίτο σενάριο αφορά έναν ασθενή με «νωτιαία καταπληξία», οπότε η καλύτερη επιλογή θα ήταν ένα αμιγώς αγγειοσυσπαστικό φάρμακο (φαινυλεφρίνη).

4. Ποιο από τα παρακάτω είναι το πιο σωστό αναφορικά με την επεμβατική αιμοδυναμική παρακολούθηση;

- α. Πολλές μελέτες έχουν καταδείξει ότι η τοποθέτηση καθετήρα πνευμονικής αρτηρίας μειώνει τη θνητότητα.
- β. Οι μετρήσεις της αρτηριακής πίεσης με το χειροκίνητο σφυγμομανόμετρο και το ηλεκτρονικό πιεσόμετρο είναι σχετικά ακριβείς σε καταστάσεις καταπληξίας.
- γ. Η κεντρική φλεβική πίεση αντικατοπτρίζει με ακρίβεια το

προφορτίο της αριστερής κοιλίας στους βαρέως πάσχοντες.
δ. Το γαλακτικό οξύ αυξάνεται όταν ο SvO_2 μειωθεί σε επίπεδα $< 30\%$ έως 40% .

Απάντηση: δ. Η επεμβατική αιμοδυναμική παρακολούθηση προσφέρει στον ιατρό μεγάλο όγκο χρήσιμων πληροφοριών. Στους ασθενείς με καταπληξία θα πρέπει να τοποθετείται αρτηριακός καθετήρας για τη μέτρηση της αρτηριακής πίεσης. Οι μετρήσεις της αρτηριακής πίεσης με χειροκίνητο σφυγμομανόμετρο ή αυτόματες μη επεμβατικές ταλαντωσιμετρικές τεχνικές μπορεί να μην είναι ακριβείς στη διάρκεια καταπληξίας λόγω έντονης περιφερικής αγγειοσύσπασης. Η κεντρική φλεβική πίεση μπορεί να χρησιμοποιηθεί για την εκτίμηση της ογκαιμικής κατάστασης. Η πολύ χαμηλή κεντρική φλεβική πίεση υποδηλώνει υποογκαιμία, αλλά η υψηλή ή η φυσιολογική κεντρική φλεβική πίεση δεν υποδηλώνει κατ' ανάγκη ικανοποιητική καρδιακή πλήρωση, επειδή η τιμή της κεντρικής φλεβικής πίεσης μπορεί να επηρεαστεί από την ενδοθωρακική πίεση ή την παρουσία βαλβιδοπάθειας. Ο καθετήρας

πνευμονικής αρτηρίας παρέχει πληροφορίες για το προφορτίο της αριστερής κοιλίας (πίεση ενσφήνωσης πνευμονικών τριχοειδών) και παρέχει τη δυνατότητα μέτρησης της καρδιακής παροχής μέσω θερμοαραίωσης. Τα δεδομένα που συλλέγονται από τον καθετήρα πνευμονικής αρτηρίας μπορούν να χρησιμοποιηθούν για τη διαφοροδιάγνωση του τύπου της καταπληξίας ή για την καθοδήγηση της θεραπείας. Ωστόσο, η χρήση καθετήρα πνευμονικής αρτηρίας δεν έχει συσχετιστεί σε καμία μελέτη με βελτίωση της κλινικής έκβασης. Μπορεί να διενεργηθεί δειγματοληψία αίματος από την πνευμονική αρτηρία προκειμένου να μετρηθεί ο SvO_2 , που χρησιμεύει στην εκτίμηση της εξάρτησης της κατανάλωσης O_2 από την προσφορά O_2 . Μια τιμή SvO_2 της τάξης του 65% έως 75% σημαίνει ότι η συνολική προσφορά O_2 επαρκεί για να ικανοποιηθούν οι μεταβολικές ανάγκες του οργανισμού. Το γαλακτικό οξύ αυξάνεται πάντα όταν ο SvO_2 μειωθεί σε επίπεδα $< 30\%$ έως 40% . Όμως, τα επίπεδα γαλακτικού μπορεί να αυξηθούν και επί υψηλότερων τιμών SvO_2 στους ασθενείς με περιοχική και όχι συνολική υποαιμάτωση.

ΚΕΦΑΛΑΙΟ 23

Καρδιογενής Καταπληξία

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Ερωτήσεις Ανασκόπησης

1. Ποιο από τα παρακάτω αντιστοιχεί σε κατηγορία IV κατά Killip;
- α. Τρίτος καρδιακός τόνος (S_3) ή/και τρίζοντες στις βάσεις άμφω.
 - β. Πνευμονικό οίδημα (τρίζοντες σε όλη την έκταση των πνευμονικών πεδίων άμφω).
 - γ. Καθαρά πνευμονικά πεδία με υπόταση.
 - δ. Πνευμονικό οίδημα με υπόταση.

Απάντηση: δ. Η ταξινόμηση κατά Killip περιγράφει την πρόγνωση μετά από έμφραγμα μυοκαρδίου. Η καρδιογενής καταπληξία που ορίζεται ως πνευμονικό οίδημα σε συνδυασμό με υπόταση και υποαιμάτωση αντιστοιχεί στην κατηγορία IV που έχει συσχετιστεί με την υψηλότερη θνητότητα.

2. Ποιο από τα παρακάτω αποτελεί αντένδειξη χορήγησης β-αποκλειστών στους ασθενείς με οξύ έμφραγμα μυοκαρδίου;
- α. Κλάσμα εξώθησης 40%.
 - β. Καρδιακή συχνότητα > 60 bpm.
 - γ. Αρτηριακή πίεση > 100/60 mm Hg.
 - δ. Πνευμονικό οίδημα και καρδιακή συχνότητα > 110 bpm.
 - ε. Κανένα από τα παραπάνω δεν αποτελεί αντένδειξη χορήγησης β-αποκλειστών.

Απάντηση: δ. Στους ασθενείς με έμφραγμα μυοκαρδίου και πνευμονικό οίδημα, οι β-αποκλειστές μπορεί να επιδεινώσουν την καρδιακή ανεπάρκεια και να προκαλέσουν υπόταση ή ακόμα και καρδιογενή καταπληξία. Η χρήση τους θα πρέπει να αναβάλλεται μέχρι να σταθεροποιηθεί ο ασθενής. Η απλή συστολική δυσλειτουργία δεν αποτελεί αντένδειξη, ούτε οι συγκεκριμένες τιμές καρδιακής συχνότητας και αρτηριακής πίεσης. Μόλις η οξεία καρδιακή ανεπάρκεια αντιμετωπιστεί επιτυχώς, θα πρέπει να γίνει προσπάθεια έναρξης β-αποκλειστή.

3. Ποιο από τα παρακάτω αποτελεί το χαρακτηριστικό εύρημα της ρήξης μεσοκοιλιακού διαφράγματος στον καθετηριασμό δεξιών κοιλοτήτων;

- α. Μεγάλα κύματα ν στην κυματομορφή του δεξιού κόλπου.
- β. Αύξηση και εξίσωση των διαστολικών πιέσεων σε όλες τις καρδιακές κοιλοότητες.
- γ. Αύξηση των πιέσεων των δεξιών κοιλοτήτων και μείωση των πιέσεων των αριστερών κοιλοτήτων κατά την εισπνοή.
- δ. Απότομη αύξηση του κορεσμού της αιμοσφαιρίνης σε O_2 κατά την προώθηση του καθετήρα από τον δεξιό κόλπο στην πνευμονική αρτηρία.

Απάντηση: δ. Το χαρακτηριστικό εύρημα αυτής της κατάστασης είναι η αριστεροδεξιά ενδοκαρδιακή διαφυγή (που διαπιστώνεται από την απότομη αύξηση του κορεσμού της αιμοσφαιρίνης σε O_2 κατά τον καθετηριασμό των δεξιών κοιλοτήτων). Τα μεγάλα κύματα ν υποδηλώνουν ανεπάρκεια τριγλώχινας. Η αύξηση και η εξίσωση των διαστολικών πιέσεων σε όλες τις καρδιακές κοιλοότητες υποδηλώνει επιπωματισμό που μπορεί να εμφανιστεί μετά από ρήξη ελευθέρου τοιχώματος της αριστερής κοιλίας. Η αύξηση των πιέσεων των δεξιών κοιλοτήτων και η μείωση των πιέσεων των αριστερών κοιλοτήτων κατά την εισπνοή (σημείο Kussmaul) παρατηρείται στον επιπωματισμό και τη συμπιεστική περικαρδίτιδα.

ΚΕΦΑΛΑΙΟ 24

Σοβαρή Σήψη και Σηπτική Καταπληξία

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Ερωτήσεις Ανασκόπησης

Για τις ερωτήσεις 1 έως 5 χρησιμοποιήστε το παρακάτω κλινικό σενάριο:

Ένας 72χρονος μεταφέρεται στη ΜΕΘ από την παθολογική κλινική λόγω υπότασης (80/40 mm Hg) και πιθανολογούμενης σοβαρής σήψης. Είχε εισαχθεί στην παθολογική κλινική πριν από 12 ώρες για πολυλοβώδη πνευμονία χωρίς σημαντική υποξαιμία. Η κατάσταση του επιδεινώθηκε σταδιακά παρά τη χορήγηση αντιβιοτικών ευρέος φάσματος. Πλέον παρουσιάζει πυρετό, ταχυκαρδία και ταχύπνοια. Ο κορεσμός σε O_2 μέσω παλμικής οξυμετρίας (SpO_2) ισούται με 88% υπό οξυγονοθεραπεία υψηλής ροής με μάσκα προσώπου. Η φυσική εξέταση αναδεικνύει σύγχυση, αισθητά αυξημένο αναπνευστικό έργο και τραχύτητα αναπνευστικού ψιθυρίσματος. Εκτός από σοβαρή μεταβολική οξέωση, ο αιματολογικός έλεγχος αποκαλύπτει τα εξής: αριθμός λευκοκυττάρων (WBC) 32.000/mm³ με 47% ώρες μορφές, αριθμός αιμοπεταλίων (PLT) 105.000/mm³, αιμοσφαιρίνη 10,8 g/dL. Χορηγούνται ταχύως 2 L φυσιολογικού ορού 0,9% μέσω περιφερικού φλεβοκαθετήρα και η αρτηριακή πίεση βελτιώνεται ελαφρώς. Λόγω επικείμενης αναπνευστικής ανεπάρκειας, διενεργείται ενδοτραχειακή διασωλήνωση και εφαρμόζεται μηχανικός αερισμός. Τοποθετείται καθετήρας πνευμονικής αρτηρίας από τον οποίον συλλέγονται τα παρακάτω δεδομένα:

Αρτηριακή πίεση (mm Hg)	90/45
Μέση αρτηριακή πίεση (ΜΑΠ) (mm Hg)	60
Καρδιακή συχνότητα (bpm)	105
Κεντρική φλεβική πίεση (mm Hg)	10
Πίεση πνευμονικής αρτηρίας (mm Hg)	30/18
Πίεση ενσφήνωσης πνευμονικών τριχοειδών (mm Hg)	16
Καρδιακός δείκτης (L/min/m ²)	2,1

Χρησιμοποιήστε αυτό το κλινικό σενάριο για να απαντήσετε τις επόμενες πέντε ερωτήσεις που αφορούν τη χορήγηση αγγειοδραστικών φαρμάκων. Θα σας δοθούν πέντε σύνολα αιμοδυναμικών παραμέτρων. Ταιριάζτε κάθε σύνολο αιμοδυναμικών παραμέτρων με το αντίστοιχο αγγειοδραστικό φάρμακο που έχει χορηγηθεί στον συγκεκριμένο ασθενή.

- Νορεπινεφρίνη.
- Ντοπαμίνη με ρυθμό έγχυσης 6 μg/kg/min.
- Ντοπαμίνη με ρυθμό έγχυσης 25 μg/kg/min.
- Δοβουταμίνη.
- Φαινyleφρίνη.

Ερώτηση 1. Αιμοδυναμικές παράμετροι.

Αρτηριακή πίεση (mm Hg)	90/45
Μέση αρτηριακή πίεση (ΜΑΠ) (mm Hg)	60
Καρδιακή συχνότητα (bpm)	115
Κεντρική φλεβική πίεση (mm Hg)	8
Πίεση πνευμονικής αρτηρίας (mm Hg)	25/15
Πίεση ενσφήνωσης πνευμονικών τριχοειδών (mm Hg)	12
Καρδιακός δείκτης (L/min/m ²)	3,3

Ερώτηση 2. Αιμοδυναμικές παράμετροι.

Αρτηριακή πίεση (mm Hg)	110/60
Μέση αρτηριακή πίεση (ΜΑΠ) (mm Hg)	77
Καρδιακή συχνότητα (bpm)	90
Κεντρική φλεβική πίεση (mm Hg)	10
Πίεση πνευμονικής αρτηρίας (mm Hg)	30/18
Πίεση ενσφήνωσης πνευμονικών τριχοειδών (mm Hg)	16
Καρδιακός δείκτης (L/min/m ²)	1,9

Ερώτηση 3. Αιμοδυναμικές παράμετροι.

Αρτηριακή πίεση (mm Hg)	99/55
Μέση αρτηριακή πίεση (ΜΑΠ) (mm Hg)	70
Καρδιακή συχνότητα (bpm)	115
Κεντρική φλεβική πίεση (mm Hg)	10
Πίεση πνευμονικής αρτηρίας (mm Hg)	30/18
Πίεση ενσφήνωσης πνευμονικών τριχοειδών (mm Hg)	16
Καρδιακός δείκτης (L/min/m ²)	3,1

Ερώτηση 4. Αιμοδυναμικές παράμετροι.

Αρτηριακή πίεση (mm Hg)	118/65
Μέση αρτηριακή πίεση (ΜΑΠ) (mm Hg)	80
Καρδιακή συχνότητα (bpm)	120
Κεντρική φλεβική πίεση (mm Hg)	10
Πίεση πνευμονικής αρτηρίας (mm Hg)	30/15
Πίεση ενσφήνωσης πνευμονικών τριχοειδών (mm Hg)	16
Καρδιακός δείκτης (L/min/m ²)	3,1

Ερώτηση 5. Αιμοδυναμικές παράμετροι.

Αρτηριακή πίεση (mm Hg)	118/65
Μέση αρτηριακή πίεση (ΜΑΠ) (mm Hg)	80
Καρδιακή συχνότητα (bpm)	95
Κεντρική φλεβική πίεση (mm Hg)	10
Πίεση πνευμονικής αρτηρίας (mm Hg)	30/18
Πίεση ενσφήνωσης πνευμονικών τριχοειδών (mm Hg)	16
Καρδιακός δείκτης (L/min/m ²)	2,4

Απαντήσεις

1. δ. Η δοβουταμίνη διεγείρει κυρίως τους β_1 -αδρενεργικούς υποδοχείς, με αποτέλεσμα να ασκεί θετική ινότροπη και χρονότροπη δράση και να αυξάνει την καρδιακή παροχή. Επίσης, η δοβουταμίνη διεγείρει σε μικρό βαθμό τους α_1 και τους β_2 -αδρενεργικούς υποδοχείς, προκαλώντας γενικευμένη αγγειοδιαστολή και μείωση των συστηματικών αγγειακών αντιστάσεων (SVR). Ο συνδυασμός της αυξημένης καρδιακής παροχής και των μειωμένων SVR μπορεί να οδηγήσει σε μικρή μείωση της αρτηριακής πίεσης. Η δοβουταμίνη συνιστάται στους ασθενείς με καρδιογενή καταπληξία και ανθεκτική καρδιακή ανεπάρκεια. Να θυμάστε ότι η δοβουταμίνη ως μονοθεραπεία σε αυτόν τον ασθενή, χωρίς τη συγχρήγηση ενός παράγοντα υποστήριξης της αρτηριακής πίεσης, μπορεί να οδηγήσει σε επιδεινούμενη υπόταση.
2. ε. Η φαινyleφρίνη, ένας εκλεκτικός αγωνιστής των α_1 -αδρενεργικών υποδοχέων που ασκεί αμιγώς αγγειοσυσπαστική δράση. Η χρονότροπη και η ινότροπη δράση της είναι αμελητέες και η αύξηση που προκαλεί στη ΜΑΠ οφείλεται σχεδόν αποκλειστικά στην αύξηση των SVR. Αυτό μπορεί να οδηγήσει σε αντανakλαστική βραδυκαρδία. Σε γενικές γραμμές, η φαινyleφρίνη αυξάνει τις SVR, ενώ παράλληλα επηρεάζει ελάχιστα ή καθόλου την καρδιακή παροχή. Προσέξτε ότι η χορήγηση φαινyleφρίνης σε αυτόν τον ασθενή μείωσε τον ήδη χαμηλό καρδιακό δείκτη λόγω αύξησης του μεταφορτίου.
3. β. Οι δράσεις της ντοπαμίνης είναι δόσοεξαρτώμενες. Στις χαμηλότερες δόσεις (1-5 μg/kg/min), η ντοπαμίνη διεγείρει τους D_1 -ντοπαμινεργικούς υποδοχείς της σπλαχνικής αγγειακής κοίτης προκαλώντας εκλεκτική αγγειοδιαστολή και αύξηση της παραγωγής ούρων. Σε δόσεις 5-10 μg/kg/min, η ντοπαμίνη

- διεγείρει τους β₁-αδρενεργικούς υποδοχείς, με αποτέλεσμα να αυξάνεται η καρδιακή συχνότητα και ο όγκος παλμού, γεγονός που τελικά οδηγεί σε αύξηση της καρδιακής παροχής και μικρή αύξηση της συστολικής αρτηριακής πίεσης.
4. γ. Σε υψηλότερες δόσεις (>10 μg/kg/min), η ντοπαμίνη διεγείρει κυρίως τους α-αδρενεργικούς υποδοχείς, προκαλώντας γενηκευμένη αγγειοσυσπασση και αύξηση των SVR καθώς και αύξηση της καρδιακής παροχής και της συστολικής αρτηριακής πίεσης λόγω διέγερσης των β-αδρενεργικών υποδοχέων. Σε υψηλότερες δόσεις, η ντοπαμίνη μπορεί να χρησιμοποιηθεί ως ισχυρό αγγειοσυσπαστικό.
5. α. Η νορεπινεφρίνη διεγείρει τους α₁ και τους β₁-αδρενεργικούς υποδοχείς προκαλώντας έντονη αγγειοσυσπασση και μικρή αύξηση της καρδιακής παροχής. Η νορεπινεφρίνη χρησιμοποιείται συχνά στους ασθενείς με σήψη με στόχο την επίτευξη της επιθυμητής ΜΑΠ. Η αναμενόμενη αύξηση της καρδιακής παροχής είναι πολύ μικρότερη από εκείνη που επιτυγχάνει η ντοπαμίνη, οπότε ενδέχεται να χρειαστεί και ένας επιπλέον παράγοντας για ινότροπη υποστήριξη στους ασθενείς με πτωχή μυοκαρδιακή συσταλτικότητα.
6. Ποιο από τα παρακάτω είναι το πιο σωστό αναφορικά με τη χρήση κορτικοστεροειδών στους ασθενείς με σηπτική καταπληξία;
- α. Τα κορτικοστεροειδή αντενδείκνυνται στους ασθενείς με σηπτική καταπληξία.
- β. Στους ασθενείς με σηπτική καταπληξία θα πρέπει να χορηγούνται 100 mg υδροκορτιζόνης ανά 8 ώρες
- γ. Στους ασθενείς που παραμένουν αιμοδυναμικά ασταθείς παρά την επιθετική χορήγηση υγρών και αγγειοσυσπαστικών θα πρέπει να εξετάζεται το ενδεχόμενο χορήγησης κορτικοστεροειδών.
- δ. Κορτικοστεροειδή θα πρέπει να χορηγούνται μόνο στους ασθενείς που δεν ανταποκρίνονται στη δοκιμασία διέγερσης με ACTH.

Απάντηση: γ. Η χορήγηση κορτικοστεροειδών στους ασθενείς με σηπτική καταπληξία αποτελεί αντικείμενο αντιπαράθεσης που συντηρείται για μεγάλο χρονικό διάστημα. Αρχικά, χρησιμοποιήθηκαν στεροειδή σε υψηλές δόσεις για σύντομο χρονικό διάστημα σε μια προσπάθεια να κατασταλεί η προφλεγμονώδης αντίδραση της σήψης. Η πρακτική αυτή απέβη αναποτελεσματική και εγκαταλείφθηκε στα τέλη της δεκαετίας του 1980. Αργότερα, διατυπώθηκε η θεωρία της «σχετικής επινεφριδιακής ανεπάρκειας» στη σηπτική καταπληξία, με αποτέλεσμα να αναζωπυρωθεί το ενδιαφέρον για τη χρήση των κορτικοστεροειδών στη σηπτική καταπληξία. Επίσης, σε μικρές μελέτες και σε μια τυχαιοποιημένη μελέτη, η χορήγηση υδροκορτιζόνης σε μη ανταποκρινόμενους στη δοκιμασία διέγερσης με ACTH συσχετίστηκε με μειωμένη θνητότητα. Εντούτοις, η μελέτη CORTICUS δεν κατάφερε να καταδείξει όφελος από τη χρήση υδροκορτιζόνης σε ασθενείς με σηπτική καταπληξία. Οι κατευθυντήριες οδηγίες που δημοσίευσε η Surviving Sepsis Campaign το 2016 αποθαρρύνουν την ενδοφλέβια χορήγηση υδροκορτιζόνης στους ασθενείς με σηπτική καταπληξία, όταν η αρτηριακή τους πίεση ανταποκρίνεται στη χορήγηση υγρών και αγγειοσυσπαστικών. Όμως, στους ασθενείς που δεν ανταποκρίνονται στην επιθετική χορήγηση υγρών και αγγειοσυσπαστικών θα πρέπει να εξετάζεται το ενδεχόμενο χορήγησης στεροειδών: 200-300 mg υδροκορτιζόνης ημερησίως σε διαιρεμένες δόσεις (50 mg ενδοφλεβίως ανά 6 ώρες ή 100 mg ανά 8 ώρες) για 7 ημέρες ή μέχρι την ανάταξη της καταπληξίας, ως συμπληρωματικής αγωγής για τη ρύθμιση της ανταπόκρισης του καρδιαγγειακού συστήματος στην καταπληξία. Η μελέτη ADRENAL, που δημοσιεύτηκε το 2018, τυχαιοποίησε 3800 ασθενείς με σηπτική καταπληξία στο προαναφερόμενο σχήμα υδροκορτιζόνης ή εικονικό φάρμακο. Η υδροκορτιζόνη συσχετίστηκε με ταχύτερη ανάταξη της καταπληξίας χωρίς, όμως, να βελτιώσει θνητότητα στις 28 και 90 ημέρες. Επίσης, στην ομάδα της υδροκορτιζόνης παρατηρήθηκε υψηλότερη επίπτωση υπεργλυκαιμίας και υπερνατριαιμίας. Η μελέτη APROCCHSS, που δημοσιεύτηκε επίσης το 2018, τυχαιοποίησε 1241 ασθενείς με σηπτική καταπληξία σε υδροκορτιζόνη/φθοριοϋδροκορτιζόνη ή εικονικό φάρμακο, και κατέδειξε όφελος επιβίωσης στην πρώτη ομάδα. Το ενδεχόμενο χορήγησης στεροειδών θα πρέπει να εξετάζεται στους βαρύτερα πάσχοντες που χρειάζονται υψηλές δόσεις αγγειοσυσπαστικών.

ΚΕΦΑΛΑΙΟ 25

Καρδιακός Επιπωματισμός

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Ερωτήσεις Ανασκόπησης

1. Η φυσιολογία του επιποματισμού οφείλεται συνήθως σε:

- α. Ταχεία συσσώρευση 50 έως 100 mL υγρού σε έναν ασθενή με φυσιολογική καρδιά και περικάρδιο
- β. Σταδιακή περαιτέρω συσσώρευση $\geq 1\text{L}$ υγρού σε έναν ασθενή με χρόνια περικαρδιακή συλλογή
- γ. Ταχεία περαιτέρω συσσώρευση 50 έως 100 mL υγρού σε έναν ασθενή με χρόνια περικαρδιακή συλλογή
- δ. Όλα τα παραπάνω

Απάντηση: δ. Επιποματισμός εκδηλώνεται όταν το περικάρδιο φτάσει στο σημείο της καμπύλης πίεσης-όγκου που παρουσιάζει απότομη άνοδο (βλ. Εικ. 25.1). Στους ασθενείς με φυσιολογικό περικάρδιο που δεν διαθέτει την ικανότητα διάτασης, ακόμα και μια μικρή αύξηση της ποσότητας του περικαρδιακού υγρού μπορεί να προκαλέσει μια κρίσιμη πτώση της διατοχωματικής πίεσης. Όταν το υγρό συσσωρεύεται βραδέως, όπως π.χ. επί κακοήθειας, ουραιμίας ή άλλων χρόνιων καταστάσεων, απαιτείται αύξηση της ποσότητας του υγρού κατά $\geq 1\text{L}$ για να αυξηθεί σημαντικά η ενδοπερικαρδιακή πίεση. Ωστόσο, στις προαναφερόμενες καταστάσεις μπορεί να εμφανιστεί επιποματισμός εάν προστεθεί ξαφνικά μια μικρή ποσότητα σε μια ήδη μεγάλη περικαρδιακή συλλογή.

2. Ένας ασθενής με υγρή-συμπιεστική περικαρδίτιδα υποβάλλεται σε περικαρδιοκέντηση και αφαιρούνται 500 mL υγρού. Στο υπερηχοκαρδιογράφημα που ακολούθησε δεν διαπιστώθηκε περικαρδιακή συλλογή. Η αρχική αιμοδυναμική καταγραφή ανέδειξε ενδοπερικαρδιακή πίεση 20 mm Hg και πίεση δεξιού κόλπου 20 mm Hg. Οι αντίστοιχες τιμές μετά την *εκκενωτική περικαρδιοκέντηση* θα είναι:

- α. Ενδοπερικαρδιακή πίεση $>5\text{ mm Hg}$ και πίεση δεξιού κόλπου 5-10 mm Hg
- β. Ενδοπερικαρδιακή πίεση 0 mm Hg και πίεση δεξιού κόλπου 5-10 mm Hg
- γ. Ενδοπερικαρδιακή πίεση $>5\text{ mm Hg}$ και πίεση δεξιού κόλπου 15 mm Hg
- δ. Ενδοπερικαρδιακή πίεση 0 mm Hg και πίεση δεξιού κόλπου 15 mm Hg

Απάντηση: δ. Μετά την πλήρη αφαίρεση του υγρού, η ενδοπερικαρδιακή πίεση εξισώνεται με την ατμοσφαιρική πίεση (0 mm Hg κατά συνθήκη). Όμως στους ασθενείς με υγρή-συμπιεστική περικαρδίτιδα εξακολουθούν να παρατηρούνται αιμοδυναμικά ευρήματα που παραπέμπουν σε συμπίεση, και συγκεκριμένα αυξημένη πίεση δεξιού κόλπου και απότομη κάθοδος γ (βλ. Εικ. 25.5 και 25.11).

3. Η τριάδα του Beck περιλαμβάνει τα εξής:

- α. Βύθιοι καρδιακοί τόνοι, παράδοξος σφυγμός και διάταση σφαγίτιδων.
- β. Παράδοξος σφυγμός, διάταση σφαγίτιδων και ταχυκαρδία.
- γ. Βύθιοι καρδιακοί τόνοι, ταχυκαρδία και διάταση σφαγίτιδων.
- δ. Βύθιοι καρδιακοί τόνοι, διάταση σφαγίτιδων και μειωμένη αρτηριακή πίεση.

Απάντηση: δ. Ο Claude Beck, ο πρώτος καθηγητής καρδιαγγειακής χειρουργικής στην Αμερική, ήταν αυτός που περιέγραψε το ομώνυμο σημείο. Τα άλλα σημεία – παράδοξος σφυγμός και ταχυκαρδία – παρατηρούνται στον επιποματισμό, αλλά δεν περιλαμβάνονται στην κλασική τριάδα.

4. Στη διαφοροδιάγνωση μεταξύ επιποματισμού και συμφορητικής καρδιακής ανεπάρκειας-αμφότερα εκ των οποίων σχετίζονται με αυξημένη πίεση αριστερού κόλπου-ποιο από τα παρακάτω ισχύει;

- α. Και στις δυο καταστάσεις ακούγεται τρίτος καρδιακός τόνος (S_3).

β. Τρίζοντες ακούγονται σπάνια στον επιποματισμό.

γ. Και στις δυο καταστάσεις ακούγεται τέταρτος καρδιακός τόνος (S_4).

δ. Το σημείο της τετραγωνικής ρίζας απαντάται συχνά στον επιποματισμό.

Απάντηση: β. Ένα διαφοροδιαγνωστικό σημείο του επιποματισμού είναι ότι τα πνευμονικά πεδία είναι συνήθως καθαρά. Παρά το γεγονός ότι η πίεση αριστερού κόλπου είναι κατά κανόνα αυξημένη (και ίση με την πίεση του πίεση δεξιού κόλπου). Στον οξύ επιποματισμό, η μειωμένη ροή αίματος εντός της πνευμονικής κυκλοφορίας αποτρέπει την πνευμονική συμφόρηση. Τρίτος (S_3) και τέταρτος καρδιακός τόνος (S_4) δεν ακούγονται λόγω μειωμένης εισροής αίματος στις κοιλίες. Το σημείο της τετραγωνικής ρίζας παρατηρείται στους ασθενείς με συμπίεστική περικαρδίτιδα, αν και στα περιστατικά με επιποματισμό και συμπίεστική περικαρδίτιδα το σημείο αυτό απουσιάζει αν έχει συσσωρευτεί αρκετό υγρό εντός της περικαρδιακής κοιλότητας, επειδή το εν λόγω σημείο εμφανίζεται λόγω εισροής αίματος στις κοιλίες κατά την πρωτοδιαστολή.

5. Στο υπερηχοκαρδιογράφημα, ένα πολύ ειδικό εύρημα για τον επιποματισμό είναι η:

α. Σύμπτωση δεξιού κόλπου.

β. Σύμπτωση αριστερού κόλπου.

γ. Σύμπτωση αριστερής κοιλίας.

δ. Απουσία αναπνευστικής διακύμανσης της διαμετροειδικής και της διατριγωνικής ροής.

Απάντηση: γ. Η σύμπτωση της αριστερής κοιλίας στον επιποματισμό οφείλεται στη μειωμένη διατοχωματική πίεση λόγω αυξανόμενης ενδοπερικαρδιακής πίεσης. Επειδή οι πιέσεις των δεξιών κοιλοτήτων είναι κατά κανόνα πολύ μικρότερες από εκείνες των αριστερών, η σύμπτωση των δεξιών κοιλοτήτων εμφανίζεται νωρίτερα από εκείνη των αριστερών. Η σύμπτωση του αριστερού κόλπου μετά από επέμβαση αορτοστεφανιαίας παράκαμψης (CABG) δεν αποτελεί σπάνιο φαινόμενο και οφείλεται στη συσσώρευση υγρού γύρω από τον αριστερό κόλπο. Η σύμπτωση της αριστερής κοιλίας αποτελεί σπάνιο φαινόμενο, ακόμα και στους ασθενείς με επιποματισμό, και η παρουσία της υποδηλώνει πολύ υψηλή ενδοπερικαρδιακή πίεση. Πρόκειται για πολύ ειδικό εύρημα. Η παρουσία αναπνευστικής διακύμανσης και όχι η απουσία αυτής είναι απόρροια της διακοιλιακής αλληλεξάρτησης (βλ. Εικ. 25.7 και 25.8) και αποτελεί τυπικό εύρημα του επιποματισμού.

6. Ένα ηλεκτροκαρδιογραφικό εύρημα που σχετίζεται με τον επιποματισμό και παρατηρείται σπάνια σε άλλες καταστάσεις είναι:

α. Χαμηλά δυναμικά.

β. Ανάσπαση του διαστήματος ST.

γ. Ηλεκτρική εναλλαγή.

δ. Αναπνευστική διακύμανση του ύψους του QRS.

Απάντηση: γ. Η Ηλεκτρική εναλλαγή αποτελεί σχετικά ειδικό αλλά όχι ευαίσθητο εύρημα για τον επιποματισμό, το οποίο οφείλεται στις εκκρεμοειδείς κινήσεις της καρδιάς εντός μιας κοιλότητας γεμάτης υγρό. Τα χαμηλά δυναμικά αποτελούν ένα πολύ συχνό εύρημα που, όμως, απαντάται σε πολλές καταστάσεις, όπως διηθητικές μυοκαρδιοπάθειες, πνευμονικό εμφύσημα, μυοκαρδιακή νέκρωση λόγω εμφράγματος, υποθυρεοειδισμός και άλλα. Ανάσπαση του διαστήματος ST παρατηρείται στο οξύ έμφραγμα μυοκαρδίου και στην οξεία περικαρδίτιδα, αλλά δεν έχει συσχετιστεί με τον επιποματισμό. Η αναπνευστική διακύμανση του ύψους του QRS αποτελεί φυσιολογικό εύρημα που επιτείνεται επί πνευμονοπάθειας ή άλλων καταστάσεων.

7. Η περικαρδιοκέντηση μπορεί να οδηγήσει σε επιδεινούμενη αιμοδυναμική κατάσταση στους ασθενείς με επιπωματισμό και:
- α. Διαχωρισμό αορτής.
 - β. Ρήξη ελευθέρου τοιχώματος αριστερής κοιλίας μετά από έμφραγμα μυοκαρδίου.
 - γ. Ραγέν ανεύρυσμα θωρακικής αορτής.
 - δ. Όλα τα παραπάνω.

Απάντηση: δ. Η διατήρηση της ακεραιότητας του περικαρδίου μπορεί να αποτρέψει τη ραγδαία απώλεια αίματος σε όλες τις παραπάνω κλινικές περιστάσεις. Η περικαρδιοκέντηση μπορεί να οδηγήσει σε κατακλυσμιαία αιμορραγία.

8. Ποιο από τα παρακάτω ισχύει;

- α. Στους ασθενείς με καταπληξία λόγω επιπωματισμού, οι θωρακικές συμπίεσεις αποβαίνουν συνήθως αποτελεσματικές.
- β. Στους ασθενείς με αναπνευστική δυσχέρεια λόγω επιπωματισμού, η ενδοτραχειακή διασωλήνωση θα πρέπει να αποφεύγεται, εάν είναι δυνατόν.
- γ. Στους ασθενείς με επιπωματισμό οι οποίοι είναι αγχώδεις ή ταχυπνοϊκοί, η καταστολή βοηθάει.
- δ. Στους ασθενείς με επιπωματισμό απαιτείται επιθετική διουρητική αγωγή.

Απάντηση: β. Οι θωρακικές συμπίεσεις αποβαίνουν συνήθως αναποτελεσματικές, επειδή δεν καταπολεμούν τον υποκείμενο παθοφυσιολογικό μηχανισμό και είναι απίθανο να αυξήσουν τον όγκο παλμού. Άγχος και ταχύπνοια εμφανίζονται συχνά στους ασθενείς με επιπωματισμό και οφείλονται στην απελευθέρωση κατεχολαμινών και τη χαμηλή καρδιακή παροχή. Η χορήγηση καταστολής μπορεί να απενεργοποιήσει έναν από τους τελευταίους εναπομείναντες προστατευτικούς μηχανισμούς για τη διατήρηση της καρδιακής παροχής σε ικανοποιητικά επίπεδα. Οι πιέσεις πλήρωσης των κοιλιών πρέπει να διατηρηθούν σε φυσιολογικά επίπεδα, οπότε η διουρητική αγωγή αντενδείκνυται γιατί πολλές φορές μειώνει τη φλεβική επιστροφή. Η ενδοτραχειακή διασωλήνωση αντενδείκνυται γιατί μπορεί να προκαλέσει αιφνίδια αιμοδυναμική αποσταθεροποίηση, επειδή αυξάνει την ενδοθωρακική πίεση και μειώνει τη φλεβική επιστροφή στην καρδιά.

ΚΕΦΑΛΑΙΟ 26

Υποογκαιμία και Τραυματική Καταπληξία: Μη Χειρουργική Αντιμετώπιση

Βιβλιογραφία

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Ερωτήσεις Ανασκόπησης

1. Ένας 19χρονος με βάρος 90 kg υπέστη ρήξη σπλήνα βαθμού σοβαρότητας IV, μετά από τροχαίο ατύχημα. Λόγω αιμοδυναμικής αστάθειας μεταφέρθηκε από το ΤΕΠ στο χειρουργική αίθουσα όπου υποβλήθηκε σε λαπαροτομία για έλεγχο βλαβών. Στη συνέχεια εισήχθη στη ΜΕΘ για συνέχιση της αντιμετώπισής του. Τα ζωτικά σημεία κατά την εισαγωγή του είναι αρτηριακή πίεση 80/40 mm Hg και καρδιακή συχνότητα 125 bpm, ενώ η αποβολή ούρων ισούται με 15 mL/ώρα. Μετά την ανάνηψη με κρυσταλλοειδή διαλύματα και προϊόντα αίματος, η αρτηριακή πίεση είναι 115/75 mm Hg, η καρδιακή συχνότητα 99 bpm, ενώ η αποβολή ούρων 100 mL/ώρα. Το γαλακτικό οξύ ορού είναι 5,2 mmol/L και το έλλειμμα βάσης 9 mEq/L. Ποιο από τα παρακάτω ισχύει;

- α. Δεδομένης της φυσιολογικοποίησης των ζωτικών σημείων και της αποβολής ούρων, η ανάνηψη του ασθενούς έχει ολοκληρωθεί, και δεν απαιτείται περαιτέρω επιθετική αναπλήρωση υγρών.
- β. Το έλλειμμα βάσης θα πρέπει να πρέπει να διορθωθεί με τη χορήγηση διττανθρακικού νατρίου.
- γ. Παρά τη φυσιολογικοποίηση των ζωτικών σημείων και της αποβολής ούρων, συνεχίζει να παρουσιάζει ενδείξεις ιστικής υποαιμάτωσης.
- δ. Στον ασθενή αυτόν θα πρέπει να τοποθετηθεί καθετήρας πνευμονικής αρτηρίας για να αποσαφηνιστεί η αιμοδυναμική κατάσταση και να τιτλοποιηθεί η αναπλήρωση υγρών.

Απάντηση: γ. Παρόλο που έχουν διατυπωθεί ορισμένες βάσιμες απόψεις, η αλήθεια είναι ότι ο βέλτιστος θεραπευτικός στόχος στην ανάνηψη των τραυματιών παραμένει άγνωστος. Αν και η φυσιολογικοποίηση των ζωτικών σημείων και της αποβολής ούρων αποτελεί μια θετική ένδειξη, είναι γνωστό ότι εάν η ανάνηψη σταματήσει εδώ, θα παραμείνει ατελής και ένας σημαντικός αριθμός ασθενών θα παραμείνουν σε κατάσταση «κρυφής καταπληξίας» με αποτέλεσμα να διατρέχουν υψηλό κίνδυνο πολυοργανικής ανεπάρκειας και θανάτου. Μια πιο σωστή στρατηγική είναι η συσχέτιση ολόκληρης της κλινικής εικόνας με πολλούς δείκτες υποάρδευσης, όπως τα ζωτικά σημεία, η φυσική εξέταση, η αποβολή ούρων, το γαλακτικό οξύ ορού, το έλλειμμα βάσης, ο κορεσμός μικτού φλεβικού αίματος σε οξυγόνο κλπ., υπολογίζοντας παράλληλα τη σχέση οφέλους/κινδύνου που παρουσιάζει η παρατεταμένη χορήγηση υγρών και προϊόντων αίματος (π.χ. το ενδεχόμενο επιδείνωσης της οξυγόνωσης ή εμφάνισης συνδρόμου κοιλιακού διαμερίσματος). Το έλλειμμα βάσης έχει μελετηθεί στους τραυματίες και έχει συσχετιστεί με την έκβαση. Όμως, τα δεδομένα αυτά δεν είναι αξιόπιστα, και είναι αδύνατο να δημοσιευθεί με ασφάλεια ένα συγκεκριμένο όριο γαλακτικού οξέος ή ένα χρονικό περιθώριο φυσιολογικοποίησης της τιμής του. Επιπλέον, το έλλειμμα βάσης είναι ένας αδρός δείκτης υποαιμάτωσης και μπορεί να επηρεαστεί σημαντικά από τη χορηγούμενη αγωγή, όπως τα χλωριούχα διαλύματα. Ο καθετήρας πνευμονικής αρτηρίας δεν έχει κανέναν ρόλο σε αυτόν τον ασθενή.

2. Ένας 25χρονος τραυματίστηκε στην κοιλία μετά από επίθεση με μαχαίρι με αποτέλεσμα το επίπλυν να είναι ορατό κατά τη φυσική εξέταση. Καταφτάνει στο ΤΕΠ με συστολική αρτηριακή πίεση 86 mm Hg και ανταποκρίνεται στα ερωτήματα με σωστό τρόπο. Ποιο από τα παρακάτω ενδείκνυται σε αυτόν τον ασθενή;
- α. Δεδομένου του ικανοποιητικού επιπέδου συνείδησης, θα πρέπει να υποβληθεί σε αξονική τομογραφία (CT) θώρακος και κοιλίας για να αποσαφηνιστεί καλύτερα το τραύμα του πριν τον προεγχειρητικό σχεδιασμό.
 - β. Θα πρέπει να τοποθετηθεί φλεβοκαθετήρας μεγάλης διαμέτρου και να ξεκινήσει αμέσως ενδοφλέβια χορήγηση υγρών και μετάγγιση προϊόντων αίματος μέχρι η αρτηριακή πίεση του ασθενούς να φυσιολογικοποιηθεί.

γ. Απαιτείται επείγουσα τοπική *διερεύνηση τραύματος*, προκειμένου να εξακριβωθεί η ανάγκη για επέμβαση.

δ. Θα πρέπει να τοποθετηθεί φλεβοκαθετήρας μεγάλης διαμέτρου αφήνοντας τον ασθενή να παραμείνει υποτασικός χωρίς να καταβληθεί προσπάθεια ανάνηψης, μέχρι να εισαχθεί στη χειρουργική αίθουσα.

Απάντηση: δ. Η ιδέα της επιτρεπόμενης υπότασης (permissive hypotension) και της καθυστερημένης ανάνηψης για τα διατιτραίνοντα τραύματα κατέστη δημοφιλής μετά τη δημοσίευση μιας μελέτης-ορόσημο τη δεκαετία του 1990, η οποία κατέδειξε ότι η εν λόγω στρατηγική μείωσε τη θνητότητα. Αυξάνοντας την αρτηριακή πίεση με τις αρχικές προσπάθειες ανάνηψης, υπάρχει κίνδυνος αποκόλλησης του εύθρουπτου αρχικού αιμοστατικού θρόμβου και υποτροπής της αιμορραγίας. Συνεπώς, εφόσον η αρτηριακή πίεση δεν μειωθεί περαιτέρω και δεν παρατηρηθεί πτώση του επιπέδου συνείδησης, ο ασθενής θα πρέπει να μεταφερθεί αμέσως στη χειρουργική αίθουσα και να αρχίσει εκεί η ανάνηψη. Η CT και η τοπική *διερεύνηση τραύματος* δεν έχουν κανέναν ρόλο σε αυτόν τον ασθενή, καθώς είναι προφανές ότι η κάκωση έχει προκαλέσει διάνοιξη του περιτοναίου.

3. Ένας 31χρονος άντρας εισάγεται στη ΜΕΘ μετά από επείγουσα λαπαροτομία στην οποία υπεβλήθη λόγω αμβλύς τραύματος. Στη χειρουργική αίθουσα, διαπιστώθηκε η παρουσία κακώσεων στο ήπαρ, τον έντερο και τον σπλήνα εξαιτίας των οποίων υπεβλήθη σε κολεκτομή με αναστόμωση και σπληνεκτομή. Μεταγγίστηκε με 25 μονάδες συμπυκνωμένων ερυθροκυττάρων, 15 μονάδες φρέσκου κατεψυγμένου πλάσματος, 6 μονάδες αιμοπεταλίων και 4 L κρυσταλλοειδούς διαλύματος. Χρηζει παρατεταμένης ανάνηψης για αναστροφή της ιστικής υποαιμάτωσης ενώ νοσηλεύεται στη ΜΕΘ. Δύο ώρες μετά, η κοιλιά του έχει διαταθεί και η ενδοκυστική του πίεση έχει αυξηθεί. Ποιος συνδυασμός συμπτωμάτων συνάδει περισσότερο με σύνδρομο κοιλιακού διαμερίσματος;

- α. Κεντρική φλεβική πίεση (CVP) 25 cm H₂O, αυξημένη μέγιστη πίεση αεραγωγών και πίεση plateau, ολιγουρία και ενδοκυστική πίεση 25 mm Hg.
- β. CVP 25 cm H₂O, αυξημένη μέγιστη πίεση αεραγωγών και πίεση plateau, ολιγουρία και ενδοκυστική πίεση 6 mm Hg.
- γ. CVP 5 cm H₂O, αυξημένη μέγιστη πίεση αεραγωγών, φυσιολογική πίεση plateau, φυσιολογική παραγωγή ούρων και ενδοκυστική πίεση 15 mm Hg.
- δ. Ενδοκυστική πίεση 30 mm Hg χωρίς άλλα σημαντικά ευρήματα.

Απάντηση: α. Ο ασθενής αυτός πληροί τις τυπικές προϋποθέσεις του συνδρόμου κοιλιακού διαμερίσματος: αμβλύ τραύμα στην κοιλιακή χώρα το οποίο χρήζει μαζικής μετάγγισης. Η φυσιολογική ενδοκοιλιακή πίεση ισούται με 5 έως 7 mm Hg και θα πρέπει να μετριέται στο τέλος της εκπνοής με τον ασθενή σε ύπτια θέση αφού διασφαλιστεί η απουσία σύσπασης των κοιλιακών μυών. Ο μορφομετατροπέας μηδενίζεται στη μέση μασχαλιαία γραμμή. Ενδοκοιλιακή υπέρταση μπορεί να παρατηρηθεί σε ασθενείς χωρίς σύνδρομο κοιλιακού διαμερίσματος, όπως π.χ. επί νοσογόνου παχυσαρκίας ή ασκίτη. Ως σύνδρομο κοιλιακού διαμερίσματος ορίζεται η σταθερή αύξηση της ενδοκοιλιακής πίεσης σε επίπεδα > 20 mm Hg η οποία συνοδεύεται από πρωτοεμφανιζόμενη ή επιδεινούμενη οργανική δυσλειτουργία. Το σύνδρομο κοιλιακού διαμερίσματος μπορεί να επηρεάσει σχεδόν όλα τα οργανικά συστήματα. Ο εν λόγω ασθενής παρουσιάζει μερικά από τα τυπικά ευρήματα. Η CVP θα είναι αυξημένη. Λόγω μειωμένης ενδοτοκότητας, θα αυξηθεί η μέγιστη πίεση αεραγωγών και η πίεση plateau και ο μηχανικός αερισμός θα παρουσιάσει δυσκολίες. Αξίζει να σημειωθεί, ότι η αύξηση της πίεσης αεραγωγών και της πίεσης plateau θα μπορούσαν να αποδοθούν λανθασμένα σε αύξηση της αντίστασης των αεραγωγών, π.χ. λόγω απόφραξης

4. Μια 19χρονη υπέστη σοβαρή συνθλιπτική κάκωση σε ένα βιομηχανικό ατύχημα. Τα τραύματά της περιλαμβάνουν κλειστή κρανιοεγκεφαλική κάκωση, πυελικό κάταγμα και συνθλιπτική κάκωση του δεξιού κάτω άκρου. Ποιο από τα παρακάτω είναι το πιο σωστό αναφορικά με την εκτίμηση και την αντιμετώπιση της;
 - α. Η απουσία αντανακλαστικού Cushing (βραδυκαρδία και υπέρταση) ουσιαστικά αρκεί για να αποκλειστεί η όποια σημαντική αύξηση της ενδοκράνιας υπέρτασης.
 - β. Στα πυελικά κατάγματα τύπου ανοικτού βιβλίου (open book), η ακινητοποίηση της πύελου τυλίγοντας ένα σεντόνι σφιχτά γύρω από το κάτω μέρος της πύελου μπορεί να αποβεί εξίσου αποτελεσματική με την εξωτερική οστεοσύνθεση στον έλεγχο της απώλειας αίματος.
 - γ. Η κατάργηση του περιφερικού σφυγμού στο άκρο που έχει υποστεί σύνθλιψη αποτελεί πρόωμο σημείο επικείμενου συνδρόμου διαμερίσματος.
 - δ. Η αύξηση της πίεσης σε επίπεδα > 30 mm Hg μέσα σε έναν οριοθετημένο ανατομικό χώρο ενός άκρου αποτελεί ένδειξη στενής παρακολούθησης και τακτικής μέτρησης αυτής της πίεσης.

Απάντηση: β. Η ενδοκράνια υπέρταση μπορεί να πυροδοτήσει αντανακλαστικό Cushing. Ωστόσο, η απουσία αντανακλαστικού Cushing δεν αρκεί για να αποκλειστεί η ενδοκράνια υπέρταση. Τα πνευλικά κατάγματα μπορεί να προκαλέσουν μαζική απώλεια αίματος και υποογκαιμική καταπληξία. Τα κλειστά πνευλικά κατάγματα μπορεί να προκαλέσουν απώλεια έως και 50% του κυκλοφορούντος όγκου αίματος. Τα πνευλικά κατάγματα τύπου ανοικτού βιβλίου χρήζουν επείγουσας σταθεροποίησης προκειμένου να ελεγχθεί η απώλεια αίματος. Αυτό μπορεί να επιτευχθεί με εξωτερική καθήλωση - ακινητοποίηση της πύελου με πνευλικό νάρθηκα ή τυλίγοντας ένα σεντόνι σφιχτά γύρω από το κάτω μέρος της πύελου. Η συνεχιζόμενη απώλεια αίματος μετά την ακινητοποίηση αποτελεί ένδειξη αγγειογραφίας και εμβολισμού του εμπλεκόμενου αγγείου. Η κατάργηση του περιφερικού σφυγμού στο άκρο που έχει υποστεί σύνθλιψη αποτελεί όψιμο και (όχι πρώιμο) σημείο επικείμενου συνδρόμου διαμερίσματος. Πριν την κατάργηση του περιφερικού σφυγμού εμφανίζεται πόνος, χρορότητα, παραισθησίες και παράλυση. Η μεγάλη αύξηση της πίεσης μέσα σε έναν οριοθετημένο ανατομικό χώρο ενός άκρου αποτελεί ένδειξη χειρουργικής διάνοιξης των περιτονιών και όχι απλά στενής παρακολούθησης.

ΚΕΦΑΛΑΙΟ 27

Σοβαρή Καρδιακή Ανεπάρκεια

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Ερωτήσεις Ανασκόπησης

1. Ποιο από τα παρακάτω θεωρείται αντένδειξη της χρήσης συσκευής υποβοήθησης της αριστερής κοιλίας (LVAD) ως μακροχρόνιας υποστήριξης;

- α. Σοβαρά επηρεασμένη λειτουργία αριστερής με κλάσμα εξώθησης αριστερής κοιλίας (LVEF) < 10%.
- β. Αδυναμία απογαλακτισμού από τα ινóτροπα φάρμακα.
- γ. Σοβαρή πνευμονική υπέρταση με πνευμονικές αγγειακές αντιστάσεις (PVR) < 2 μονάδες Woods.
- δ. Επηρεασμένη λειτουργία δεξιάς κοιλίας.

Απάντηση: δ. Οι ασθενείς με επηρεασμένη λειτουργία δεξιάς κοιλίας δεν ωφελούνται από την LVAD. Για την ακρίβεια, η συστολική δυσλειτουργία της δεξιάς κοιλίας μπορεί να εξελιχθεί σε σοβαρή ανεπάρκεια δεξιάς κοιλίας μετά την τοποθέτηση LVAD. Η σοβαρά επηρεασμένη λειτουργία της αριστερής κοιλίας, και η αδυναμία απογαλακτισμού από τα ινóτροπα φάρμακα αποτελούν ενδείξεις τοποθέτησης LVAD, όχι αντενδείξεις. Η σοβαρή πνευμονική υπέρταση αποτελεί αντένδειξη της τοποθέτησης LVAD εάν οι πνευμονικές αγγειακές αντιστάσεις είναι ≥ 3 μονάδες Woods. Η πνευμονική υπέρταση με χαμηλότερες πνευμονικές αγγειακές αντιστάσεις μπορεί να είναι απότοκος αριστερής καρδιακής ανεπάρκειας και δεν συνιστά λόγο ματαίωσης της τοποθέτησης LVAD.

2. Ποιο από τα παρακάτω ισχύει αναφορικά με τη χορήγηση ενδοφλέβιων αγγειοδιασταλτικών για την αντιμετώπιση της οξείας σοβαρής καρδιακής ανεπάρκειας;

- α. Η αγγειοδιασταλτική αγωγή είναι χρήσιμη για την επείγουσα αντιμετώπιση της καρδιακής ανεπάρκειας λόγω οξείας σοβαρής ανεπάρκειας μιτροειδούς μετά από έμφραγμα μυοκαρδίου.
- β. Στους ασθενείς με καρδιακή ανεπάρκεια, έχει αποδειχθεί ότι η αγγειοδιασταλτική αγωγή βοηθά στη διατήρηση της νεφρικής λειτουργίας.
- γ. Η νεσιριτίδη είναι καλύτερη από το νιτροπρωσσικό νάτριο ή τη νιτρογλυκερίνη.
- δ. Η αγγειοδιασταλτική αγωγή αντενδείκνυται επί οξείας καρδιακής ανεπάρκειας λόγω οξείας στεφανιαίας ισχαιμίας.

Απάντηση: α. Στους ασθενείς με οξεία σοβαρή ανεπάρκεια μιτροειδούς (π.χ. λόγω ρήξης τενόντιων χορδών ή θηλοειδών μυών μετά από έμφραγμα μυοκαρδίου), η αγγειοδιασταλτική αγωγή μπορεί να μειώσει το προφορτίο, να καταπολεμήσει την πνευμονική συμφόρηση και να αυξήσει την καρδιακή παροχή μέσω μείωσης του μεταφορτίου της αριστερής κοιλίας. Η αγγειοδιασταλτική αγωγή αποτελεί μια μέθοδο εξοικονόμησης χρόνου προκειμένου να ολοκληρωθεί η προετοιμασία των ασθενών για καρδιοχειρουργική επέμβαση. Δεν έχει αποδειχθεί ότι τα αγγειοδιασταλτικά βελτιώνουν απαρέγκλιτα τη νεφρική λειτουργία στους ασθενείς με καρδιακή ανεπάρκεια (εσφαλμένη η επιλογή β), και η νεσιριτίδη δεν υπερτερεί έναντι άλλων αγγειοδιασταλτικών φαρμάκων (εσφαλμένη η επιλογή γ). Στους ασθενείς με οξεία καρδιακή ανεπάρκεια λόγω οξείας στεφανιαίας ισχαιμίας, η ενδοφλέβια χορήγηση νιτρογλυκερίνης είναι πολύ χρήσιμη (εσφαλμένη η επιλογή δ).

3. Ποια είναι η συχνότερη κλινική εικόνα οξείας καρδιακής ανεπάρκειας στο νοσοκομειακό περιβάλλον;

- α. Οξεία επιδεινούμενη χρόνια καρδιακή ανεπάρκεια.
- β. Οξύ πνευμονικό οίδημα λόγω οξείας στεφανιαίας ισχαιμίας.
- γ. Οξύ πνευμονικό οίδημα λόγω σοβαρής υπέρτασης.
- δ. Καρδιογενής καταπληξία.

Απάντηση: α. Περίπου το 70% των νοσηλειών για οξεία μη αντιρροπούμενη καρδιακή ανεπάρκεια αφορούν περιστατικά οξείας επιδεινούμενης χρόνιας καρδιακής ανεπάρκειας με μειωμένο ή φυσιολογικό LVEF. Το οξύ πνευμονικό οίδημα λόγω οξείας στεφανιαίας ισχαιμίας ή σοβαρής υπέρτασης ευθύνεται για το 25% περίπου των νοσηλειών για καρδιακή ανεπάρκεια (εσφαλμένες οι επιλογές β και γ), και η καρδιογενής καταπληξία για το 5% (εσφαλμένη η επιλογή δ).

ΚΕΦΑΛΑΙΟ 28

Αναφυλαξία και Αναφυλακτική Καταπληξία

Βιβλιογραφία

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Ερωτήσεις Ανασκόπησης

1. Ποιο από τα παρακάτω αιμοδυναμικά προφίλ έχει τις περισσότερες πιθανότητες να καταγραφεί σε έναν ασθενή με αναφυλακτική καταπληξία;

ΜΑΠ	CVP	SVR	CO	HCT
α. 85	15	↑	8,0	53
β. 45	15	↓	3,5	35
γ. 45	2	↓	5,5	55
δ. 85	2	↑	8,0	35

ΜΑΠ, Μέση αρτηριακή πίεση· CO (cardiac output), καρδιακή παροχή· CVP (central venous pressure), κεντρική φλεβική πίεση· HCT (hematocrit), αιματοκρίτης· SVR (systemic vascular resistance), συστηματικές αγγειακές αντιστάσεις.

Απάντηση: γ. Η αναφυλακτική καταπληξία χαρακτηρίζεται από έντονη αγγειοδιαστολή και αιμοσυμπύκνωση. Παρόλο που η CO είναι συνήθως αυξημένη, πολλές φορές απαιτείται αναπλήρωση υγρών για να επιτευχθεί αυτό το αιμοδυναμικό προφίλ.

2. Ένας ασθενής παρουσιάζει αναφυλακτική καταπληξία εντός του ακτινολογικού εργαστηρίου. Ποιο από τα παρακάτω αποτελεί το καταλληλότερο φάρμακο πρώτης γραμμής για την αντιμετώπιση της υπότασής του;

α. Νορεπινεφρίνη.
β. Επινεφρίνη.
γ. Υδροκορτιζόνη.
δ. Δοβουταμίνη.
ε. Βαζοπρεσσίνη.

Απάντηση: β. Το καταλληλότερο φάρμακο πρώτης γραμμής είναι η επινεφρίνη που αναστέλλει την αποκοκκίωση των μαστοκυττάρων μέσω β-αδρενεργικής διέγερσης και προκαλεί αγγειοσύσπαση μέσω α-αδρενεργικής διέγερσης. Η δοβουταμίνη είναι ένας συμπαθητικομιμητικός παράγοντας που ασκεί κυρίως ινότροπη δράση και δεν θα διορθώσει την υπόταση σε έναν ασθενή με αναφυλακτική καταπληξία. Η νορεπινεφρίνη και η βαζοπρεσσίνη είναι παράγοντες δεύτερης γραμμής που μπορούν χρησιμοποιηθούν σε περιστατικά ανθεκτικά στην επινεφρίνη ή στην αναπλήρωση υγρών. Τα στεροειδή χορηγούνται για να αποτραπούν οι αντιδράσεις όψιμης φάσης και δεν έχουν άμεσο αποτέλεσμα στις αιμοδυναμικές διαταραχές.

3. Ένας ασθενής εισάγεται στη ΜΕΘ με εμμένουσα υπόταση και ταχυκαρδία στο πλαίσιο αναφυλακτικής καταπληξίας, παρόλο που του έχουν χορηγηθεί πολλαπλές δόσεις επινεφρίνης και στεροειδών καθώς bolus υγρών. Ποιοι θα μπορούσαν να είναι οι παράγοντες δεύτερης γραμμής; (Μπορεί να είναι σωστές περισσότερες από μια απαντήσεις).

α. Συνεχής έγχυση επινεφρίνης.
β. Νορεπινεφρίνη.
γ. Βαζοπρεσσίνη.
δ. Κυανούν του μεθυλενίου.
ε. Γλυκαγόνη.
στ. Εσμολόλη.

Απάντηση: β, γ, δ και ε. Ο ασθενής αυτός έχει ήδη λάβει πολλαπλές δόσεις επινεφρίνης και είναι ταχυκαρδικός. Η περραιτέρω διέγερση των β-αδρενεργικών υποδοχέων μπορεί να επιδεινώσει την ταχυκαρδία και είναι απίθανο να αναστείλει σε μεγαλύτερο βαθμό την αποκοκκίωση των μαστοκυττάρων. Η νορεπινεφρίνη, η βαζοπρεσσίνη, το κυανούν του μεθυλενίου και η γλυκαγόνη θεωρούνται παράγοντες δεύτερης γραμμής που δρουν συμπληρωματικά ως προς τους παράγοντες δεύτερης γραμμής, αλλά δεν μπορούν να τους υποκαταστήσουν. Η εσμολόλη αντενδίδνυται επειδή οι β-αποκλειστές επιδεινώνουν την έκβαση των ασθενών με αναφυλακτική καταπληξία.

ΚΕΦΑΛΑΙΟ 29

Οξεία Στεφανιαία Σύνδρομα και Οξύ Έμφραγμα Μυοκαρδίου

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Ερωτήσεις Ανασκόπησης

- Μια 56χρονη προσέρχεται στο ΤΕΠ 3 ώρες μετά την εισβολή σοβαρής δύσπνοιας. Διενεργείται το παρακάτω ΗΚΓ: Ποιο από τα παρακάτω ενδείκνυται;
 - Επανάληψη του ΗΚΓ μετά από 15 έως 30 min.
 - Άμεσο υπερηχοκαρδιογράφημα.
 - Προγραμματισμός δυναμικού υπερηχοκαρδιογραφήματος (stress-echo).
 - Προγραμματισμός σπινθηρογραφήματος αιματώσεως μυοκαρδίου με *Τεχνήτιο-99m* και διπυριδαμόλη.
 - Άμεση αξονική τομογραφία θώρακος.

Απάντηση: α. Αν και το ΗΚΓ δεν είναι διαγνωστικό εμφράγματος με εμμένονσα ανόσπαση του ST (STEMI), παρουσιάζει βαθιά αρνητικά T στις προκάρδιες απαγωγές που παραπέμπουν σε μυοκαρδιακή ισχαιμία. Αποτελεί σύνηθες φαινόμενο οι ασθενείς να παρουσιάζουν ανόσπαση του ST σε μεταγενέστερα ΗΚΓ. Για τον λόγο αυτόν οι κατευθυντήριες οδηγίες των ACC/AHA συνιστούν επανάληψη του ΗΚΓ μετά από 15 έως 30 min, εάν το αρχικό ΗΚΓ είναι μη διαγνωστικό²¹

- Ένας 75χρονος με ατομικό αναμνηστικό αγγειοπλαστικής στεφανιαίας αρτηρίας και δύσπνοιας προσπάθειας έχει εισαχθεί στη ΜΕΘ μετά από χειρουργική επέμβαση επιδιόρθωσης ανευρύσματος κοιλιακής αορτής. Η ασπιρίνη και η κλοπιδογρέλη που ελάμβανε είχαν διακοπεί για 10 ημέρες προ της επέμβασης. Τη δεύτερη μετεγχειρητική μέρα παραπονέθηκε για θωρακικό πόνο, η τροπονίνη αυξήθηκε και διενεργήθηκε το παρακάτω ΗΚΓ: Ποιο από τα παρακάτω αποτελεί την καλύτερη στρατηγική αντιμετώπισης;
 - Η ηλικία του αποτελεί αντένδειξη της θεραπείας επαναιμάτωσης.
 - Τα κύματα Q αποτελούν αντένδειξη της θεραπείας επαναιμάτωσης.
 - Θα πρέπει να χορηγηθεί θρομβόλυση επειδή η επιδιόρθωση του ανευρύσματος του αποτελεί αντένδειξη του καθετηριασμού καρδιάς.
 - Θα πρέπει να διενεργηθεί καθετηριασμός καρδιάς επειδή η επιδιόρθωση του ανευρύσματος του αποτελεί αντένδειξη της θρομβόλυσης.

Απάντηση: δ. Η ηλικία του ασθενούς δεν αποτελεί αντένδειξη της θεραπείας επαναιμάτωσης. Κύματα Q στο αρχικό ΗΚΓ παρατηρούνται στο 50% των ασθενών με οξύ STEMI, και η παρουσία τους δεν αποτελεί αντένδειξη της θεραπείας επαναιμάτωσης. Η πρόσφατη εγχείριση του ασθενούς αποτελεί αντένδειξη της θρομβόλυσης, αλλά όχι του καθετηριασμού καρδιάς, ο οποίος μπορεί να διενεργηθεί χρησιμοποιώντας την κερκιδική πρόσβαση.

- Μια 56χρονη προσέρχεται στο ΤΕΠ 1 ώρα μετά την εισβολή θωρακικού πόνου. Διενεργείται το παρακάτω ΗΚΓ: Ποιο από τα παρακάτω αποτελεί την καλύτερη στρατηγική αντιμετώπισης;
 - Χορήγηση ανταγωνιστή υποδοχέων GP IIb/IIIa εν αναμονή του αποτελέσματος τροπονίνης.
 - Υπογλώσσια νιφεδιπίνη για την αντιμετώπιση του σπασμού στεφανιαίων αρτηριών.
 - Χορήγηση ασπιρίνης, κλοπιδογρέλης και ενός ενδοφλέβιου θρομβολυτικού (ρετεπλάση ή τενεκτεπλάση).
 - Διακομιδή του ασθενούς σε ένα νοσοκομείο που απέχει 2 ώρες, προκειμένου να υποβληθεί σε καθετηριασμό καρδιάς.

Απάντηση: γ. Ενδείκνυται αποτελεί θεραπεία επαναιμάτωσης επειδή το ΗΚΓ είναι ενδεικτικό οξέος STEMI κατωτέρου τοιχώματος. Διακομιδή σε άλλο νοσοκομείο συνιστάται όταν η αγγειοπλαστική στεφανιαίων αρτηριών μπορεί να διενεργηθεί εντός 2 ωρών από την άφιξη στο αρχικό ΤΕΠ ή επί παρουσίας αντενδείξεων στη θρομβόλυση. Σύμφωνα με τις κατευθυντήριες οδηγίες των

ACCF/AHA (2013), θρομβόλυση θα πρέπει να χορηγείται στους ασθενείς με STEMI εάν αναμένεται ότι δεν μπορεί να διενεργηθεί πρωτογενής PCI εντός 120 min από την πρώτη επαφή του ασθενούς με το σύστημα υγείας (βλ. O'Gara PT, Kushner FG, Ascheim DD, et al. 2013 ACCF/AHA guideline for the management of ST-elevation myocardial infarction: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. Circulation. 2013;127:e362–e425). Συνεπώς, επί απουσίας αντενδείξεων στη θρομβόλυση, στον ασθενή αυτόν θα πρέπει να χορηγηθεί ασπιρίνη, κλοπιδογρέλη και ένας θρομβολυτικός παράγοντας. Η θεραπεία επαναιμάτωσης δεν θα πρέπει να καθυστερεί αναμένοντας τα αποτελέσματα της τροπονίνης. Η υπογλώσσια νιφεδιπίνη αντενδείκνυται στους ασθενείς με STEMI, επειδή προκαλεί αντανακλαστική διέγερση του συμπαθητικού συστήματος, ταχυκαρδία και υπόταση.

- Στη μελέτη ISIS-2 (Second International Study of Infarct Survival), μετά από παρακολούθηση διάρκειας 5 εβδομάδων, αγγειακός θάνατος σημειώθηκε στους 804 από τους 8587 (9,2%) ασθενείς που τυχαιοποιήθηκαν στη χορήγηση ασπιρίνης και στους 1016 από τους 8600 (11,8%) που τυχαιοποιήθηκαν στη χορήγηση εικονικού φαρμάκου. Άρα, σε πόσους ασθενείς με υποψία εμφράγματος μυοκαρδίου θα πρέπει να χορηγηθεί ασπιρίνη για να αποτραπεί ένας αγγειακός θάνατος μετά από 5 εβδομάδες;
 - 10
 - 20
 - 38
 - 50
 - 100

Απάντηση: γ. Αριθμός πασχόντων που πρέπει να υποβληθούν σε θεραπεία = $1/(\text{απόλυτη μείωση κινδύνου}) = 1/(11,8\% - 9,2\%) = 1/2,6\% = 1/0,026 = 38,46$.

- Μια 65χρονη μεταφέρεται στη ΜΕΘ επειδή αισθάνθηκε θωρακικό πόνο στη διάρκεια αιμοκάθαρσης. Πάσχει από χρόνια υπέρταση και χρόνια νεφρική νόσο, και εντάχθηκε πρόσφατα στην αιμοκάθαρση. Η αντιυπερτασική της αγωγή περιλαμβάνει κλονιδίνη, υδραλαζίνη και διλτιαζέμη. Η αρτηριακή της πίεση ισούται με 180/100 mm Hg. Ακούγεται τρίτος καρδιακός τόνος (S₃) και τρίζοντες στις βάσεις άμφω. Η τροπονίνη είναι ελαφρώς αυξημένη. Η ακτινογραφία θώρακος παρουσιάζει πνευμονική συμφόρηση. Η ασθενής δεν επιθυμεί να υποβληθεί σε επεμβατικές διαγνωστικές εξετάσεις. Ποιο από τα παρακάτω φάρμακα είναι το καταλληλότερο;
 - Μη κλασματοποιημένη ηπαρίνη.
 - Ενοξαπαρίνη.
 - Φονταπαρινόξη.
 - Επιτιφιματίδη.

Απάντηση: α. Η ενοξαπαρίνη, η φονταπαρινόξη και η επιτιφιματίδη αντενδείκνυται στους αιμοκαθαιρόμενους ασθενείς.

- Μια 65χρονη μεταφέρεται στη ΜΕΘ επειδή αισθάνθηκε θωρακικό πόνο στη διάρκεια αιμοκάθαρσης. Πάσχει από χρόνια υπέρταση και χρόνια νεφρική νόσο, και εντάχθηκε πρόσφατα στην αιμοκάθαρση. Η αντιυπερτασική της αγωγή περιλαμβάνει κλονιδίνη, υδραλαζίνη και διλτιαζέμη. Η αρτηριακή της πίεση ισούται με 180/100 mm Hg. Ακούγεται τρίτος καρδιακός τόνος (S₃) και τρίζοντες στις βάσεις άμφω. Η τροπονίνη είναι ελαφρώς αυξημένη. Η ασθενής δεν επιθυμεί να υποβληθεί σε επεμβατικές διαγνωστικές εξετάσεις. Ποιο από τα παρακάτω σχήματα είναι το καταλληλότερο για αυτόν τον ασθενή;

α. Ασπιρίνη 325 mg ημερησίως.

β. Ασπιρίνη 325 mg ημερησίως και πρασσυγρέλη 10 mg ημερησίως.

γ. Ασπιρίνη 325 mg ημερησίως και κλοπιδογρέλη 75 mg ημερησίως.

δ. Ασπιρίνη 325 mg ημερησίως και τικαγρελόρη 90 mg δυο φορές ημερησίως.

Απάντηση: γ. Συνιστάται διπλή αντιαθρομβωτική θεραπεία με ασπιρίνη 325 mg ημερησίως και κλοπιδογρέλη 75 mg ημερησίως. Η μονοθεραπεία με ασπιρίνη αποτελεί λανθασμένη πρακτική. Η πρασσυγρέλη ενδείκνυται μόνο σε ασθενείς που υποβάλλονται σε αγγειοπλαστική στεφανιαίων αρτηριών. Στους ασθενείς που λαμβάνουν τικαγρελόρη, η δόση ασπιρίνης δεν θα πρέπει να υπερβαίνει τα 100 mg ημερησίως.

7. Ένας 80χρονος με διαβήτη προσέρχεται στο ΤΕΠ με θωρακικό πόνο. Είχε υποστεί παροδικό ισχαιμικό επεισόδιο (ΤΙΑ) πριν από 1 χρόνο, και πριν από 6 μήνες υπεβλήθη σε αγωγή για αιμορραγία ανώτερου πεπτικού λόγω γαστρίτιδας. Τα ευρήματα της φυσικής εξέτασης είναι φυσιολογικά. Ακολουθεί ΗΚΓ επί πόνου. Ποιο από τα παρακάτω ενδείκνυται;

α. Σπινθηρογράφημα αιματώσεως μυοκαρδίου σε ηρεμία.

β. Σπινθηρογράφημα αιματώσεως μυοκαρδίου σε κόπωση.

γ. Ενδοφλέβια χορήγηση θρομβολυτικού.

δ. Καθετηριασμός καρδιάς.

Απάντηση: δ. Το ΗΚΓ του ασθενούς παρουσιάζει διάχυτες κατασπάσεις του διαστήματος ST συμβατές με μυοκαρδιακή ισχαιμία, οπότε ενδείκνυται καθετηριασμός καρδιάς. Χορήγηση θρομβολυτικού δεν ενδείκνυται επειδή το ΗΚΓ του ασθενούς δεν παρουσιάζει STEMI ή αποκλεισμό αριστερού σκέλους. Το σπινθηρογράφημα αιματώσεως μυοκαρδίου σε κόπωση αντενδείκνυται. Το σπινθηρογράφημα αιματώσεως μυοκαρδίου σε ηρεμία δεν θα ήταν διαφωτιστικό.

8. Ένας 80χρονος προσέρχεται στο ΤΕΠ με θωρακικό πόνο. Είχε υποστεί παροδικό ισχαιμικό επεισόδιο (ΤΙΑ) πριν από 1 χρόνο, και πριν από 6 μήνες υπεβλήθη σε αγωγή για αιμορραγία ανώτερου πεπτικού λόγω γαστρίτιδας. Η στεφανιογραφία ανέδειξε στένωση 90% του πρόσθιου κατιόντα (LAD) η οποία αντιμετωπίστηκε με εμφύτευση επικαλυμμένου με φαρμακευτικές ουσίες stent (DES). Ποιο από τα παρακάτω σχήματα είναι το καταλληλότερο για αυτόν τον ασθενή;

α. Ασπιρίνη 81 mg ημερησίως και ομεπραζόλη 40 mg ημερησίως.

β. Ασπιρίνη 81 mg ημερησίως, πρασσυγρέλη 10 mg και ομεπραζόλη 40 mg ημερησίως.

γ. Ασπιρίνη 81 mg ημερησίως, τικαγρελόρη 90 mg δυο φορές ημερησίως και ομεπραζόλη 40 mg ημερησίως.

δ. Ασπιρίνη 325 mg ημερησίως, τικαγρελόρη 90 mg δυο φορές ημερησίως και ομεπραζόλη 40 mg ημερησίως.

Απάντηση: γ. Στον ασθενή εμφυτεύθηκε DES, οπότε ενδείκνυται διπλή αντιαθρομβωτική θεραπεία. Επίσης, θα πρέπει να του χορηγηθεί ένας αναστολέας αντλίας πρωτονίων, επειδή έχει ατομικό αναμνηστικό αιμορραγίας πεπτικού. Η πρασσυγρέλη αντενδείκνυται λόγω της ηλικίας του ασθενούς και επειδή έχει ατομικό αναμνηστικό ΤΙΑ. Στους ασθενείς που λαμβάνουν τικαγρελόρη, η δόση ασπιρίνης δεν θα πρέπει να υπερβαίνει τα 100 mg ημερησίως.

ΚΕΦΑΛΑΙΟ 30

Βαλβιδοπάθειες στη Μονάδα Εντατικής Θεραπείας

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Ερωτήσεις Ανασκόπησης

1. Ένας 80χρονος νοσηλεύεται με συμφορητική καρδιακή ανεπάρκεια. Ο ασθενής δεν πάσχει από στεφανιαία νόσο. Η αορτική βαλβίδα του είναι έντονα ασβεστωμένη. Παρέμβαση στην αορτική βαλβίδα συνιστάται σε ποια/ες από τις παρακάτω καταστάσεις;

- α. Μέγιστη ταχύτητα αορτικής ροής (Vmax) 3,2 m/sec, μέση κλίση πίεσης 25 mm Hg, κλάσμα εξώθησης αριστερής κοιλίας (LVEF) 30%, επιφάνεια αορτικού στομίου (AVA) 0,8 cm². Μετά από έγχυση δοβουταμίνης η μέση κλίση πίεσης φτάνει στα 32 mm Hg, το LVEF στο 40% και η AVA στο 1,1 cm².
- β. Vmax 3,2 m/sec, μέση κλίση πίεσης 25 mm Hg, LVEF 55%, AVA 0,8 cm², δείκτης όγκου παλμού (SVI) 45 mL/min/m².
- γ. Vmax 3,2 m/sec, μέση κλίση πίεσης 25 mm Hg, LVEF 30%, AVA 0,8 cm². Μετά από έγχυση δοβουταμίνης η μέση κλίση πίεσης φτάνει στα 45 mm Hg, το LVEF στο 40% και η AVA παραμένει αμετάβλητη.
- δ. Vmax 3,2 m/sec, μέση κλίση πίεσης 25 mm Hg, LVEF 55%, AVA 0,8 cm² και SVI 30 mL/min/m².

Απάντηση: γ. και δ. Στη στένωση αορτικής βαλβίδας (AS) με χαμηλή κλίση πίεσης (μέση κλίση πίεσης < 40 mm Hg), είναι σημαντικό να επιβεβαιωθεί ότι η αιτία της καρδιακής ανεπάρκειας είναι η αληθής σοβαρή AS. Ο ασθενής του σεναρίου α πάσχει από ψευδο-σοβαρή AS, και το χαμηλό LVEF οφείλεται σε δυσλειτουργία αριστερής κοιλίας (LV) και όχι σε σοβαρή AS. Έτσι, το LVEF βελτιώνεται με την έγχυση δοβουταμίνης, και παρόλο που παρατηρείται μια μικρή αύξηση στην κλίση πίεσης, η βαλβίδα ανοίγει καλύτερα με αποτέλεσμα να αυξάνεται η AVA. Ο ασθενής του σεναρίου β έχει διατηρημένο LVEF με χαμηλή κλίση πίεσης. Αυτό μπορεί να παρατηρηθεί σε ασθενείς με σοβαρή AS και μικρή υπερτροφική κοιλία οι οποίοι δεν μπορούν να αυξήσουν τη ροή διαμέσου της αορτικής βαλβίδας σε βαθμό τέτοιον που η κλίση πίεσης να φτάσει τα 40 mm Hg. Ωστόσο, ο όγκος παλμού (SV) αυτού του ασθενούς ήταν φυσιολογικός. Ο ασθενής του σεναρίου γ πάσχει από συμπτωματική σοβαρή AS σταδίου D2 με χαμηλή ροή και χαμηλή κλίση πίεσης. Έτσι, η έγχυση δοβουταμίνης προκαλεί αύξηση της καρδιακής παροχής και της κλίσης πίεσης, αλλά η AVA παραμένει αμετάβλητη ή αυξάνεται ελαφρώς, γεγονός που υποδηλώνει σταθερή απόφραξη του βαλβιδικού στομίου. Ο ασθενής του σεναρίου δ πάσχει από συμπτωματική σοβαρή AS τύπου D3 με διατηρημένη λειτουργία LV και χαμηλή κλίση πίεσης λόγω χαμηλού SVI (< 35 mL/min/m²).

2. Ένας 68χρονος με πρόπτωση και συμπτωματική χρόνια ανεπάρκεια της μιτροειδούς (MR) παραπέμπεται για διαδερμική επιδιόρθωσή της. Το LVEF του ασθενούς ισούται με 40%. Είναι διαβητικός, αιμοκαθαιρόμενος, και είχε υποβληθεί κατά το παρελθόν σε επέμβαση αορτοστεφανιαίας παράκαμψης (CABG) και σε ακτινοθεραπεία με τεχνική μανδύα για λέμφωμα.

Ποιο από τα παρακάτω ισχύει;

- α. Επί του παρόντος, δεν πληροί τα κριτήρια των ACC/AHA για επιδιόρθωση μιτροειδούς.
- β. Πληροί τα κριτήρια των ACC/AHA αλλά θα πρέπει να υποβληθεί σε χειρουργική επιδιόρθωση μιτροειδούς.
- γ. Σύμφωνα με μια τυχαιοποιημένη μελέτη, σε ασθενείς σαν αυτόν, η διαδερμική επιδιόρθωση μιτροειδούς αποτελεί μια αποδεκτή εναλλακτική επιλογή έναντι της εγχείρησης.
- δ. Η πιθανότητα παραμονής μέτριας ή σοβαρότερης MR είναι ελαφρώς υψηλότερη μετά τη διαδερμική επιδιόρθωση από ότι μετά τη χειρουργική.
- ε. Στη λειτουργική MR, η χειρουργική και η διαδερμική επιδιόρθωση επιτυγχάνουν παρόμοιες εκβάσεις ενώ στην εκφυλιστική MR (όπως στον συγκεκριμένο ασθενή) υπερτερεί η χειρουργική επιδιόρθωση.

Απάντηση: ε. Σύμφωνα με τα κριτήρια των ACC/AHA, οι

ασθενείς με συμπτωματική χρόνια σοβαρή MR και LVEF > 30% πληρούν τα κριτήρια κατηγορίας Ι για επιδιόρθωση μιτροειδούς. Η σύσταση αυτή έχει παραμείνει अपαράλλακτη στις επικαιροποιημένες κατευθυντήριες οδηγίες του 2017. Ως διαβητικός, αιμοκαθαιρόμενος ασθενής με προβληματική θωρακική κοιλότητα (αφού έχει προηγηθεί CABG και ακτινοθεραπεία με τεχνική μανδύα), ο κίνδυνος που ενέχει η χειρουργική επιδιόρθωση είναι απαγορευτικός. Η μελέτη EVEREST II συνέκρινε ασθενείς με διατηρημένο κλάσμα εξώθησης και χαμηλό χειρουργικό κίνδυνο. Η μελέτη στους ασθενείς υψηλού κινδύνου δεν ήταν τυχαιοποιημένη και αφορούσε και αυτή ασθενείς με διατηρημένο κλάσμα εξώθησης. Τα δεδομένα επομένως δεν υποστηρίζουν την επιλογή γ. Η μέτρια ή μεγαλύτερη ανεπάρκεια της μιτροειδούς στην EVEREST II ήταν σχεδόν τριπλάσια στο ένα έτος (46% έναντι 17%) με την διαδερμική παρέμβαση σε σχέση με την χειρουργική επιδιόρθωση. Στην ανάλυση υποομάδων διαπιστώθηκε ότι η χειρουργική και η διαδερμική επιδιόρθωση επιτυγχάνουν παρόμοιες εκβάσεις στη λειτουργική MR, ενώ στην εκφυλιστική MR υπερτερεί η χειρουργική επιδιόρθωση. Ο ασθενής αυτός αποτελεί δυνητικό υποψήφιο για τοποθέτηση του αδειοδοτημένου από τον Οργανισμό Τροφίμων και Φαρμάκων των ΗΠΑ (FDA) MitraClip.

3. Μια 50χρονη προσέρχεται στο ΤΕΠ με δύσπνοια προσπαθείας (συμπτώματα κατηγορίας ΙΙΙ/ΙV κατά NYHA). Το ατομικό αναμνηστικό της περιλαμβάνει υπερτροφική μυοκαρδιοπάθεια και στεφανιαία νόσο με τοποθέτηση stent στον πρόσθιο κατιόντα κλάδο (LAD) πριν από έναν χρόνο. Επί του παρόντος, λαμβάνει 50 mg μετοπρολόλης παρατεταμένης αποδέσμευσης ημερησίως. Η αρτηριακή της πίεση ήταν 140/80 mm Hg και η καρδιακή της συχνότητα 65 bpm. Το υπερηχοκαρδιογράφημα ανέδειξε φυσιολογική λειτουργία αριστερής κοιλίας με υπερτροφία του μεσοκοιλιακού διαφράγματος (2,2 cm). Η κλίση πίεση στον χώρο εξόδου της αριστερής κοιλίας (left ventricular outflow tract-LVOT) ήταν 55 mm Hg σε ηρεμία. Παρατηρήθηκε πρόσθια συστολική κίνηση της μιτροειδούς. Η πρόσθια μιτροειδική γλωχίνα είναι υπερβολικά επιμυκωμένη και παρατηρείται μέτρια προς σοβαρή MR. Υπεβλήθη σε στεφανιογραφία που ανέδειξε βατό LAD και μη αποφρακτικές βλάβες στα υπόλοιπα αγγεία. Ποιο από τα παρακάτω αποτελεί την καλύτερη στρατηγική αντιμετώπισης;

- α. Αύξηση της μετοπρολόλης παρατεταμένης αποδέσμευσης στα 100 mg ημερησίως, προκειμένου η καρδιακή συχνότητα να μειωθεί ακόμα περισσότερο.
- β. Παραπομπή σε επεμβατικό καρδιολόγο για διαφραγματική κατάλυση με αιθανόλη και επανεκτίμηση της MR σε δεύτερο χρόνο.
- γ. Διενέργεια δυναμικού υπερηχοκαρδιογραφήματος (stress echo) προκειμένου να εξακριβωθεί αν η κλίση πίεσης στον LVOT αυξάνεται σε συνθήκες φόρτισης.
- δ. Παραπομπή σε καρδιοχειρουργό για μυεκτομή και επιδιόρθωση μιτροειδούς βαλβίδας.

Απάντηση: δ. Στους ασθενείς που λαμβάνουν την ενδεδειγμένη αγωγή και παρουσιάζουν αυτόματη ή προκλητή κλίση πίεσης στον LVOT > 50 mm Hg θα πρέπει να εξετάζεται το ενδεχόμενο διαφραγματικής μυεκτομής ή διαφραγματικής κατάλυσης με αιθανόλη. Σε γενικές γραμμές, η τελευταία μέθοδος προτιμάται στους ασθενείς με μείζονες συννοσηρότητες που δεν είναι κατάλληλοι υποψήφιοι για χειρουργική επέμβαση. Η διαφραγματική μυεκτομή σε συνδυασμό με επιδιόρθωση μιτροειδούς βαλβίδας στους ασθενείς με συνυπάρχουσα πρωτοπαθή μιτροειδοπάθεια αποτελεί καλύτερη επιλογή για τη σταθερή μείωση της απόφραξης του LVOT, έχει συσχετιστεί με μικρότερη ανάγκη για εμφύτευση μόνιμου βηματοδότη, δεν προκαλεί μυοκαρδιακή νέκρωση με τα συνοδά της προβλήματα, και αντιμετωπίζει τη μιτροειδοπάθεια. Η διενέργεια δυναμικού υπερηχοκαρδιογραφήματος δεν είναι αναγκαία σε αυτόν τον ασθενή επειδή πληροί ήδη τις προϋποθέσεις για παρέμβαση με βάση την κλίση πίεσης στον LVOT κατά την ηρεμία.

ΚΕΦΑΛΑΙΟ 31

Καρδιακές Αρρυθμίες

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Ερωτήσεις Ανασκόπησης

1. Ένας ασθενής σας εμφανίζει ξαφνικά παροξυσμική υπερκοιλιακή ταχυκαρδία. Ποιο από τα παρακάτω αποτελεί το φάρμακο εκλογής για την άμεση αύξηση της ανερέθιστης περιόδου στον κολποκοιλιακό κόμβο;

- α. Αμιωδαρόνη.
- β. Αδενοσίνη.
- γ. Διλτιαζέμη.
- δ. Λιδοκαΐνη.

Απάντηση: β. Η αδενοσίνη είναι μια ουσία που απαντάται στη φύση και το 1990 αδειοδοτήθηκε από τον FDA ως το φάρμακο εκλογής για την επείγουσα αντιμετώπιση της υπερκοιλιακής ταχυκαρδίας (supraventricular tachycardia-SVT). Η αδενοσίνη ασκεί αρνητική χρονότροπη δράση στον φλεβοκόμβο, επιβραδύνει την αγωγιμότητα και αυξάνει την ανερέθιστη περίοδο στον κολποκοιλιακό κόμβο. Ο χρόνος ημίσειας ζωής της αδενοσίνης ισούται με 10 sec επειδή μεταβολίζεται ταχέως. Η αδενοσίνη μπορεί να προκαλέσει έξωση, δύσπνοια, θωρακική δυσφορία και ναυτία. Οι εκδηλώσεις αυτές υποχωρούν εντός 30 έως 60 sec. Η αδενοσίνη είναι πολύ αποτελεσματική για τον τερματισμό μια οξείας SVT, καθώς αποβαίνει επιτυχής σε ποσοστό > 90% των περιστατικών. Αρχικά χορηγείται μια δόση bolus των 6 mg εντός 1 έως 2 sec. Εάν η αρρυθμία δεν τερματιστεί εντός 3 min, χορηγείται με παρόμοιο τρόπο μια δόση bolus των 12 mg. Σπάνια χορηγείται δόση bolus 18 mg.

2. Ποιος από τους παρακάτω αποτελεί τον συχνότερο κυτταρικό μηχανισμό πρόκλησης κοιλιακής ταχυκαρδίας στους ασθενείς με ισχαιμική καρδιοπάθεια;

- α. Επανείσοδος.
- β. Πρώιμες μετεκπολώσεις.
- γ. Όψιμες μετεκπολώσεις.
- δ. Παθολογική αυτοματικότητα.

Απάντηση: α. Επί απουσίας δομικής καρδιοπάθειας, ο πρωταρχικός μηχανισμός πρόκλησης κοιλιακής ταχυκαρδίας είναι η πυροδοτούμενη δραστηριότητα ή η παθολογική αυτοματικότητα. Επί παρουσίας δομικής καρδιοπάθειας, ο πρωταρχικός μηχανισμός είναι η επανείσοδος. Μετά από έμφραγμα μυοκαρδίου μπορεί να δημιουργηθεί ουλή με νησίδες βιώσιμων μυοκαρδιακών κυττάρων. Αυτό μπορεί να οδηγήσει σε βραδεία και κατακερματισμένη αγωγή ή/και διακοπή της αγωγής. Με τον τρόπο αυτόν δημιουργείται το ιδανικό ηλεκτροφυσιολογικό και ανατομικό υπόστρωμα για την εμφάνιση αρρυθμιών επανεισόδου.

3. Ποιο αντιαρρυθμικό φάρμακο δεν είναι ασφαλές στους ασθενείς με ατομικό αναμνηστικό εμφράγματος μυοκαρδίου;

- α. Φλεκαϊνίδα.
- β. Αμιωδαρόνη.
- γ. Δροναδρόνη.
- δ. Σοταλόλη.

Απάντηση: α. Η φλεκαϊνίδα είναι ένα αντιαρρυθμικό φάρμακο της κατηγορίας Ic και συνιστάται ως παράγοντας πρώτης γραμμής για την ανάταξη σε φλεβοκομβικό ρυθμό και τη διατήρησή του, στους ασθενείς με κολπική μαρμαρυγή και δομικά φυσιολογική καρδιά. Σύμφωνα με τα ευρήματα της μελέτης CAST (Cardiac Arrhythmia Suppression Trial) που δημοσιεύτηκε το 1990, η φλεκαϊνίδα αντενδείκνυται στους ασθενείς με στεφανιαία νόσο ή ατομικό αναμνηστικό εμφράγματος μυοκαρδίου. Ο σκοπός αυτής της μελέτης ήταν να εξεταστεί η αποτελεσματικότητα της φλεκαϊνίδης, της ενκαϊνίδης και της μορισιζίνης σε εμφραγματίες με μειωμένο κλάσμα εξώθησης αριστερής κοιλίας και συχνές έκτακτες κοιλιακές συστολές. Η φλεκαϊνίδα απέβη αποτελεσματική στην καταστολή της κοιλιακής εκτοπίας αλλά αύξησε τους αρρυθμικούς θανάτους κατά τρεις φορές, συγκριτικά με το εικονικό φάρμακο.

ΚΕΦΑΛΑΙΟ 32

Υπερτασικές Κρίσεις

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Ερωτήσεις Ανασκόπησης

1. Ποιοι από τους ακόλουθους παράγοντες είναι πιο σημαντικός για να καθοριστεί αν ένας ασθενής αποτελεί επείγον υπερτασικό περιστατικό;

- α. Συστολική αρτηριακή πίεση 200 mm Hg ή υψηλότερη
- β. Διαστολική αρτηριακή πίεση 110 mm Hg ή υψηλότερη
- γ. Μέση αρτηριακή πίεση 120 mm Hg ή υψηλότερη
- δ. Παρουσία οξείας βλάβης τελικού οργάνου
- ε. Παρουσία σοβαρής κεφαλαλγίας

Απάντηση: δ. Τα επείγοντα περιστατικά υπέρτασης ορίζονται από την παρουσία οξείας βλάβης τελικού οργάνου. Τα κύρια όργανα που μπορεί να επηρεαστούν από την οξεία αύξηση της αρτηριακής πίεσης που οδηγεί σε επείγον υπερτασικό περιστατικό περιλαμβάνουν τον εγκέφαλο, την καρδιά και τους νεφρούς. Είναι σημαντικό να γίνεται κατανοητό ότι οι μετρήσεις της αρτηριακής πίεσης από μόνες τους δεν μπορούν να χρησιμοποιηθούν για τη διάγνωση ενός επείγοντος περιστατικού υπέρτασης. Ασθενείς με προηγούμενη φυσιολογική αρτηριακή πίεση μπορεί να παρουσιάσουν οξεία οργανική βλάβη σε χαμηλότερες πιέσεις αίματος και, αντιθέτως, οι ασθενείς με χρόνια υπέρταση μπορεί να ανέχονται πολύ υψηλές τιμές αρτηριακής πίεσης χωρίς να υπάρχουν ενδείξεις οξείας οργανικής βλάβης.

2. Οι ασθενείς με χρόνια υπέρταση, η οποία δεν ελέγχεται ικανοποιητικά, συνήθως παρουσιάζουν μεταβολές της ικανότητας αυτορρύθμισης της εγκεφαλικής ροής αίματος σε σχέση με τη MAP (συσχέτιση μεταξύ ροής αίματος και μέσης αρτηριακής πίεσης = καμπύλη αυτορρύθμισης). Ποια από τις ακόλουθες δηλώσεις είναι σωστότερη όσον αφορά την καμπύλη αυτορρύθμισης σε έναν ασθενή με χρόνια υπέρταση;

- α. Η καμπύλη μετατρέπεται σε γραμμική συσχέτιση (δηλαδή οι μεταβολές της ροής είναι ευθέως ανάλογες με τις μεταβολές της MAP).
- β. Οι μεταβολές της καμπύλης αυτορρύθμισης είναι σημαντικές μόνο όταν ο ασθενής παρουσιάζει καταπληξία ή σοβαρή υπόταση.
- γ. Η καμπύλη μετατοπίζεται προς τα δεξιά, που σημαίνει ότι ο ασθενής είναι πιθανότερο να υποστεί εγκεφαλική ισχαιμία όταν γίνεται προσπάθεια απότομης επανόδου της αρτηριακής πίεσης στα “φυσιολογικά επίπεδα.”
- δ. Η καμπύλη μετατοπίζεται προς τα αριστερά, που σημαίνει ότι ο ασθενής μπορεί να ανεχθεί υψηλή MAP χωρίς να προκληθεί οξεία οργανική βλάβη.

Απάντηση: γ. Σε φυσιολογικές συνθήκες, η εγκεφαλική αυτορρύθμιση διατηρεί την εγκεφαλική ροή αίματος όταν οι τιμές MAP κυμαίνονται μεταξύ 60 και 150 mm Hg. Σε ασθενείς με χρόνια υπέρταση, αυτή η συσχέτιση μεταβάλλεται ώστε η καμπύλη αυτορρύθμισης να μετατοπίζεται προς τα δεξιά. Αυτό σημαίνει ότι οι ασθενείς με χρόνια υπέρταση είναι καλύτερα προετοιμασμένοι να ανεχθούν υψηλότερες MAP χωρίς να παρουσιάσουν οξεία οργανική βλάβη ή επείγουσα υπερτασική κρίση. Αντίθετα, λόγω αυτής της μετατόπισης, οι ασθενείς με χρόνια υπέρταση είναι πιθανότερο να υποστούν ισχαιμία / υποάρδευση με την ταχεία επάνοδο της αρτηριακής πίεσης σε φυσιολογικά επίπεδα. Αυτός είναι ο λόγος, για τον οποίο οι περισσότεροι ειδικοί συνιστούν μείωση-στόχο της MAP κατά 15-25% στα περισσότερα επείγοντα περιστατικά υπέρτασης.

3. Ποιες από τις ακόλουθες δηλώσεις είναι σωστότερη σχετικά με τη χρήση αντιυπερτασικών φαρμάκων για τη θεραπεία μιας υπερτασικής κρίσης;

- α. Η ενδοφλέβια θεραπεία είναι υποχρεωτική για την θεραπεία υπερτασικών κρίσεων.
- β. Η αντιυπερτασική θεραπεία πρέπει να ρίχνει γρήγορα την αρτηριακή πίεση του ασθενούς στα φυσιολογικά επίπεδα.

γ. Ένα ενδοφλέβιο φάρμακο βραχείας δράσης είναι η καλύτερη επιλογή για τη μείωση της αρτηριακής πίεσης του ασθενούς.

δ. Η μονοθεραπεία με νιτροπρωσσικό είναι η επιλογή εκλογής για τη μείωση της αρτηριακής πίεσης σε οξύ διαχωρισμό αορτής.

Απάντηση: γ. Η χορήγηση ενδοφλέβιου φαρμάκου βραχείας δράσης προσδίδει τον βέλτιστο έλεγχο για την επίτευξη του ακριβούς στόχου της αρτηριακής πίεσης. Η από του στόματος θεραπεία μπορεί να χρησιμοποιηθεί για την αντιμετώπιση ορισμένων υπερτασικών κρίσεων, όπως η μετεγχειρητική υπέρταση με λειτουργικό έντερο. Η μείωση της συστολικής αρτηριακής πίεσης κάτω από 90 mm Hg, ή ακόμα και η μείωση της αρχικής μέσης αρτηριακής πίεσης κατά 35% μόνο, έχει συσχετιστεί με μείζονα οργανική δυσλειτουργία, κόμα και θάνατο. Σε υπερτασικές κρίσεις, η μέση αρτηριακή πίεση πρέπει να μειώνεται αρχικά κατά 15-20%. Το νιτροπρωσσικό, όταν χορηγείται για τη θεραπεία υπέρτασης που σχετίζεται με διαχωριστικό ανεύρυσμα αορτής, πρέπει να χρησιμοποιείται σε συνδυασμό με έναν ενδοφλέβιο β-αποκλειστή.

4. Ποιοι από τους ακόλουθους παράγοντες είναι πιο σημαντικοί για τον καθορισμό της ανάγκης άμεσης μείωσης της αρτηριακής πίεσης σε έναν ασθενή που προσέρχεται με ισχαιμικό εγκεφαλικό επεισόδιο;

- α. Διαταραχές της νοητικής κατάστασης
- β. Έκταση εμφράκτου στην αξονική τομογραφία
- γ. Συστολική πίεση αίματος 200 mm Hg ή υψηλότερη
- δ. Απόφαση χορήγησης συστηματικής θρομβόλυσης

Απάντηση: δ. Η αντιμετώπιση της υπέρτασης στο πλαίσιο οξέος εγκεφαλικού επεισοδίου βασίζεται στην κατανόηση των μεταβολών που παρατηρούνται στην ικανότητα αυτορρύθμισης της ροής του αίματος στο τμήμα του εγκεφάλου που ισχαιμεί. Κατά τη διάρκεια οξέος ισχαιμικού εγκεφαλικού επεισοδίου, η καμπύλη αυτορρύθμισης της εγκεφαλικής ροής αίματος σε σχέση με τη MAP καθίσταται γραμμική. Με άλλα λόγια, η άρδευση εξαρτάται άμεσα από τη MAP λόγω της απώλειας της ικανότητας αυτορρύθμισης. Φυσιολογικά, το σώμα αντιρροπεί αυξάνοντας τη MAP, για να διατηρηθεί η ροή στις περιοχές του εγκεφάλου γύρω από το έμφρακτο. Οι μειώσεις της πίεσης του αίματος μπορεί να προκαλέσουν δευτεροπαθή νευρολογική βλάβη επεκτείνοντας το μέγεθος του εμφράκτου. Σε αυτό το πλαίσιο, συστήνεται επί του παρόντος να γίνονται ανεκτές υψηλές πιέσεις αίματος όταν συμβαίνει οξύ ισχαιμικό εγκεφαλικό επεισόδιο. Ο κύριος παράγοντας αλλαγής αυτής της προσέγγισης θα ήταν η χρήση συστηματικών θρομβολυτικών. Σε ασθενείς που λαμβάνουν θρομβολυτικά, η συστολική αρτηριακή πίεση πρέπει να διατηρείται κάτω από τα 180 mm Hg, για τη μείωση του κινδύνου αιμορραγίας.

5. Ποιο από τα ακόλουθα είναι πιο ορθό σε σχέση με τη θεραπεία της υπέρτασης που σχετίζεται με διαχωρισμό αορτής;

- α. Στόχος της αρτηριακής πίεσης σε διαχωρισμό αορτής είναι η μείωση της μέσης αρτηριακής πίεσης κατά 25%.
- β. Η μείωση της αρτηριακής πίεσης μέχρι τον στόχο σε διαχωρισμό αορτής πρέπει να επιτυγχάνεται εντός της πρώτης ώρας.
- γ. Η βέλτιστη θεραπεία είναι ο συνδυασμός ενός β-αποκλειστή με ένα αγγειοδιασταλτικό φάρμακο.
- δ. Η αποφυγή της πτώσης της αρτηριακής πίεσης κάτω από το φάσμα αυτορρύθμισης είναι υψίστης σημασίας στην αντιμετώπιση του διαχωρισμού αορτής.

Απάντηση: γ. Σκεπτικό: Η μείωση της διαμητρικής τάσης, που αφορά το ρυθμό μεταβολής της πίεσης σε σχέση με το χρόνο (ή dp/dt , το αορτικό κύμα παλμού – η πρώτη παράγωγος της πίεσης ως προς το χρόνο), είναι σημαντική για την ελάττωση της επίδρασης

κάθε καρδιακού κύκλου στο διαχωρισμό, και αποτελεί μία από τις κύριες αρχές της θεραπείας της αυξημένης αρτηριακής πίεσης στον διαχωρισμό της αορτής. Η πίεση πρέπει να μειώνεται ως τα φυσιολογικά επίπεδα σε 15-30 λεπτά, ακόμα και με κίνδυνο πτώσης κάτω από το φάσμα αυτορρύθμισης της αρτηριακής πίεσης. Τα

φάρμακα εκλογής περιλαμβάνουν νιτροπρωσσικό συν εσμολόλη, φαινολδοπάμη συν εσμολόλη, νικαρδιπίνη συν εσμολόλη, ή λαβεταλόλη ενδοφλέβια.

ΚΕΦΑΛΑΙΟ 33

Οξύ Διαχωρισμός (Θωρακικής) Αορτής

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Ερωτήσεις Ανασκόπησης

1. Ποιο από τα ακόλουθα είναι *πιο ορθό σε σχέση* με τον οξύ διαχωρισμό της αορτής;
- α.** Οι διαχωρισμοί της κατιούσας αορτής χρειάζονται χειρουργική αντιμετώπιση.
 - β.** Όταν υπάρχει υπέρταση, η αρτηριακή πίεση πρέπει να μειώνεται κατά 15%.
 - γ.** Ο πόνος θεωρείται σημείο διαχωρισμού σε εξέλιξη.
 - δ.** Η συμπίεση του δακτυλίου της αορτικής βαλβίδας μπορεί να προκαλέσει φύσημα στένωσης αορτής.

Απάντηση: γ. Εκτός και αν ο διαχωρισμός της κατιούσας αορτής θέτει σε κίνδυνο κάποιο αγγείο που εκφύεται από την αορτή, η χειρουργική επέμβαση δεν ενδείκνυται, ενώ η συντηρητική αντιμετώπιση (έλεγχος πίεσης αίματος) είναι η μοναδική θεραπεία. Ενδείκνυται η ελάττωση της αρτηριακής πίεσης μέχρι τη φυσιολογική τιμή. Ο πόνος υποδηλώνει συνεχιζόμενο διαχωρισμό με διάσταση των στιβάδων του αορτικού τοιχώματος. Ο εγγύς διαχωρισμός προς τον αορτικό δακτύλιο μπορεί να οδηγήσει σε ανεπάρκεια, και όχι σε στένωση αορτής.

2. Ποια από τα ακόλουθα αντιυπερτασικά σχήματα θα ήταν πιο κατάλληλο για την ομαλοποίηση της αρτηριακής πίεσης σε διαχωρισμό αορτής;
- α.** Υδραλαζίνη ενδοφλέβια
 - β.** Εσμολόλη και νιτρογλυκερίνη ενδοφλέβια
 - γ.** Κλονιδίνη από του στόματος
 - δ.** Εσμολόλη και νιτροπρωσσικό ενδοφλέβια

Απάντηση: δ. Σε διαχωρισμό αορτής, η προσέγγιση χειρισμού της αρτηριακής πίεσης είναι η ταχεία ομαλοποίησή της με ταυτόχρονο έλεγχο της καρδιακής συχνότητας για την αποφυγή ταχυκαρδίας ή βραδυκαρδίας. Το θεραπευτικό σχήμα εκλογής περιλαμβάνει έναν ενδοφλέβιο β-αποκλειστή, που χορηγείται πρώτος και ακολουθείται από ένα μεικτό αγγειοδιασταλτικό φάρμακο, όπως είναι το νιτροπρωσσικό, που έχει ταχεία έναρξη και ταχεία λήξη δράσης.

3. Ποια από τις ακόλουθες είναι η διαγνωστική μέθοδος εκλογής για τον οξύ διαχωρισμό της θωρακικής αορτής;
- α.** Υπολογιστική τομογραφική αγγειογραφία (αξονική αγγειογραφία-computed tomographic angiogram)
 - β.** Αγγειογραφία μαγνητικού συντονισμού (Magnetic resonance angiography-MRA)
 - γ.** Αορτογραφία (Aortography)
 - δ.** Διαθωρακική ηχοκαρδιογραφία (Transthoracic echocardiography)

Απάντηση: α. Η τρισδιάστατη ογκομετρική υπολογιστική τομογραφική αγγειογραφία είναι η προτιμώμενη αρχική διαγνωστική δοκιμασία για το διαχωρισμό της αορτής, με υψηλή ευαισθησία και ειδικότητα. Η αορτογραφία είναι λιγότερο επιθυμητή επειδή είναι επεμβατική και οδηγεί σε πολλά ψευδώς αρνητικά αποτελέσματα. Η διαγνωστική ακρίβεια της MRA είναι υψηλή, αφού προσεγγίζει το 100% σε τεχνικά άρτιες μελέτες, αλλά η μέθοδος περιορίζεται από τις αντενδείξεις της, όπως σε ασθενείς με βηματοδότες, μεταλλικά εμφυτεύματα και υποστηρικτικές συσκευές. Η διαθωρακική ηχοκαρδιογραφία είναι σημαντική διαγνωστική εξέταση για τον εντοπισμό επιπλοκών όπως είναι η περικαρδιακή συλλογή (σε εγγύς διαχωρισμό), η αορτική ανεπάρκεια, ή ο περιορισμός της στεφανιαίας ροής, αλλά δεν βοηθά στη διάγνωση του διαχωρισμού καθ' αυτού. Το διοισοφάγειο ηχοκαρδιογράφημα είναι εξαιρετικό διαγνωστικό εργαλείο σε διαχωρισμούς της ανιούσας αορτής.

ΚΕΦΑΛΑΙΟ 34

Γενικές Αρχές Μετεγχειρητικής Φροντίδας στη Μονάδα Εντατικής Θεραπείας

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Ερωτήσεις Ανασκόπησης

1. Ποια από τα ακόλουθα προεγχειρητικά φάρμακα πρέπει να συνεχίζονται στη διάρκεια της άμεσης περιεγχειρητικής περιόδου σε ασθενείς που υποβάλλονται σε μείζονες γενικές χειρουργικές επεμβάσεις;

- α. Διουρητικά
- β. Αποκλειστές διαύλων ασβεστίου
- γ. Γλυκοκορτικοειδή
- δ. Μετφορμίνη

Απάντηση: γ. Τα γλυκοκορτικοειδή πρέπει να συνεχίζονται στις καθιερωμένες δόσεις για μείζονες γενικές χειρουργικές επεμβάσεις για την πρόληψη πρόκλησης υπότασης λόγω επινεφριδιακής καταστολής. Οι αποκλειστές διαύλων ασβεστίου και τα διουρητικά πρέπει να διακόπτονται περιεγχειρητικά για την πρόληψη πρόκλησης υπότασης και πιθανώς επιδείνωσης υπότασης λόγω αιμορραγίας ή σήψης. Η μετφορμίνη πρέπει να διακόπτεται περιεγχειρητικά μέχρι ο ασθενής να ανέχεται τη διατροφή χωρίς διακοπές, για την αποφυγή υπογλυκαιμίας.

2. Ποιο από τα ακόλουθα φάρμακα μπορεί να οδηγήσει σε μείωση των επεισοδίων παραληρήματος, όταν χρησιμοποιείται ως κατασταλτικό σε ασθενείς με μηχανικό αερισμό;

- α. Δεξμεδετομιδίνη
- β. Βενζοδιαζεπίνες
- γ. Γκαμπαπεντίνη
- δ. Μορφίνη

Απάντηση: α. Η δεξμεδετομιδίνη είναι ένας αγωνιστής των α2 αδρενεργικών υποδοχέων, που έχει καταδειχθεί ότι μειώνει το άγχος, τη διάρκεια του υπερκινητικού παραληρήματος και τη διάρκεια του μηχανικού αερισμού σε ασθενείς με παραλήρημα. Οι βενζοδιαζεπίνες έχει διαπιστωθεί ότι αυξάνουν τη συχνότητα του παραληρήματος, τη διάρκεια του μηχανικού αερισμού και τη διάρκεια παραμονής στην εντατική. Η μορφίνη (οπιοειδές) και η γκαμπαπεντίνη (μη οπιοειδές) είναι αναλγητικά φάρμακα και συνήθως δεν χορηγούνται για καταστολή.

3. Ποια από τις ακόλουθες διαγνώσεις αποτελεί αντένδειξη για τις καθημερινές δοκιμές αυτόματης αφύπνισης (spontaneous awakening trials-SAT);

- α. Σηπτική καταπληξία
- β. Επιληπτικοί σπασμοί
- γ. Ανοιχτή κοιλία
- δ. Εν τω βάθει φλεβική θρόμβωση

Απάντηση: β. Οι ασθενείς με επιληπτικούς σπασμούς συχνά χρειάζονται σημαντική καταστολή για τον έλεγχο και την πρόληψη της επιληπτικής δραστηριότητας και μια SAT μπορεί να οδηγήσει σε υποτροπή και επιδείνωση των σπασμών. Η σηπτική καταπληξία, η ανοιχτή κοιλία και οι εν τω βάθει φλεβικές θρομβώσεις δεν αποτελούν αντενδείξεις για τη μείωση της καταστολής, ούτε εμποδίζουν την προσπάθεια να μπορέσει ο ασθενής να ακολουθήσει εντολές και να διενεργηθεί μια δοκιμή αυτόματης αναπνοής.

4. Με ποια από τις ακόλουθες τεχνικές μπορεί να βελτιωθεί η θνητότητα σε ασθενείς με σύνδρομο οξείας αναπνευστικής δυσχέρειας (acute respiratory distress syndrome-ARDS);

- α. Αναπνεύμενος όγκος ίσος με 10 mL/kg
- β. Αναστροφή σχέσης εισπνευστικού-εκπνευστικού χρόνου
- γ. Πρηνής θέση
- δ. Αερισμός με υψίσυχο ταλαντωτή

Απάντηση: γ. Στην ιατρική βιβλιογραφία, έχει διαπιστωθεί ότι η πρηνής θέση βελτιώνει τη θνητότητα και την οξυγόνωση, ευνοώντας τη σχέση αερισμού-αιμάτωσης και μειώνοντας την κυκλοφορική παράκαμψη (shunt). Ο αερισμός με χαμηλό αναπνεύμενο όγκο (6 mL/kg) και συμπληρωματική θετική τελο-εκπνευστική πίε-

ση βελτιώνει τη θνητότητα σε ασθενείς με ARDS. Η αναστροφή σχέσης εισπνευστικού-εκπνευστικού χρόνου και ο αερισμός με υψίσυχο ταλαντωτή δεν έχει αποδειχθεί ότι βελτιώνουν τη θνητότητα στην ιατρική βιβλιογραφία.

5. Ποια από τις ακόλουθες τεχνικές δεν μειώνει την επίπτωση της πνευμονίας που σχετίζεται με τον αναπνευστήρα (ventilator-associated pneumonia-VAP);

- α. Επείγουσα διασωλήνωση εξωνοσοκομειακά για την προστασία του αεραγωγού
- β. Ανύψωση της κεφαλής της κλίνης στις 30-45 μοίρες
- γ. Στοματική φροντίδα με χλωρεξιδίνη
- δ. Υπογλωττική αναρρόφηση εκκρίσεων

Απάντηση: α. Έχει διαπιστωθεί ότι η επείγουσα διασωλήνωση αυξάνει τον κίνδυνο VAP. Η ανύψωση της κεφαλής της κλίνης, η στοματική φροντίδα με χλωρεξιδίνη και η υπογλωττική αναρρόφηση εκκρίσεων μειώνουν τα ποσοστά VAP σε ασθενείς της μονάδας εντατικής θεραπείας.

6. Ποιος από τους ακόλουθους ασθενείς είναι πιθανό να χρειαστεί παρεντερική διατροφή;

- α. Ένας ασθενής που χρειάζεται σταθερά χαμηλή δόση αγγειοσυσπαστικών
- β. Ένας ασθενής με εγγύς εντεροδερματικό συρίγγιο υψηλής έκκρισης
- γ. Ένας ασθενής με ανοιχτή κοιλία
- δ. Ένας ασθενής με γαστρικό υπόλειμμα 300 mL

Απάντηση: β. Οι ασθενείς με εγγύς εντεροδερματικά συρίγγια υψηλής έκκρισης χρειάζονται ολική παρεντερική σίτιση, επειδή δεν απορροφώνται οι θρεπτικές ουσίες από το έντερο και επειδή η εντερική σίτιση αυξάνει την έκκριση του συριγγίου. Οι ασθενείς που λαμβάνουν χαμηλές δόσεις αγγειοσυσπαστικών ουσιών και οι ασθενείς με ανοιχτή κοιλία, ανέχονται την εντερική σίτιση χωρίς προβλήματα. Ο έλεγχος των γαστρικών υπολειμμάτων δεν πρέπει να αποτελεί διαδικασία ρουτίνας, αλλά εφόσον γίνεται αυτός ο έλεγχος, η εντερική σίτιση πρέπει να διακόπτεται μόνο σε ασθενείς με όγκους μεγαλύτερους από 500 mL.

7. Τι από τα ακόλουθα περιλαμβάνει η βέλτιστη στρατηγική διάσωσης ασθενών με αιμορραγική καταπληξία;

- α. Μετάγγιση ερυθροκυττάρων
- β. Έγχυση ισοτονικών κρυσταλλοειδών
- γ. Έγχυση κολλοειδών
- δ. Μετάγγιση με υψηλή αναλογία πλάσματος και αιμοπεταλίων προς ερυθροκύτταρα

Απάντηση: δ. Οι μεταγγίσεις υψηλής αναλογίας αντικαθιστούν τους παράγοντες πήξης που έχουν απολεσθεί και μειώνουν την ποσότητα των ερυθροκυττάρων που χορηγούνται σε ασθενείς με αιμορραγία. Τα ισοτονικά κρυσταλλοειδή, τα κολλοειδή και τα ερυθροκύτταρα που χορηγούνται σε ασθενείς με ενεργό αιμορραγία, δεν αντικαθιστούν τους παράγοντες πήξης, προκαλούν αραίωση αυτών και οδηγούν σε αύξηση του αριθμού των ερυθροκυττάρων που μεταγγίζονται.

8. Η δοκιμασία με τη μεγαλύτερη ευαισθησία για τη διάγνωση διαφυγής από την αναστόμωση μετά από οισοφαγεκτομή είναι

- α. Δοκιμασία κατάποσης με αντιθετικό μέσο
- β. Ενδοσκόπηση
- γ. Υπολογιστική τομογραφία με αντιθετικό μέσο από του στόματος
- δ. Εξέταση του περιεχομένου της περιαναστομωτικής παροχέτευσης

Απάντηση: β. Η ενδοσκόπηση έχει υψηλότερη ευαισθησία από τις άλλες εξετάσεις για την ανίχνευση αναστομωτικής διαφυγής

και επίσης επιτρέπει την ελάχιστη επεμβατική αντιμετώπιση των διαφυγών με τοποθέτηση stent. Οι άλλες εξετάσεις έχουν χαμηλή ευαισθησία, που κυμαίνεται από 7-50%.

- 9.** Ποιο από τα ακόλουθα θα ήταν το επόμενο βήμα στην αντιμετώπιση ενός ασθενούς με τραυματισμό άκρου που κινδυνεύει από νεκρωτική λοίμωξη μαλακών ιστών και αιμοδυναμική αστάθεια;
- α.** Λήψη απλών ακτινογραφιών
 - β.** Διενέργεια υπολογιστικής τομογραφίας
 - γ.** Εισαγωγή στη μονάδα εντατικής θεραπείας για χορήγηση αντιβιοτικών και αναζωογόνηση με υγρά
 - δ.** Επείγουσα χειρουργική επέμβαση για χειρουργική διερεύνηση και καθαρισμό

Απάντηση: δ. Οι ασθενείς με νεκρωτική λοίμωξη μαλακών ιστών χρειάζονται επείγουσα χειρουργική παροχέτευση και καθαρισμό, και η διερεύνηση θα οδηγήσει στην οριστική διάγνωση. Η υπολογιστική τομογραφία, η εισαγωγή στη μονάδα εντατικής θεραπείας για χορήγηση αντιβιοτικών και αναζωογόνηση με υγρά, καθώς και η λήψη απλών ακτινογραφιών, απλά θα καθυστερήσουν την οριστική θεραπεία, χωρίς να οδηγήσουν σε οριστική διάγνωση.

- 10.** Ποιο από τα ακόλουθα συμβάλλει στην πρόληψη οξείας νεφρικής βλάβης σε ασθενείς που νοσηλεύονται στη μονάδα εντατικής θεραπείας;

- α.** Χαμηλή δόση ντοπαμίνης
- β.** N-ακετυλοκυστεΐνη
- γ.** Αναπλήρωση όγκου με ισοτονικά κρυσταλλοειδή
- δ.** Χορήγηση διττανθρακικών

Απάντηση: γ. Η αναπλήρωση όγκου με κρυσταλλοειδή για την διατήρηση επαρκούς νεφρικής άρδευσης μειώνει την επίπτωση της οξείας νεφρικής βλάβης σε ασθενείς που νοσηλεύονται στη μονάδα εντατικής θεραπείας, καθώς και περιεγχειρητικά. Δεν έχει διαπιστωθεί ότι η N-ακετυλοκυστεΐνη και τα διττανθρακικά μειώνουν την επίπτωση της οξείας νεφρικής βλάβης. Η χορήγηση χαμηλής δόσης ντοπαμίνης μπορεί να αυξήσει τη νεφρική άρδευση, αλλά δεν έχει καταδειχτεί ότι μειώνει την επίπτωση της οξείας νεφρικής βλάβης.

ΚΕΦΑΛΑΙΟ 35

Μετεγχειρητική Αντιμετώπιση του Καρδιοχειρουργικού Ασθενούς

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Ερωτήσεις Ανασκόπησης

1. Κάθε ένας από τους παράγοντες που ακολουθούν οδηγεί σε παράταση της διάρκειας της διασωλήνωσης εκτός από:
- α. Παράταση λειτουργίας αντλίας
 - β. Διαταραχές πήξης
 - γ. Προχωρημένη ηλικία
 - δ. Ιστορικό εγκεφαλικού επεισοδίου

Απάντηση: δ. Η παράταση της λειτουργίας της αντλίας διεγχειρητικά, οι διαταραχές πήξης και η προχωρημένη ηλικία, έχει καταδειχτεί ότι καθυστερούν την αποσωλήνωση, αλλά το ιστορικό εγκεφαλικού επεισοδίου δεν επηρεάζει την ικανότητα έγκαιρου απογαλακτισμού και αποσωλήνωσης ενός ασθενούς.

2. Ποιο από τα ακόλουθα είναι αληθές σχετικά με την μετεγχειρητική κολπική μαρμαρυγή;
- α. Είναι σπάνια και συχνά υποχωρεί χωρίς παρέμβαση.
 - β. Σχετίζεται με αυξημένη θνητότητα και διάρκεια νοσηλείας.
 - γ. Μπορεί να αντιμετωπιστεί προφυλακτικά με διγοξίνη.
 - δ. Χρειάζεται έλεγχο ρυθμού και όχι έλεγχο συχνότητας.

Απάντηση: β. Η μετεγχειρητική κολπική μαρμαρυγή είναι η συχνότερη επιπλοκή σε καρδιοχειρουργικούς ασθενείς και σχετίζεται με αυξημένη θνητότητα και νοσηρότητα. Ο έλεγχος του ρυθμού δεν προσφέρει μακροχρόνιο όφελος σε σύγκριση με τον έλεγχο της συχνότητας. Δεν έχει διαπιστωθεί ότι η δακτυλίτιδα είναι αποτελεσματική για τη διατήρηση του φλεβοκομβικού ρυθμού μετεγχειρητικά.

3. Τα ακόλουθα είναι αληθή σχετικά με τα μετεγχειρητικά εγκεφαλικά επεισόδια σε καρδιοχειρουργικούς ασθενείς εκτός από:
- α. Αυτά τα εγκεφαλικά επεισόδια είναι συνήθως αιμορραγικά, λόγω της υψηλής δόσης ηπαρίνης που χορηγείται στην καρδιοπνευμονική παράκαμψη.
 - β. Ο αποκλεισμός με λαβίδα και η τοποθέτηση κάνουλας στην αορτή μπορεί να οδηγήσει σε αθηρωματικά έμβολα.
 - γ. Η αναγνώριση της καρωτιδικής νόσου προεγχειρητικά έχει μειώσει τον κίνδυνο εγκεφαλικού επεισοδίου.
 - δ. Ο καθορισμός της χρονικής στιγμής εμφάνισης ενός εγκεφαλικού επεισοδίου μπορεί να είναι δύσκολος μετεγχειρητικά.

Απάντηση: α. Η επίπτωση μετεγχειρητικού εγκεφαλικού επεισοδίου έχει μειωθεί λόγω της διερεύνησης, της αναγνώρισης και της αντιμετώπισης της καρωτιδικής νόσου, αλλά η καρδιοπνευμονική παράκαμψη με τον αποκλεισμό μιας αθηρωματικής αορτής με λαβίδα και τοποθέτηση κάνουλας μπορεί να οδηγήσει σε εμβολικό εγκεφαλικό επεισόδιο. Η ακριβής χρονική στιγμή εγκατάστασης ενός εγκεφαλικού επεισοδίου μπορεί να είναι δύσκολο να αναγνωρισθεί, επειδή η αναισθησία καθιστά την κλινική-νευρολογική εξέταση αναξιόπιστη για 4-6 ώρες μετά την επέμβαση. Τα περισσότερα εγκεφαλικά επεισόδια είναι εμβολικής αιτιολογίας και η επίπτωση των αιμορραγικών εγκεφαλικών επεισοδίων είναι χαμηλή, παρά την διεγχειρητική αντιπηκτική αγωγή.

ΚΕΦΑΛΑΙΟ 36

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Ερωτήσεις Ανασκόπησης

1. Ποια από τα ακόλουθα περιστατικά υποξαιμίας αναμένεται να έχουν φυσιολογική κυψελιδο-αρτηριακή διαφορά (alveolar-arterial, A-a) οξυγόνου;

- α. 25χρονος άνδρας που έλαβε υπερβολική δόση ηρωίνης
- β. 32χρονη γυναίκα με παρ' ολίγον πνιγμό
- γ. 40χρονος άνδρας με οξεία κρίση άσθματος
- δ. 60χρονος με πνευμονική εμβολή

Απάντηση: α. Ο υποαερισμός από μόνος του (όπως συμβαίνει σε καταστολή της αναπνοής λόγω υπερβολικής δόσης ηρωίνης) μπορεί να αποτελέσει αιτία υποξαιμίας, αλλά η κυψελιδο-αρτηριακή διαφορά παραμένει φυσιολογική, επειδή δεν υπάρχει διαταραχή της επιφάνειας ανταλλαγής οξυγόνου. Όλες οι άλλες καταστάσεις σχετίζονται με κάποιου βαθμού διαταραχή αερισμού-αιμάτωσης, η οποία σχετίζεται με αύξηση της κυψελιδο-αρτηριακής διαφοράς, που συμβάλλει στην πρόκληση υποξαιμίας (πλήρωση των κυψελίδων με νερό, βρογχόσπασμος, και απελευθέρωση μεσολαβητών λόγω θρόμβου σε πνευμονική αρτηρία, αντίστοιχα).

2. Ποια από τις ακόλουθες διαταραχές είναι (τουλάχιστον) πιθανό να έχει καλή έκβαση εφόσον αντιμετωπιστεί με υποστήριξη με μη-επεμβατικό αερισμό;

- α. Σύνδρομο οξείας αναπνευστικής δυσχέρειας (ARDS) δευτεροπαθές λόγω πνευμονίας
- β. Χρόνια αποφρακτική πνευμονοπάθεια (COPD) με υπερκαπνία
- γ. Παχυσαρκία με υποαερισμό
- δ. Συμφορητική καρδιακή ανεπάρκεια (CHF) με υποξαιμία

Απάντηση: α. Υπάρχει αυξανόμενο ενδιαφέρον για τη χρήση μη-επεμβατικού αερισμού στην αντιμετώπιση των εξάρσεων COPD, CHF, και υποαερισμού που σχετίζεται με νευρομυϊκή νόσο, αλλά δεν έχει αποδειχτεί ότι ο μη-επεμβατικός αερισμός είναι πάντα ωφέλιμος σε πνευμονία και σε μέτριο ως σοβαρό ARDS. Στην πραγματικότητα, πρόσφατα δεδομένα υποδηλώνουν υψηλότερη θνητότητα με τη χρήση μη-επεμβατικού αερισμού σε μέτριο ως σοβαρό ARDS, που πιθανώς σχετίζεται με την καθυστερημένη έναρξη προστατευτικού για τους πνεύμονες μηχανικού αερισμού.

3. Ποια από τα ακόλουθα ευρήματα περιλαμβάνονται στον ορισμό του Βερολίνου για το ARDS;

- α. Αμφοτερόπλευρα πνευμονικά διηθήματα
- β. Εξέλιξη από οξύ πνευμονικό τραύμα
- γ. Ενδείξεις αυξημένης πίεσης απόφραξης πνευμονικής αρτηρίας (PCWP)
- δ. Αυξημένα επίπεδα εγκεφαλικού νατριουρητικού πεπτιδίου (BNP) στον ορό

Απάντηση: α. Ο ορισμός του Βερολίνου για το ARDS περιλαμβάνει (1) έναρξη εντός μιας εβδομάδας από αναγνωρίσιμο κλινικό επεισόδιο ή νέων ή επιδεινούμενων αναπνευστικών συμπτωμάτων, (2) αμφοτερόπλευρα πνευμονικά διηθήματα (όχι πλευριτικές συλλογές), (3) αναπνευστική ανεπάρκεια που δεν εξηγείται επαρκώς από καρδιακή ανεπάρκεια και/ή υπερφόρτιση με υγρά, και (4) παθολογική οξυγόνωση με λόγο $\text{PaO}_2/\text{FIO}_2$ ίσο ή χαμηλότερο από 300. Η διαταραχή οξυγόνωσης υπό PEEP καθορίζει τη βαρύτητα του ARDS ως ήπιο ($\text{PaO}_2/\text{FIO}_2 \leq 300$, αλλά >200), μέτριο ($\text{PaO}_2/\text{FIO}_2 \leq 200$, αλλά >100), ή σοβαρό ($\text{PaO}_2/\text{FIO}_2 \leq 100$).

4. Ποια από τα ακόλουθα περιλαμβάνει ο προστατευτικός για τους πνεύμονες μηχανικός αερισμός;

- α. Αναπνεόμενο όγκο 4- 6 mL/kg ιδανικού βάρους σώματος
- β. Σταθερή διατήρηση της θετικής τελοεκπνευστικής πίεσης (PEEP) πάνω από 10 cm H₂O
- γ. Διατήρηση της μέγιστης εισπνευστικής πίεσης κάτω από 40 cm H₂O
- δ. Διατήρηση του κλάσματος εισπνεόμενου οξυγόνου (FIO_2) στο

0,6 ή λιγότερο, για την αποφυγή τοξικότητας από οξυγόνο

Απάντηση: α. Ο προστατευτικός αερισμός έχει σχεδιαστεί για τον περιορισμό της πρόκλησης πνευμονικής βλάβης από τον μηχανικό αερισμό σε ασθενείς με ARDS, ώστε να επιτραπεί στον πνεύμονα να αναρρώσει. Ο προστατευτικός αερισμός περιλαμβάνει την χρήση αναπνεόμενου όγκου 4-6 mL/Kg βάσει προβλεπόμενου βάρους σώματος (τουλάχιστον 6 mL/ kg και χαμηλότερα αν η τελοεκπνευστική πίεση πλατώ δεν είναι ≤ 30 cm H₂O), τη χρήση επαρκούς PEEP για τη διατήρηση ανοιχτών αεραγωγών και την αποφυγή πρόκλησης ατελεκτατικού τραύματος, που προκαλείται όταν η PEEP είναι πολύ χαμηλή, με αποτέλεσμα να συμπιέσει ο πνεύμονας στο τέλος της εκπνοής και στη συνέχεια να επανεκπύσσεται στην επόμενη αναπνοή, προκαλώντας τραύμα λόγω ανάπτυξης διατμητικών δυνάμεων. Η PEEP συχνά καθορίζεται βάσει του νομογράμματος της στρατηγικής υψηλής ή χαμηλής PEEP, όπου χρησιμοποιείται υψηλότερη PEEP σε πιο σοβαρό ARDS. Πρέπει να χρησιμοποιείται το λιγότερο τοξικό FIO_2 για τη διατήρηση της PaO_2 στα 55-80 mm Hg.

5. Για ποιους από τους ακόλουθους λόγους μπορεί να είναι ωφέλιμα τα φάρμακα νευρομυϊκού αποκλεισμού στην αντιμετώπιση ενός ασθενούς με ARDS;

- α. Μειωμένη διακυψελιδική πίεση
- β. Αύξηση δυσγυχρονισμού αερισμού
- γ. Αύξηση ανάγκης καταστολής
- δ. Μείωση φλεβικής επιστροφής

Απάντηση: α. Τα φάρμακα νευρομυϊκού αποκλεισμού σε πρώιμο ARDS μπορεί να είναι ωφέλιμα και να οδηγήσουν σε βελτίωση της έκβασης, μειώνοντας την διακυψελιδική πίεση και βελτιώνοντας τον συγχρονισμό ασθενούς-αναπνευστήρα. Η μείωση της ενδοθωρακικής πίεσης με τη μείωση της θετικής πίεσης που απαιτείται για την αναπνοή και πιθανώς τη μείωση των αναγκών PEEP, βελτιώνει τη φλεβική επιστροφή και την καρδιακή παροχή. Ο βελτιωμένος συγχρονισμός ασθενούς-αναπνευστήρα οδηγεί σε πιο σταθερή εφαρμογή της PEEP, μειώνει την διακυψελιδική κλίση πίεσης και μειώνει και την τελοεκπνευστική πίεση πλατώ. Υπάρχουν επίσης δεδομένα που δείχνουν λιγότερο βιοτραύμα (πνευμονική βλάβη που οφείλεται στο μηχανικό αερισμό [ventilator-induced lung injury-VILI] που σχετίζεται με την συστηματική απελευθέρωση προφλεγμονωδών μεσολαβητών) και πιθανώς λιγότερη συστηματική οργανική δυσλειτουργία. Επί του παρόντος διενεργείται η μελέτη ROSE (Reevaluation Of Systemic Early neuromuscular blockade) από το National Heart, Lung, and Blood Institute PETAL (prevention and early treatment of acute lung injury) Network (Δίκτυο πρόληψης και πρώιμης θεραπείας της οξείας πνευμονικής βλάβης του Εθνικού Ινστιτούτου Καρδιάς, Πνεύμονα και Αίματος), που είναι μια μεγάλη πολυκεντρική μελέτη για την αξιολόγηση της επίδρασης του πρώιμου νευρομυϊκού αποκλεισμού στην αντιμετώπιση του μέτριου προς σοβαρού ARDS.

6. Ποια από τις ακόλουθες στρατηγικές μπορεί να βελτιώσει την έκβαση ασθενών με ARDS;

- α. Ελεύθερος χειρισμός υγρών
- β. Πρώιμη χορήγηση υψηλών δόσεων στεροειδών
- γ. Πρηνής τοποθέτηση σε σοβαρή υποξαιμία
- δ. Διατροφική υποστήριξη που προάγει το ανοσοποιητικό

Απάντηση: γ. Έχει διαπιστωθεί ότι η πρηνής θέση βελτιώνει την επιβίωση σε ασθενείς με μέτριο προς σοβαρό ARDS και επίμονη υποξαιμία. Σε προηγούμενες μελέτες σε όλους τους ασθενείς με ARDS δεν διαπιστώθηκε όφελος επιβίωσης. Ο συντηρητικός χειρισμός των υγρών μείωσε την οργανική δυσλειτουργία και αύξησε τις ημέρες χωρίς ανάγκη μηχανικού αερισμού σε σύγκριση με την ελεύθερη χορήγηση υγρών. Οι υψηλές δόσεις στεροειδών δεν ωφέλησαν σε ARDS ή σήψη, αλλά πρόσφατες μελέτες και

μετα-αναλύσεις έδειξαν ότι η πρόωπη και/ή χαμηλή δόση διάσωσης μεθυλπρεδνιζολόνης είναι ευνοϊκή στην αντιμετώπιση ασθενών με μέτριο προς σοβαρό ARDS. Πρόσφατες μελέτες δεν έδειξαν να υπάρχει όφελος σχετιζόμενο με τη χρήση διατροφής που υποστηρίζει το ανοσοποιητικό σύστημα σε ασθενείς με ARDS.

7. Με ποια από τις ακόλουθες στρατηγικές μειώνεται ο κίνδυνος πρόκλησης πνευμονικής νόσου λόγω μηχανικού αερισμού;
- α. Αύξηση του αναπνεόμενου όγκου στα 10 mL/kg προβλεπόμενου σωματικού βάρους
 - β. Παροχή PEEP
 - γ. Προσθήκη χειρισμού εμφύσησης (αναστεναγμού-sigh) ανά 10λεπτο
 - δ. Διενέργεια χειρισμών επιστράτευσης σε κάθε βάρδια

Απάντηση: β. Έχει διαπιστωθεί ότι η παροχή επαρκούς PEEP ελαχιστοποιεί την πρόκληση VILI και προλαμβάνει την VILI σε πειραματικά μοντέλα. Η χρήση υψηλών αναπνεόμενων όγκων (δηλαδή ≥ 10 mL/kg προβλεπόμενου σωματικού βάρους), εμφυσέσεων και χειρισμών επιστράτευσης μπορεί να προκαλέσουν κυψελιδική υπερδιάταση, η οποία μπορεί να οδηγήσει σε βαρότραυμα και VILI.

8. Σε ποιας αιτιολογίας ARDS πρέπει να εξετάζεται το ενδεχόμενο χορήγησης κορτικοστεροειδών;
- α. Ιογενείς λοιμώξεις
 - β. Σοβαρή πνευμονία
 - γ. Βλάβη λόγω εισρόφησης οξέος
 - δ. Πολλαπλές μεταγγίσεις αίματος

Απάντηση: β. Μια μετα-ανάλυση και συστηματική ανασκόπηση μελετών, στις οποίες προστέθηκαν κορτικοστεροειδή στην αντιβιοτική αγωγή ασθενών με σοβαρή πνευμονία, έδειξε βελτίωση της επιβίωσης και χαμηλότερα ποσοστά ανάπτυξης ARDS. Σε αυτή την μετα-ανάλυση βασίστηκε κυρίως η κοινή πρόσφατη σύσταση της Εταιρείας Ιατρικής Εντατικής Θεραπείας – Ευρωπαϊκής Εταιρείας Εντατικής Θεραπείας (Society of Critical Care Medicine–European Society of Intensive Care

Medicine) σχετικά με τη χορήγηση κορτικοστεροειδών είτε πρώιμα (έναρξη την ημέρα 6), είτε όψιμα (μετά την 6^η ημέρα), για την αντιμετώπιση ασθενών με μέτριο ως σοβαρό ARDS.

9. Η πρηνής θέση ενδείκνυται σε ασθενείς με ARDS και ποιο από τα ακόλουθα;

- α. Ιστορικό χειρουργικής επέμβασης στην κοιλία
- β. Μερική τάση αρτηριακού οξυγόνου $\text{PaO}_2/\text{FIO}_2 < 150$
- γ. Σύνδρομο υποαερισμού της παχυσαρκίας
- δ. Νόσο καθ' υπεροχήν των άνω λοβών

Απάντηση: β. Έχει καταδειχτεί όφελος από την πρηνή θέση σε ασθενείς με μέτριο προς σοβαρό ARDS ή $\text{PaO}_2/\text{FIO}_2$ ίση ή χαμηλότερη από 150. Αν και οι ασθενείς που περιγράφονται στις εναλλακτικές απαντήσεις α, γ και δ, μπορεί να ωφεληθούν από την πρηνή θέση ανάλογα με το βαθμό του ελλείμματος οξυγόνωσης που παρουσιάζουν, αυτές οι συγκεκριμένες διαγνώσεις από μόνες τους δεν έχουν συσχετιστεί με όφελος από την πρηνή θέση.

10. Ποια από τις ακόλουθες δηλώσεις σχετικά με την εισπνεόμενη αγγειοδιασταλτική θεραπεία σε ARDS είναι σωστή;

- α. Το εισπνεόμενο μονοξείδιο του αζώτου (NO) έχει διαπιστωθεί ότι βελτιώνει την επιβίωση.
- β. Το εισπνεόμενο NO προκαλεί συστηματική υπόταση.
- γ. Το εισπνεόμενο NO αυξάνει την PaO_2 .
- δ. Το εισπνεόμενο NO έχει εγκριθεί για χρήση από τον FDA.

Απάντηση: γ. Έχει διαπιστωθεί σε πολλές μελέτες ότι το εισπνεόμενο NO προκαλεί πρόωπη αύξηση της οξυγόνωσης ασθενών με σοβαρό ARDS. Δυστυχώς, η βελτίωση της οξυγόνωσης δεν συνδυάστηκε με βελτίωση της επιβίωσης ή με πρωιμότερο απογαλακτισμό από τον μηχανικό αερισμό. Το NO δεσμεύεται από την αιμοσφαιρίνη των κυκλοφορούντων ερυθροκυττάρων και δεν υπάρχει συστηματική επίδραση από την εισπνεόμενη αγγειοδιασταλτική θεραπεία. Το εισπνεόμενο NO δεν έχει εγκριθεί από τον FDA για τη θεραπεία του ARDS. Η εισπνεόμενη εποπροστενόλη (ένας λιγότερο δαπανηρός εκλεκτικός εισπνεόμενος αγγειοδιασταλτικός), που επίσης δεν έχει εγκριθεί από τον FDA, και το εισπνεόμενο NO, έχουν χρησιμοποιηθεί ως θεραπεία “διάσωσης” σε ασθενείς με ARDS, στους οποίους το πρωτόκολλο μηχανικού αερισμού, ο νευρομυϊκός αποκλεισμός και η πρηνής τοποθέτηση δεν οδήγησαν σε αποδεκτή PaO_2 .

ΚΕΦΑΛΑΙΟ 37

Απειλητικό για τη Ζωή Άσθμα

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Ερωτήσεις Ανασκόπησης

1. Ποιος από τους ακόλουθους είναι ο καλύτερος προγνωστικός δείκτης απειλητικής για τη ζωή κρίσης άσθματος;

- α. Ηλικία >45 ετών
- β. Αφροαμερικανική καταγωγή
- γ. Προηγούμενη σχεδόν μοιραία κρίση
- δ. Ανδρικό φύλο

Απάντηση: γ. Η προχωρημένη ηλικία, το γυναικείο φύλο και η Αφροαμερικανική καταγωγή προδιαθέτουν σε σοβαρό άσθμα με έναρξη στην ενήλικη ζωή, αλλά ο καλύτερος προγνωστικός δείκτης θνητότητας είναι ένα παρολίγον μοιραίο προηγούμενο επεισόδιο.

2. Ποιο από τα ακόλουθα πρέπει να οδηγήσει το γιατρό σε άμεση διασωλήνωση και μηχανικό αερισμό ασθενούς με σοβαρό άσθμα;

- α. Μερική τάση αρτηριακού διοξειδίου του άνθρακα (PaCO_2) ίση με 45 με αναπνευστική συχνότητα 26 αναπνοές το λεπτό
- β. Εφίδρωση
- γ. Διάχυτος αμφοτερόπλευρος συριγμός στην ακρόαση
- δ. Λοίμωξη H1N1

Απάντηση: α. Όλα τα ανωτέρω συμπτώματα είναι σοβαρά και μπορεί να οδηγήσουν σε ανάγκη μηχανικού αερισμού. Όμως, ένας ασθενής με αυξημένη αναπνευστική συχνότητα και ταυτόχρονα αυξημένη PaCO_2 έχει σοβαρή διαταραχή του αερισμού και ανεπαρκή ικανότητα αντιρρόπησης της.

3. Ποια από τις ακόλουθες θεραπείες έχει τον σαφέστερο και πιο αδιαμφισβήτητο ρόλο στην αντιμετώπιση του σοβαρού οξέος άσθματος;

- α. Βρογχική θερμοπλαστική
- β. Αντισώματα κατά ανοσοσφαιρίνης E, όπως η ομαλιζουμάμπη
- γ. Αναστολείς λευκοτριενίων
- δ. Βρογχοδιασταλτικοί β-αγωνιστές

Απάντηση: δ. Κάθε μία από τις ανωτέρω θεραπευτικές επιλογές είναι πολλά υποσχόμενη για την αντιμετώπιση του χρόνιου άσθματος, αλλά μόνο οι βρογχοδιασταλτικοί β-αγωνιστές έχουν καλά τεκμηριωμένο ρόλο στη διάσωση από το οξύ σοβαρό άσθμα.

ΚΕΦΑΛΑΙΟ 38

Χρόνια Αποφρακτική Πνευμονοπάθεια

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Ερωτήσεις Ανασκόπησης

1. Ποιος είναι ο ορισμός της οξείας έξαρσης της χρόνιας αποφρακτικής πνευμονοπάθειας (ΧΑΠ);

Απάντηση:

- Έχει καταβληθεί πολλή προσπάθεια για την τυποποίηση της διάγνωσης της οξείας έξαρσης της ΧΑΠ, αλλά λόγω της ποικιλίας των συμπτωμάτων που χαρακτηρίζουν κάθε περιστατικό, είναι δύσκολο να επιτευχθεί συναίνεση.
- Έχει οριστεί ανάλογα με την επιδείνωση συγκεκριμένων σημείων και συμπτωμάτων όπως είναι η δύσπνοια, ο βήχας, ο όγκος των πτυέλων και το περιεχόμενό τους σε πύον. Είναι επίσης σημαντικό να λαμβάνεται υπ' όψη η ανάγκη για πρόσθετη θεραπεία, πέραν της συνήθους.
- Τα ζωτικά σημεία περιλαμβάνουν συνήθως ταχυκαρδία και ταχύπνοια. Συχνά υπάρχει συριγμός και άλλα ακροαστικά ευρήματα.
- Μπορεί να παρατηρηθεί η χρήση των επικουρικών αναπνευστικών μυών καθώς η βαρύτητα της κρίσης επιδεινώνεται. Λόγω της κόπωσης του διαφράγματος, αυτό δεν λειτουργεί πλέον ως κύριος εισπνευστικός μυς, αλλά υποστηρίζει την εισπνευστική προσπάθεια των μεσοπλευρίων μυών σταθεροποιώντας τον θωρακικό κλωβό, προκαλώντας ένα σημείο που ονομάζεται παράδοξη αναπνοή.

2. Ποιοι παράγοντες μπορεί να επισπεύσουν μια οξεία έξαρση της ΧΑΠ;

Απάντηση:

- *Λοιμώξεις (βακτηριακές ή ιογενείς)*
 - Τα βακτήρια και οι ιοί ευθύνονται για την συντριπτική πλειονότητα των επεισοδίων οξείας έξαρσης της ΧΑΠ. Η βρογχοσκοπική δειγματοληψία του περιφερικού αεραγωγού αποκάλυψε την ύπαρξη παθογόνων βακτηρίων στο 50% των εξάρσεων. Το 50% περίπου των περιστατικών σχετίζεται με ιογενείς λοιμώξεις του ανώτερου αναπνευστικού. Το ένα τέταρτο περίπου των ασθενών που εισάγονται στο νοσοκομείο με οξεία έξαρση της ΧΑΠ έχουν ταυτόχρονη βακτηριακή ή ιογενή λοίμωξη και αυτοί είναι οι ασθενείς με τις σοβαρότερες εξάρσεις.
- *Περιβαλλοντικοί παράγοντες*
 - Οι περιβαλλοντικοί παράγοντες περιλαμβάνονται στις μη λοιμώδεις αιτίες των εξάρσεων της ΧΑΠ που πρέπει να διερευνώνται ως προδιαθεσικοί παράγοντες.
 - Επιδημιολογικές μελέτες έδειξαν ότι οι εισαγωγές στο νοσοκομείο λόγω οξείας έξαρσης της ΧΑΠ αυξάνονται ελαφρώς, όταν αυξάνονται τα επίπεδα διοξειδίου του θείου, όζοντος, διοξειδίου του αζώτου και σωματιδίων στην ατμόσφαιρα.
- *Πνευμονική θρομβοεμβολή*
 - Η πνευμονική θρομβοεμβολή μπορεί να επιταχύνει τις οξείες εξάρσεις της ΧΑΠ είτε μέσω διαταραχής της ανταλλαγής αερίων, είτε μέσω αύξησης των πνευμονικών αγγειακών πιέσεων.
- *Αποτυχία φαρμακευτικής αγωγής ή έλλειψη συμμόρφωσης με αυτήν*
 - Πολλές οξείες εξάρσεις της ΧΑΠ μπορούν να εξηγηθούν λόγω ανεπαρκούς φαρμακευτικής αγωγής ή έλλειψης συμμόρφωσης με αυτήν. Αυτοί οι παράγοντες είναι μάλλον υποτιμημένα αίτια εξάρσεων σε ασθενείς με ΧΑΠ.
 - Ορισμένες αλληλεπιδράσεις φαρμάκων μπορεί να προκαλέσουν τοξικότητα ή απώλεια δράσης ενός φαρμάκου, και ο γιατρός πρέπει να ελέγχει αν έχουν προστεθεί νέα φάρμακα για άλλες παθήσεις στο θεραπευτικό πρόγραμμα του ασθενούς.
- *Άγνωστοι*
 - Η αιτία του ενός τρίτου των επεισοδίων οξείας έξαρσης της ΧΑΠ δεν είναι γνωστή.

3. Μελέτες έδειξαν ότι σε ασθενείς που εισάγονται στο νοσοκομείο λόγω σοβαρής οξείας έξαρσης της ΧΑΠ αγνώστου αιτιολογίας, ως και το 25% είχαν πνευμονική εμβολή, επιβεβαιωμένη με αζονική τομογραφία. Ποιοι είναι οι παράγοντες κινδύνου πνευμονικής θρομβοεμβολής (pulmonary thromboembolism-PTE) σε ασθενείς με ΧΑΠ;

Απάντηση:

- Καθιστική ζωή
- Ανεπάρκεια δεξιάς κοιλίας
- Τοιχωματικοί θρόμβοι δεξιάς κοιλίας
- Δευτεροπαθής πολυκυτταραιμία

4. Ποια είναι η βασική αρχή της αρχικής αντιμετώπισης της οξείας έξαρσης της ΧΑΠ;

Απάντηση: ABCO

- Αντιβιοτικά (Antibiotics)
- Βρογχοδιασταλτικά (Bronchodilators)
- Κορτικοστεροειδή (Corticosteroids)
- Οξυγόνο (Oxygen)

5. Γιατί χρειάζεται προσοχή όταν χορηγείται οξυγόνο σε ασθενή με οξεία έξαρση της ΧΑΠ;

Απάντηση:

- Αν και το οξυγόνο εξακολουθεί να είναι ο ακρογωνιαίος λίθος της εναρκτήριας θεραπείας των περισσότερων εξάρσεων ΧΑΠ, πρέπει να χορηγείται με προσοχή σε ασθενείς με χρόνια υπερκαπνία, επειδή είναι γνωστό ότι οδηγεί σε κλινικά σημαντικές αυξήσεις της PaCO_2 σε ορισμένους ασθενείς με ΧΑΠ, ως αποτέλεσμα μεταβολών του φυσιολογικού νεκρού χώρου και ίσως και λόγω καταστολής της αναπνευστικής ώσης.
- Η οξυγονοθεραπεία πρέπει να ξεκινά με χαμηλό κλάσμα εισπνεόμενου οξυγόνου (FIO_2) και να τιτλοποιείται αργά προς τα πάνω ανάλογα με τις ανάγκες, με προσεκτική παρακολούθηση για την τεκμηρίωση της βελτίωσης και της σταθεροποίησης της μερικής τάσης αρτηριακού οξυγόνου (PaO_2), και με ιδιαίτερη προσοχή στη διατήρηση της οξυαιμοσφαιρίνης μεταξύ 88% και 92% ή περισσότερο, χωρίς να προκαλούνται επικίνδυνες πτώσεις του pH λόγω αυξήσεων του CO_2 .
- Όμως, όταν υπάρχει οξεία σοβαρή υποξαιμία σε ασθενείς με επικείμενη αναπνευστική ανεπάρκεια, η οξυγονοθεραπεία υψηλής ροής μπορεί να είναι η καλύτερη επιλογή για τον ασθενή, ανεξάρτητα από τον κίνδυνο κατακράτησης CO_2 .

6. Συνιστάται η λήψη καλλιέργειας πτυέλων ως ρουτίνα σε όλους τους ασθενείς με οξεία έξαρση της ΧΑΠ. Οι επεμβατικές τεχνικές για τη λήψη δείγματος καλλιέργειας δεν ενδείκνυνται γενικά. Ποιες είναι οι δύο εξαιρέσεις αυτής της οδηγίας;

Απάντηση:

- Πνευμονία της κοινότητας με αρνητική καλλιέργεια που δεν ανταποκρίνεται στη θεραπεία.
- Πνευμονία που σχετίζεται με μηχανικό αερισμό.

7. Ποιοι είναι οι στόχοι της υποστήριξης του αερισμού σε ασθενείς με οξεία έξαρση της ΧΑΠ που παρουσιάζουν Οξεία Αναπνευστική Ανεπάρκεια (ΟΑΑ);

Απάντηση:

- Ανάπαυση των αναπνευστικών μυών στη διάρκεια της θερα-

πείας της υποκείμενης νόσου.

- Διόρθωση σοβαρής υποξαιμίας και υπερκαπνίας.

8. Ποιοι ασθενείς με οξεία έξαρση της ΧΑΠ και ΟΑΑ πρέπει να είναι υποψήφιοι για Μη Επεμβατικό Αερισμό (Non Invasive Ventilation-NIV);

Απάντηση:

- Σε ασθενείς με μέτριας βαρύτητας ΟΑΑ, που χαρακτηρίζεται από επίπεδα pH μεταξύ 7,25 και 7,30, ο NIV ενδείκνυται για λίγες ώρες την ημέρα (<12 ώρες) για την πρόληψη ενδοτραχειακής διασωλήνωσης.
- Σε ασθενείς σε πιο σοβαρή κατάσταση ($\text{pH} < 7.25$), η συχνότητα της αποτυχίας του NIV σχετίζεται αντιστρόφως ανάλογα με την αναπνευστική οξέωση. Σε αυτό τον πληθυσμό, η χρήση NIV ως εναλλακτική του επεμβατικού αερισμού δεν επηρεάζει τη θνητότητα ή τη διάρκεια της υποστήριξης του αερισμού, αλλά σχετίζεται με χαμηλότερο ποσοστό επιπλοκών (πνευμονία οφειλόμενη σε μηχανικό αερισμό, δυσκολία απογαλακτισμού).
- Παρά το αυξημένο ποσοστό αποτυχιών, αξίζει μια βραχεία δοκιμή NIV αν δεν υπάρχουν αντενδείξεις (*μειωμένο επίπεδο συνείδησης, καρδιακή ή αναπνευστική ανακοπή, σοβαρή γαστρεντερική αιμορραγία, σοβαρή αιμοδυναμική αστάθεια, χειρουργική επέμβαση προσώπου ή τραύμα προσώπου, απόφραξη ανώτερου αεραγωγού, αδυναμία αποβολής εκκρίσεων*).

9. Ποιες στρατηγικές υπάρχουν για τη μείωση της δυναμικής υπερδιάτασης και της iPEEP κατά τη διάρκεια μηχανικού αερισμού σε ασθενή με ΟΑΑ και οξεία έξαρση της ΧΑΠ;

Απάντηση:

- Επιλογή του μεγαλύτερου δυνατού χρόνου εκπνοής
- Μείωση της ανάγκης αερισμού και του κατά λεπτό αερισμού του ασθενούς
- Μείωση της αντίστασης στη ροή του αέρα με τη χρήση βρογχοδιασταλτικών και κορτικοστεροειδών

10. Ποιοι ασθενείς με οξεία έξαρση της ΧΑΠ πρέπει να εξετάζονται για εισαγωγή στην μονάδα εντατικής θεραπείας;

Απάντηση:

Ασθενείς με

- Σοβαρή δύσπνοια που δεν ανταποκρίνονται επαρκώς στην αρχική επείγουσα θεραπεία
- Μεταβολές της νοητικής κατάστασης (σύγχυση, λήθαργος, κώμα)
- Επίμονη ή επιδεινούμενη υποξαιμία
- Επίμονη ή επιδεινούμενη αναπνευστική οξέωση παρά τον NIV
- Ανάγκη για μηχανικό αερισμό
- Αιμοδυναμική αστάθεια

ΚΕΦΑΛΑΙΟ 39

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Ερωτήσεις Ανασκόπησης

1. Ένας 73χρονος άνδρας προσκομίστηκε σε ένα περιφερειακό νοσοκομείο επειδή ήταν ληθαργικός και βρέθηκε στο πάτωμα ενός κέντρου αποκατάστασης, όπου ανάρρωνε μετά από μια ανεπίπλεκη αμφοτερόπλευρη αυχενική πεταλεκτομή στο επίπεδο A3-A7. Στην κλινική αποκατάστασης κινείτο ελάχιστα και του χορηγούσαν οπιοειδή, ανάλογα με τις ανάγκες, λόγω μετεγχειρητικού πόνου στην πλάτη. Έχει ιστορικό χρόνιας αποφρακτικής πνευμονοπάθειας (ΧΑΠ), υπέρτασης και στεφανιαίας νόσου που χρειάστηκε αορτοστεφανιαία παράκαμψη, φέρει εμφυτευμένο αμφικοιλιακό βηματοδότη-απινιδωτή και έχει πολλούς πνευμονικούς όζους, που είναι σταθεροί για περισσότερο από ένα χρόνο.

Κατά την προσέλευση στο περιφερειακό νοσοκομείο, αναφέρθηκε ότι ο ασθενής ήταν ληθαργικός αλλά αφυπνιζόμενος, και φορούσε αυχενικό κηδεμόνα (κολλάρο). Παρουσίαζε περιοδική αναπνοή με αναπνευστική συχνότητα από 0 ως 24 αναπνοές το λεπτό. Τα υπόλοιπα ζωτικά σημεία ήταν φυσιολογικά και η κλινική εξέταση ήταν χωρίς ιδιαίτερα ευρήματα. Ο κορεσμός της αιμοσφαιρίνης σε οξυγόνο ήταν 98% με χορήγηση οξυγόνου 2 L/min μέσω ρινοκαθετήρα. Τα εργαστηριακά ευρήματα περιελάμβαναν κρεατινίνη 1,85 mg/dL (βασική 0,9 mg/dL), φυσιολογικά επίπεδα TSH, ασβέστιο 10,8 mg/dL και αλβουμίνη 2,5 gm/dL. Δεν υπήρχαν παθολογικά ευρήματα στην αξονική τομογραφία κεφαλής χωρίς σκιαγραφικό μέσο. Η αξονική τομογραφία θώρακος χωρίς σκιαγραφικό μέσο έδειξε πολλαπλούς σταθερούς πνευμονικούς όζους, πολλαπλές εκφυλιστικές αλλοιώσεις σπονδύλων, εμφυσηματικές αλλοιώσεις και διάταση της πνευμονικής αρτηρίας που υποδηλώνει χρόνια πνευμονική υπέρταση.

Ενώ βρισκόταν στο περιφερειακό νοσοκομείο, ο ασθενής υπέστη οξύ ως υποξύ ισχαιμικό εγκεφαλικό επεισόδιο στην δεξιά μετωποβρεγματική περιοχή. Διασωληνώθηκε για πιθανή πνευμονία από εισρόφηση και αναπνευστική ανεπάρκεια. Στη συνέχεια μεταφέρθηκε στο τριτοβάθμιο κέντρο, στο οποίο εργάζεστε, για περαιτέρω αξιολόγηση της αναπνευστικής ανεπάρκειας.

Κατά την άφιξή του στο τριτοβάθμιο κέντρο, ο ασθενής είναι σε εγρήγορση και ξύπνιος, ακολουθεί οδηγίες και κινεί και τα τέσσερα άκρα, παρά την ήπια αδυναμία του αριστερού χεριού και του αριστερού ποδιού. Την 2^η και την 3^η ημέρα της νοσηλείας του, αποσυνδέθηκε από τον μηχανικό αερισμό και διενεργήθηκε δοκιμή με T, αλλά η προσπάθεια απογαλακτισμού απέτυχε εντός 10λεπτου, λόγω αναπνευστικής δυσχέρειας με ταχύπνοια και χρήση επικουρικών αναπνευστικών μυών. Τα επίπεδα του εγκεφαλικού νατριουρητικού πεπτιδίου ήταν φυσιολογικά και δεν υπάρχουν σημεία αναπνευστικής απόφραξης. Στην ακτινογραφία θώρακος δεν διακρίνονται διηθήματα.

Ποια είναι η καλύτερη διαγνωστική εξέταση για την αξιολόγηση της αναπνευστικής ανεπάρκειας του ασθενούς;

- α. Υπερηχοκαρδιογράφημα
- β. Δοκιμασία εισπνοής-εκπνοής (Sniff test)
- γ. Αμφοτερόπλευρο ηλεκτρομυογράφημα φρενικού νεύρου (EMG)
- δ. Βρογχοσκόπηση και βιοψία πνευμονικών όζων
- ε. Βιοψία γαστροκνημιαίου νεύρου

Απάντηση: γ. Η κλινική εικόνα εγείρει την υποψία πάρεσης ή παράλυσης των φρενικών νεύρων. Το ηλεκτρομυογράφημα των φρενικών νεύρων αμφοτερόπλευρα απέτυχε να προκαλέσει κινητική ανταπόκριση στο δεξιό και στο αριστερό ημιδιάφραγμα και το ίδιο εύρημα επιβεβαιώθηκε με υπερηχογράφημα του διαφράγματος. Αυτό μπορεί να σχετίζεται με το ιστορικό των αυχενικών σπονδυλικών στενώσεων και την χειρουργική επέμβαση που ακολούθησε. Έχει διατυπωθεί η υπόθεση ότι οι ασθενείς που υποβάλλονται σε αυχενική πεταλεκτομή μπορεί να παρουσιάσουν όψιμα κεντρική άπνοια, που οφείλεται στην διατομή δικτυονωτιαίων ινών που νευρώνουν τους πυρήνες των φρενικών νεύρων. Εναλλακτικά, μπορεί το ένα φρενικό

νεύρο να είχε προσβληθεί από την αορτοστεφανιαία παράκαμψη και η πρόσφατη επέμβαση στην σπονδυλική στήλη να επηρέασε το άλλο φρενικό νεύρο. Οι πολλαπλές εκφυλιστικές αλλοιώσεις των σπονδύλων είχαν αποδοθεί σε πολλαπλό μυέλωμα.

Ένα υπερηχοκαρδιογράφημα (επιλογή α) μπορεί να βοηθήσει, αλλά τα επίπεδα εγκεφαλικού νατριουρητικού πεπτιδίου είναι φυσιολογικά και η ακτινογραφία θώρακος ήταν αρνητική για διηθήματα. Η δοκιμασία εισπνοής-εκπνοής (επιλογή β) μπορεί να είναι χρήσιμη στα εξωτερικά ιατρεία για την αξιολόγηση τυχόν ανύψωσης του ημιδιαφράγματος, αλλά δεν είναι εφαρμόσιμη σε διασωληνωμένο ασθενή. Η βιοψία των πνευμονικών όζων ή του γαστροκνημιαίου νεύρου (επιλογές δ και ε) δεν θα διαφωτίσουν τους μηχανισμούς που ευθύνονται για την αποτυχία του απογαλακτισμού.

2. Ένας 64χρονος παχύσαρκος άνδρας προσκομίζεται στα επείγοντα από το γιό του για εκτίμηση μεταβολής της νοητικής του κατάστασης, η οποία έχει επιδεινωθεί τις τελευταίες εβδομάδες. Ο ασθενής έχει γνωστό ιστορικό μέτριας βαρύτητας ΧΑΠ, σακχαρώδη διαβήτη τύπου 2 και υπέρτασης. Είναι βαρύνος καπνιστής και κάνει κατάχρηση αλκοόλ. Η φαρμακευτική του αγωγή κατ'οίκον περιλαμβάνει λισινοπρίλη και γλυβουρίδη.

Ο γιός του ασθενούς αναφέρει ότι ο πατέρας του δεν παρουσίασε νέο εξάνθημα ή πυρετό, ούτε είχε επαφή με κάποιον ασθενή. Τις τελευταίες λίγες εβδομάδες, ο ασθενής βρισκόταν στο σπίτι του, έτρωγε και κοιμόταν στο κρεβάτι όλη την ημέρα με λίγη ως καθόλου δραστηριότητα. Ο γιός πιστεύει ότι ο πατέρας του δεν είχε θωρακικό άλγος ή δύσπνοια, αλλά ότι πήρε βάρος.

Κατά την προσέλευση, η αρτηριακή πίεση ήταν 160/84 mm Hg με ρυθμική καρδιακή συχνότητα 60 παλμών το λεπτό, αναπνευστική συχνότητα 10-12 αναπνοές το λεπτό, και κορεσμό οξυγόνου 96% με χορήγηση οξυγόνου 5 L/min μέσω ρινοκαθετήρα. Τα ευρήματα της κλινικής εξέτασης περιλαμβάνουν παχύσαρκο άνδρα, με στρογγυλό πρόσωπο, σε εγρήγορση, χωρίς δυσχέρεια, ο οποίος όμως αποκοιμήθηκε κατά τη διάρκεια της συνέντευξης. Ο αυχένος ήταν ευρύς και κοντός χωρίς διάταση σφαγίτιδων, χωρίς λεμφαδενοπάθεια, ή διόγκωση θυρεοειδούς. Η ακρόαση αποκάλυψε μειωμένο αναπνευστικό ψιθύρισμα, χωρίς συριγμό και φυσιολογικούς καρδιακούς τόνους. Η εξέταση της κοιλίας ήταν φυσιολογική. Η νευρολογική εξέταση δεν αποκάλυψε εστιακά νευρολογικά ελλείμματα, αν και παρουσίαζε θωρά αντανάκλαστα και καθυστέρηση της φάσης χαλάρωσης στο σφυρό.

Οι εργαστηριακές εξετάσεις κατά την προσέλευση έδειξαν υπονატραιμία (130 mEq/L), διττανθρακικά 37 mEq/L, ήπια αύξηση τρανσαμινασών με φυσιολογική χολερυθρίνη, φυσιολογικό INR και φυσιολογικά επίπεδα αμμονίας. Τα επίπεδα λιπιδίων ήταν HDL 45 mg/dL, LDL 203 mg/dL και τριγλυκερίδια 356 mg/dL. Οι δοκιμασίες ανίχνευσης ουσιών στα ούρα ήταν αρνητικές για οπιοειδή και βενζοδιαζεπίνες. Τα επίπεδα BNP ήταν φυσιολογικά. Τα αέρια αρτηριακού αίματος με χορήγηση ενός λίτρου οξυγόνου μέσω ρινοκαθετήρα ήταν: pH 7,28, PaCO₂ 80 mm Hg και PaO₂ 50 mm Hg. Τα ευρήματα της ακτινογραφίας θώρακος ήταν θετικά για εμφυσηματικές αλλοιώσεις και η αξονική τομογραφία κεφαλής δεν αποκάλυψε παθολογικά ευρήματα.

I. Ποια είναι η αιτία της υποξαιμίας σε αυτό τον ασθενή;

- α. Κυψελιδικός υποαερισμός
- β. Ενδοκαρδιακή επικοινωνία
- γ. Διαταραχή της σχέσης αερισμού-αιμάτωσης (V/Q) λόγω ΧΑΠ
- δ. Διαταραχή διάχυσης λόγω σιωπηρής διάμεσης πνευμονικής νόσου

II. Ποια εξέταση είναι πιο πιθανό να αποκαλύψει την αιτία της αναπνευστικής ανεπάρκειας σε αυτό τον ασθενή;

- α. Αξονική αγγειογραφία για τον αποκλεισμό πνευμονικής εμβολής
- β. Διαθωρακικό υπερηχοκαρδιογράφημα αντίθεσης για τη

διερεύνηση ενδοκαρδιακής επικοινωνίας

γ. Μαγνητική τομογραφία εγκεφάλου για τη διερεύνηση του εγκεφαλικού στελέχους

δ. Επίπεδα TSH, T3 και T4 και αντιμετώπιση ασθενούς μέχρι να βγουν τα αποτελέσματα

ε. Δεν χρειάζονται περαιτέρω εξετάσεις και ο ασθενής πρέπει να διασωληνωθεί

Απάντηση: Ι. α. Η κυψελιδο-αρτηριακή διαφορά οξυγόνου είναι φυσιολογική. Οι άλλες επιλογές (ενδοκαρδιακή διαφυγή, διαταραχή λόγου V/Q και περιορισμός διάχυσης) θα οδηγούσαν σε αύξηση της κυψελιδο-αρτηριακής διαφοράς και επομένως, είναι εσφαλμένες απαντήσεις.

II. δ. Υπάρχουν πολλά ευρήματα που υποδηλώνουν υποθυρεοειδισμό και θα μπορούσε να υποστηρίξει κανείς ότι ο ασθενής βρίσκεται σε μυξοιδηματικό κόμμα, που χρήζει επείγουσας αντιμετώπισης. Τα ευρήματα της κλινικής εξέτασης είναι σημαντικά. Αυτός ο ασθενής δεν παρουσιάζει οξεία αναπνευστική δυσχέρεια και δεν έχει έξαρση ΧΑΠ (η επιλογή είναι λανθασμένη). Τα αποτελέσματα της μέτρησης των αερίων αρτηριακού αίματος και του BNP αντανakλούν χρόνια αναπνευστική οξέωση και φυσιολογική κυψελιδο-αρτηριακή διαφορά, που υποδηλώνει υποαερισμό. Η υπονατρία και οι τιμές των λιπιδίων είναι υποστηρικτικά της διάγνωσης του υποθυρεοειδισμού.

3. Μια 33χρονη γυναίκα στο 2^ο τρίμηνο της εγκυμοσύνης και χωρίς σημαντικό ιατρικό ιστορικό προσήλθε στα επείγοντα λόγω δύσπνοιας τον τελευταίο μήνα και αδυναμία των εγγύς μώντων άκρων. Δεν είχε παρουσιάσει δερματικό εξάνθημα, ούτε ναυτία, εμέτους ή διάρροια, ούτε είχε εμβολιαστεί πρόσφατα. Η νευρολογική της εξέταση ήταν φυσιολογική, εκτός από τη μειωμένη μυϊκή ισχύ τόσο στα άνω, όσο και στα κάτω άκρα (Medical Research Council [MRC] score, 3/5 για τους εγγύς μύες και 4/5 για τους περιφερικούς μύες). Τα αντανακλαστικά, η αισθητικότητα, τα κρανιακά νεύρα και η λειτουργία της παρεγκεφαλίδας ήταν φυσιολογικά. Οι εργαστηριακές εξετάσεις έδειξαν αύξηση της κρεατινικής κινάσης ορού (2500 U/L με φυσιολογικές τιμές 29–168 U/L) και αυξημένη ταχύτητα καθίζησης ερυθροκυττάρων (85 mm/h με φυσιολογικές τιμές 0–42 mm/h). Τα αέρια αρτηριακού αίματος σε αέρα δωματίου υποδήλωναν έξαρση χρόνιας αναπνευστικής οξέωσης (pH 7,32, PaCO₂ 59 mm Hg, PaO₂ 78 mm Hg, διττανθρακικά (HCO₃⁻) 29 mEq/L), οπότε ξεκίνησε μη επεμβατικός αερισμός. Περαιτέρω εξετάσεις απέκλεισαν πνευμονική λοίμωξη, πνευμονική εμβολή και καρδιακή δυσλειτουργία, ως υποκείμενες αιτίες των συμπτωμάτων. Η συνεχής παρακολούθηση του εμβρύου και ο γυναικολογικός υπέρηχος δεν αποκάλυψαν παθολογικά ευρήματα. Στις επόμενες 24 ώρες, παρά τον μη επεμβατικό αερισμό, η αναπνευστική οξέωση επιδεινώθηκε σημαντικά (pH 7,12 και PaCO₂ 105 mm Hg), οδηγώντας σε νάρκωση από διοξείδιο του άνθρακα. Η ασθενής διασωληνώθηκε και συνδέθηκε με μηχανικό αερισμό. Με την υποχώρηση της υπερκαπνίας η ασθενής βελτιώθηκε. Την επόμενη ημέρα, η μέγιστη εισπνευστική πίεση ήταν -14 cm H₂O. Επιπλέον, το ηλεκτρομυογράφημα επί κλίνης με τη χρήση βελόνας αποκάλυψε ηλεκτροφυσιολογικά ευρήματα διάχυτης ερεθιστικής μυοπάθειας με αυξημένη δραστηριότητα εισαγωγής, αυτόματα δυναμικά ινιδισμού και θετικά αιχμηρά κύματα, μυοπαθητικά δυναμικά κινητικής μονάδας και πρόωμη επιστράτευση. Ποια είναι η καλύτερη επιλογή εξέτασης για την αξιολόγηση της αναπνευστικής ανεπάρκειας της ασθενούς;

α. Μαγνητική τομογραφία μηνών

β. Βιοψία γαστροκνημιαίου νεύρου

γ. Βιοψία δελτοειδούς ή τετρακέφαλου μυός

δ. Ηλεκτρομυογράφημα φρενικού νεύρου αμφοτερόπλευρα

ε. Οσφυονωτιαία παρακέντηση

Απάντηση: γ. Αυτή η ασθενής έχει συμμετρική αδυναμία εγγύς μώντων, αυξημένα επίπεδα μυϊκών ενζύμων ορού, αυξημένη

ταχύτητα καθίζησης ερυθρών και ηλεκτρομυογραφικές διαταραχές που υποδηλώνουν μυοπάθεια. Η κλινική πορεία υποδηλώνει επίκτητη μυοπάθεια. Είναι απαραίτητη μια μυϊκή βιοψία για τον χαρακτηρισμό της μυοπάθειας. Η έλλειψη δερματικού εξανθήματος αποκρύπτει από τη διάγνωση της δερματομυοσίτιδας. Το αυτοάνοσο φλεγμονώδες εξίδρωμα που εισβάλλει σε μη-νεκρωτικές μυϊκές ίνες (όπως σε αυτή την ασθενή) υποδηλώνει πολυμυοσίτιδα. Η νεκρωτική παθολογοανατομική εικόνα υποδηλώνει νεκρωτική αυτοάνοση μυοπάθεια.

Η μαγνητική τομογραφία των μηνών (επιλογή α) μπορεί να δείξει μυϊκό οίδημα, ωστόσο αυτό το εύρημα δεν είναι επαρκές για την οριστική διάγνωση. Η βιοψία του γαστροκνημιαίου νεύρου (επιλογή β) και το ηλεκτρομυογράφημα του φρενικού νεύρου αμφοτερόπλευρα (επιλογή δ) δεν αναμένεται να βοηθήσουν στη διάγνωση, αν σκεφτεί κανείς ότι το ηλεκτρομυογράφημα δεν έδειξε νευροπαθητικά ευρήματα. Η οσφυονωτιαία παρακέντηση (επιλογή ε) θα ήταν χρήσιμη δοκιμασία για τη διάγνωση του συνδρόμου Guillain-Barré, που δεν είναι ασύνηθες να εκδηλώνεται κατά τη διάρκεια της εγκυμοσύνης. Σε αυτή την ασθενή, παρά την σημαντικά αυξημένη κρεατινική κινάση ορού, τα ηλεκτρομυογραφικά ευρήματα αποκλείουν αυτή την πιθανότητα.

4. Μία 58χρονη, λεπτή, αλκοολική γυναίκα με γνωστή ΧΑΠ προσκομίστηκε στην μονάδα εντατικής θεραπείας λόγω κρίσης τονικοκλονικών σπασμών. Της τέλειωσαν τα χρήματα και δεν μπορούσε να αγοράσει ούισκι, μετά από βαριά κατανάλωση αλκοόλ για πολλές ημέρες. Στην κλινική εξέταση ήταν επικοινωνιακή, αλλά ασυνάρτητη, με καθαρούς πνεύμονες και τα εν τω βάθει τενόντια αντανακλαστικά ήταν 2+ και συμμετρικά. Είναι καχεκτική με δείκτη μάζας σώματος 19. Οι αρχικές εργαστηριακές εξετάσεις περιελάμβαναν νάτριο ορού 138 mEq/L, κάλιο 2,6 mEq/L, χλώριο 90 mEq/L, ολικό CO₂ ορού 15 mmol/L, ανόργανα φωσφορικά ορού 3,2 mEq/L, αλβουμίνη 2,4 g/dL, και άζωτο ουρίας αίματος 7 mg/100 mL. Το δείγμα αρτηριακού αίματος, ενώ η ασθενής ανέπνεε αέρα δωματίου, έδειξε μεταβολική οξέωση και υποξαιμία (pH 7,24, PaCO₂ 33 mm Hg, και PaO₂ 55 mm Hg). Η αξονική τομογραφία κεφαλής ήταν φυσιολογική και η ακτινογραφία θώρακος δεν έδειξε την παρουσία διηθημάτων.

Στη μονάδα εντατικής θεραπείας έλαβε ενδοφλεβίως γλυκόζη, κάλιο, θειαμίνη, διαλυτές πολυβιταμίνες και φαινοτοΐνη. Στην ασθενή χορηγήθηκε επίσης από του στόματος υδροξείδιο του αργιλίου με υδροξείδιο του μαγνησίου (Maalox). Την επόμενη ημέρα η ασθενής βελτιώθηκε και ξεκίνησε διατροφή από του στόματος. Την 4^η ημέρα όμως, η ασθενής βρέθηκε ληθαργική. Η αναπνοή της ήταν ταχεία και ρηχή. Ένα δείγμα αρτηριακού αίματος που λήφθηκε ενόσω η ασθενής φορούσε μάσκα οξυγόνου μη επανεισπνοής έδειξε μεικτή μεταβολική και αναπνευστική οξέωση (pH 7,01, PaCO₂ 71 mm Hg, και PaO₂ 107 mm Hg). Η ασθενής διασωληνώθηκε ενδοτραχειακά. Η ακτινογραφία θώρακος μετά τη διασωλήνωση δεν κατέδειξε την ύπαρξη διηθησεων. Δεν παρατηρήθηκαν σπασμοί, εστιακά νευρολογικά ελλείμματα, παθολογικά αντανακλαστικά οφθαλμικών κορών, ή αρρυθμίες. Η μοναδική μεταβολή ήταν η παρουσία γενικευμένης έλλειψης αντανακλαστικών και μυϊκής αδυναμίας. Τοποθετήθηκε ρινογαστρικός σωλήνας σίτισης για συνεχόμενη σίτιση. Τις 2 επόμενες ημέρες δεν ήταν σε θέση να παράγει εκούσια ζωτική χωρητικότητα μεγαλύτερη από 400 mL. Η μέγιστη εισπνευστική πίεση ήταν -12 cm H₂O. Συνεχίστηκε ο επεμβατικός αερισμός.

Ποια είναι η επόμενη εξέταση που πρέπει να διενεργηθεί για την αξιολόγηση της αναπνευστικής ανεπάρκειας της ασθενούς;

α. Αξονική τομογραφία κεφαλής

β. Συνχής ηλεκτροεγκεφαλογραφική παρακολούθηση

γ. Βιοψία τετρακέφαλων μυών

δ. Ηλεκτρολύτες ορού

ε. Οσφυονωτιαία παρακέντηση

Απάντηση: δ. Αυτή η ασθενής προσήλθε αρχικά με υπόνοια

σπασμών λόγω στέρησης. Οι εργαστηριακές εξετάσεις κατά την εισαγωγή της έδειξαν υποξαιμία και μεταβολική οξέωση, σύνθετες εύρημα μετά από γενικευμένους τονικοκλονικούς σπασμούς. Η αρνητική ακτινογραφία θώρακος και το ιστορικό ΧΑΠ υποδηλώνουν ότι η υποκείμενη νόσος προκάλεσε την υποξαιμία. Η κλινική πορεία της ασθενούς παρουσιάζει αρχικά νευρολογική βελτίωση. Γρήγορα ξεκινά διατροφή από του στόματος. Η ασθενής είναι γνωστή βαριά πότης και είναι υποσιτισμένη. Αυτοί είναι παράγοντες υψηλού κινδύνου για υποφωσφαταιμία, λόγω συνδρόμου επανασίτισης. Πράγματι, την 6^η ημέρα της νοσηλείας, κι ενώ η ασθενής είναι διασωληνωμένη για 48 ώρες, όλες οι εργαστηριακές εξετάσεις είναι εντός φυσιολογικών ορίων εκτός από τα επίπεδα ανόργανων φωσφορικών ορού (0,5 mEq/L). Χορηγήθηκε ενδοφλέβια φωσφορικό κάλιο, 60 mEq, για 16 ώρες. Το επόμενο πρωί η μυϊκή αδυναμία είχε βελτιωθεί πολύ και η ταχέως εκπνεόμενη ζωτική χωρητικότητα είχε διπλασιαστεί (800 mL). Τα ανόργανα φωσφορικά ορού ήταν 1,2 mEq/L (φυσιολογικές τιμές 1,1–1,5 mEq/L). Αργότερα το απόγευμα, η ασθενής αποσωληνώθηκε μόνη της και παρέμεινε έτσι στη συνέχεια. Η υπόλοιπη πορεία στο νοσοκομείο δεν παρουσίασε περαιτέρω συμβάντα.

Η αξονική τομογραφία κεφαλής (επιλογή α), η συνεχής ηλεκτροεγκεφαλογραφική παρακολούθηση (επιλογή β) και η οσφυονωτιαία παρακέντηση (επιλογή ε) είναι λάθος επιλογές, επειδή σε αυτή την ασθενή έχουν περιορισμένο όφελος. Η ασθενής δεν έχει εστιακό νευρολογικό έλλειμμα (επιλογή α), ούτε σπασμούς (επιλογή β) και δεν υπάρχουν σημεία που να υποδηλώνουν μηνιγγίτιδα (επιλογή ε). Η βιοψία των τετρακέφαλων μυών δεν ενδείκνυται, γιατί είναι απίθανο να αναπτυχθεί τόσο σοβαρή μυοπάθεια που να οδηγήσει σε υπερκαπνική αναπνευστική ανεπάρκεια μέσα σε λίγες ημέρες.

5. Μια 48χρονη γυναίκα με παλιό ιστορικό μαστεκτομής λόγω μη διηθητικού καρκινώματος *in situ* προσκομίστηκε και διασωληνώθηκε επείγοντως λόγω αναπνευστικής δυσχέρειας. Η ανάλυση αερίων αρτηριακού αίματος αποκάλυψε υπερκαπνία (PaCO₂ 102 mm Hg). Σύμφωνα με μέλη της οικογένειας, τις τελευταίες 3 εβδομάδες η ασθενής παραπονιόταν για προοδευτική δύσπνοια. Επιπλέον, 2 μήνες νωρίτερα παρουσίασε προοδευτική, συμμετρική αδυναμία των μυών του αυχένα, των άνω και των κάτω άκρων. Μία εβδομάδα νωρίτερα δεν μπορούσε να περπατήσει χωρίς υποστήριξη. Μετά τη διασωλήνωση, η κλινική εξέταση έδειξε αδυναμία αυχενικών μυών, ήπια συμμετρική εγγύς αδυναμία άνω και κάτω άκρων (MRC score 4/5), και αδυναμία των πρόσθιων κνημιαίων μυών (MRC 3/5). Τα εν τω βάθει τενόντια αντανάκλαστικά και η αισθητικότητα ήταν φυσιολογικά. Η μέγιστη εισπνευστική πίεση ήταν −15 cm H₂O. Δεν παρατηρήθηκαν δερματικές αλλοιώσεις. Η κρεατινική κίνηση ήταν αυξημένη (5000 IU/L, με ανώτερο φυσιολογικό όριο 145 IU/L). Οι εξετάσεις αίματος ρουτίνας

ήταν φυσιολογικές. Το αποτέλεσμα της δοκιμασίας χλωριούχου εδروفονίου (Tensilon) ήταν αρνητικό. Το ηλεκτρομυογράφημα έδειξε εκτενείς μυοπαθητικές μεταβολές με αυτόματη μυϊκή δραστηριότητα και πολυφασικά δυναμικά ενέργειας κινητικής μονάδας μικρού εύρους και βραχείας διάρκειας σε όλους τους μύες. Η αξονική τομογραφία θώρακος και κοιλίας απέκλεισαν εμφανή κακοήθεια και δεν έδειξαν σημεία διάμεσης πνευμονοπάθειας. Οι επανειλημμένες προσπάθειες απογαλακτισμού από το μηχανικό αερισμό απέτυχαν λόγω υποτροπιάζουσας υπερκαπνικής αναπνευστικής ανεπάρκειας με αναπνευστική δυσχέρεια.

Ποια είναι η καλύτερη επιλογή διερεύνησης για την αξιολόγηση της αναπνευστικής ανεπάρκειας της ασθενούς;

- α. Αξονική τομογραφία κεφαλής
- β. Τίτλοι αντισωμάτων κατά των ειδικών μυϊκών υποδοχέων τυροσινικής κίνησης (MuSK)
- γ. Μαγνητική τομογραφία μηρών
- δ. Τίτλοι αντισωμάτων Anti-Hu
- ε. Βιοψία τετρακεφάλου μυός

Απάντηση: ε. Αυτή η ασθενής παρουσιάζει νεκρωτική αυτοάνοση μυοπάθεια (necrotizing autoimmune myopathy-NAM), μια σπάνια παραλλαγή ιδιοπαθών φλεγμονωδών μυοπαθειών, που επίσης περιλαμβάνουν την πολυμυοσίτιδα, την δερματομυοσίτιδα και την σποραδική μυοσίτιδα με έγκλειστα σωματίδια. Η NAM χαρακτηρίζεται παθολογοανατομικά από νεκρωτικές μυϊκές ίνες χωρίς, ή με ελάχιστη φλεγμονή και με κάποιου βαθμού αναγέννηση. Μπορεί να συνοδεύει θεραπεία με στατίνες, νοσήματα του συνδετικού ιστού, καρκίνο και αυτοαντισώματα έναντι του σωματιδίου αναγνώρισης σήματος (signal recognition particle-SRP) ή της αναγωγάσης του 3-υδρόξυ-3-μεθυλογλουτάρυλο συνενζύμου Α (3-hydroxy-3-methylglutaryl-coenzyme A reductase/HMGCR). Κλινικά, οι ασθενείς προσέρχονται συνήθως με αδυναμία κάτω άκρων (73%). Σπανιότερα παρατηρείται περιφερική αδυναμία (41%), δυσφαγία (35%) και δύσπνοια (37%). Η αναπνευστική ανεπάρκεια ως αρχικό σύμπτωμα της NAM είναι σπάνια. Η μονοθεραπεία με πρεδνιζόνη είναι συνήθως ανεπαρκής για τον έλεγχο της νόσου. Έτσι, οι περισσότεροι ασθενείς χρειάζονται δεύτερο φάρμακο, όπως η αζαθειοπρίνη, η μεθοτρεξάτη, η μυκοφαινόλη και ενδοφλέβια ανοσοσφαιρίνη. Κατά τη διάρκεια της μείωσης ή της διακοπής της ανοσοκαταστολής, το 55% των ασθενών παρουσιάζουν υποτροπή της νόσου.

Οι επιλογές α ως δ είναι εσφαλμένες επειδή η ασθενής δεν έχει εστιακό νευρολογικό έλλειμμα (επιλογή α), η δοκιμασία εδروفονίου ήταν αρνητική (επιλογή β), η αξονική τομογραφία κοιλίας ήταν αρνητική (επιλογή γ) και επομένως η διερεύνηση κακοήθειας δεν θα ήταν η καλύτερη διερευνητική επιλογή. Η μαγνητική τομογραφία των μυών των κάτω άκρων μπορεί να αποκαλύψει εύρημα που συνάδει με οίδημα (αυξημένη ένταση σήματος), αλλά αυτό το εύρημα δεν θα αρκούσε για να τεθεί η διάγνωση της NAM.

ΚΕΦΑΛΑΙΟ 40

Πνευμονία: Ζητήματα που Αφορούν τους Βαρέως Πάσχοντες Ασθενείς

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Ερωτήσεις Ανασκόπησης

1. Ένας ασθενής με διάγνωση πνευμονίας σχετιζόμενης με τον αναπνευστήρα (ventilator-associated pneumonia/VAP) λόγω ψευδομονάδας ξεκινά αντιβιοτική θεραπεία με πιπερακιλλίνη/ταζομπακτάμη και αμικασίνη. Η συνδυαστική θεραπεία με αμικασίνη διακόπηκε μετά από 48 ώρες, όταν επιβεβαιώθηκε η ευαισθησία σε πιπερακιλλίνη/ταζομπακτάμη. Την 7^η ημέρα θεραπείας, ο ασθενής ήταν απύρετος και είχε φυσιολογική πίεση. Ο ασθενής χρειάζεται αναρρόφηση κάθε 3-4 ώρες, αλλά οι εκκρίσεις δεν είναι πυώδεις. Ο αρτηριακός κορεσμός είναι 93% επί κλάσματος εισπνεόμενου οξυγόνου (FIO₂) 0,30. Ο αριθμός των λευκών αιμοσφαιρίων έχει αυξηθεί από 9.500 κύτταρα/mm³ εχθές σε 11.300 κύτταρα/mm³. Η προκαλσιτονίνη μειώθηκε από 3,5 ng/dL στην αρχή της θεραπείας σε 0,65 ng/dL. Τι θα κάνατε σε αυτή την περίπτωση;

- α. Συνέχιση πιπερακιλλίνης/ταζομπακτάμης για άλλες 7 ημέρες
- β. Αλλαγή σε μεροπενέμη 1 g σε 3ωρη έγχυση ανά 8ωρο για άλλες 7 ημέρες
- γ. Επανάναρξη αμικασίνης με δόση εφόδου 20 mg/kg και συνέχεια χορήγηση βάσει επιπέδων φαρμάκου
- δ. Διακοπή πιπερακιλλίνης/ταζομπακτάμης και στενή παρακολούθηση
- ε. Συνέχιση πιπερακιλλίνης/ταζομπακτάμης και προσθήκη πολυμυξίνης Β σε μορφή αερολύματος

Απάντηση: δ. Ο ασθενής φαίνεται να θεραπεύεται με επιτυχία, γεγονός που φαίνεται από την χαμηλή FIO₂, την απουσία πυρετού και τα επίπεδα προκαλσιτονίνης που είναι χαμηλότερα από το 20% της αρχικής τιμής. Ο αριθμός των λευκών αιμοσφαιρίων και η ποσότητα των εκκρίσεων είναι εξαιρετικά ανακριβείς δείκτες για την εκτίμηση της ανταπόκρισης στη θεραπεία. Περισσότεροι από το 60% των ασθενών με πνευμονία λόγω ψευδομονάδας αντιμετωπίζονται επαρκώς με αντιβιοτική θεραπεία 7-8 ημερών, ιδιαίτερα όταν η αρχική θεραπεία είναι η κατάλληλη.¹²¹

2. Δέκα ημέρες μετά από διασωλήνωση και μηχανικό αερισμό, ένας ασθενής παρουσιάζει πυρετό 38,7 °C τα μεσάνυχτα. Η νοσηλεία αναφέρει αύξηση πυωδών εκκρίσεων. Αρχίζει η χορήγηση κεφεπίμης και λινεζολίδης εμπειρικά μετά την αποστολή ενδοτραχειακού εκκρίματος για καλλιέργεια. Το πρωί, οι εργαστηριακές εξετάσεις δείχνουν λευκοκυττάρωση και η ακτινογραφία θώρακος δείχνει νέα κυψελιδική πύκνωση στον αριστερό κάτω λοβό με αεροβρογχόγραμμα. Επίσης ξεκινά η χορήγηση αμικασίνης. Μετά από 72 ώρες, η καλλιέργεια ενδοτραχειακού υλικού παραμένει αρνητική. Ποια από τις ακόλουθες είναι η πιο κατάλληλη στρατηγική αντιμετώπισης;

- α. Συνέχιση του παρόντος τριπλού αντιβιοτικού σχήματος για 7 ημέρες
- β. Διακοπή όλων των αντιβιοτικών
- γ. Διακοπή λινεζολίδης και αμικασίνης και 7ήμερη χορήγηση κεφεπίμης
- δ. Διακοπή λινεζολίδης και συμπλήρωση 10ήμερης χορήγησης κεφεπίμης και αμικασίνης
- ε. Έλεγχος επιπέδων προκαλσιτονίνης και διακοπή όλων των αντιβιοτικών αν είναι κάτω από 0,50 ng/dL

Απάντηση: γ. Η υπόνοια VAP με αρνητική καλλιέργεια αντιπροσωπεύει μια δύσκολη απόφαση. Όμως, τα δεδομένα είναι αρκετά σαφή, και τα δείγματα που λαμβάνονται πριν ή αμέσως μετά την έναρξη της αντιβιοτικής αγωγής είναι επαρκή για τον αποκλεισμό χρυσίζοντα σταφυλόκοκκου ανθεκτικού στη μεθικιλίνη (methicillin-resistant *Staphylococcus aureus*-MRSA) και για τον αποκλεισμό παθογόνων ανθεκτικών σε πολλά αντιβιοτικά, όπως είναι η ψευδομονάδα και το *Acinetobacter*. Επομένως, οι επιλογές α και δ είναι σαφώς λανθασμένες. Μία και μόνο μέτρηση προκαλσιτονίνης 3 ημέρες μετά την έναρξη της θεραπείας είναι δύσκολο να ερμηνευτεί. Μπορεί να αντιπροσωπεύει επίμονη

αύξηση και επομένως η διακοπή αντιβιοτικών βάσει αυτής της τιμής ενέχει κάποιο κίνδυνο. Το κλινικό σενάριο και τα ακτινολογικά ευρήματα υποδηλώνουν πιθανότητα μεγαλύτερη από 90% ότι ο ασθενής έχει πνευμονία. Η αρνητική καλλιέργεια ενδοτραχειακού υλικού μπορεί να αντιπροσωπεύει την εξαφάνιση παθογόνων που αντιμετωπίζονται εύκολα ή μπορεί να σημαίνει ότι το δείγμα προέρχεται από τον δεξιό κάτω λοβό, αντί για τον αριστερό κάτω λοβό. Επομένως, η συνέχιση της αντιβιοτικής μονοθεραπείας είναι λογική. Ένα δείγμα βρογχοκυψελιδικού εκπλύματος από τον αριστερό κάτω λοβό με λιγότερα από 50% ουδετερόφιλα θα μπορούσε να δικαιολογήσει τη διακοπή όλων των αντιβιοτικών.

3. Ένα αθλητικό 40χρονο άτομο, που ήταν εντελώς υγιές, παρουσιάζεται με πυρετό, βήχα και δύσπνοια για 24 ώρες. Ο βήχας είναι ενίοτε παραγωγικός με ανοιχτόχρωμο ερυθρό αίμα. Ο ασθενής δεν έχει περιοδοντική νόσο. Μια ακτινογραφία θώρακος αποκαλύπτει την ύπαρξη πύκνωσης στο μέσον του δεξιού πνεύμονα με μικρό σπήλαιο, ένα ανομοιογενές διήθημα στον αριστερό κάτω λοβό και πλευριτική συλλογή. Ποια από τα ακόλουθα αντιβιοτικά σχήματα πρέπει να χορηγηθεί πρώτο;

- α. Μετρονιδαζόλη επί πλέον της κεφτριαξόνης και αζιθρομυκίνης για την κάλυψη των αναερόβιων
- β. Λινεζολίδη επί πλέον της κεφτριαξόνης και αζιθρομυκίνης για υπόνοια πνευμονίας κοινότητας από MRSA
- γ. Μονοθεραπεία με κλινδαμυκίνη για αναερόβια πνευμονία
- δ. Πιπερακιλλίνη/ταζομπακτάμη και σιπροφλοξασίνη για πιθανή πνευμονία από ψευδομονάδα
- ε. Ισονιαζίδη (INH), ριφαμικίνη, πυραζιναμίδα και αιθαμβουτόλη για φυματίωση

Απάντηση: β. Η κλινική εικόνα είναι τυπική για πνευμονία κοινότητας από τοξικογόνο χρυσίζοντα σταφυλόκοκκο, είτε ευαίσθητο, είτε ανθεκτικό στη μεθικιλίνη. Η έκθεση σε αποδοτήρια αθλητικών εγκαταστάσεων αυξάνει τον κίνδυνο MRSA και επομένως η κλινδαμυκίνη μπορεί να μην επαρκεί, αν και καταστέλλει την παραγωγή ενδοτοξίνης όπως η λινεζολίδη. Ο ασθενής δεν έχει παράγοντες κινδύνου για αναερόβια πνευμονία, για πνευμονία λόγω ψευδομονάδας, ή για φυματίωση.

4. Μία 64χρονη πιανίστα προσέρχεται στα επείγοντα λόγω πυρετού, πολύ παραγωγικού βήχα και αναπνευστικής δυσχέρειας. Στην εξέταση, είναι λίγο σε σύγχυση, σύμφωνα με την κόρη της. Έχει φυσιολογική θερμοκρασία και φυσιολογική πίεση με καρδιακή συχνότητα 110 παλμούς/λεπτό. Η αναπνευστική συχνότητα είναι 32 αναπνοές/λεπτό με ήπια χρήση των επικουρικών αναπνευστικών μυών. Ακροαστικά έχει τρίζοντες με λίγο αιγοφωνία στον αριστερό κάτω λοβό. Φαίνεται να έχει ήπια αφυδάτωση. Η ακτινογραφία θώρακος αποκαλύπτει πνευμονία αριστερού κάτω λοβού με αεροβρογχόγραμμα. Ο αρτηριακός κορεσμός είναι 89% σε αέρα δωματίου, που βελτιώνεται σε 96% με τη λήψη οξυγόνου 2 L/min μέσω ρινοκαθετήρα. Ο αριθμός των λευκών αιμοσφαιρίων είναι 12.000 κύτταρα/mm³, αιμοπετάλια 110.000/mm³. Οι ηλεκτρολύτες είναι φυσιολογικοί και το άζωτο ουρίας αίματος είναι 19 mg/dL. Πώς θα την αντιμετωπίζατε;

- α. Έναρξη ενδοφλέβιας ενυδάτωσης και εισαγωγή στη μονάδα εντατικής θεραπείας
- β. Έναρξη μη επεμβατικού αερισμού
- γ. Διενέργεια εξέτασης αερίων αρτηριακού ή φλεβικού αίματος για την εκτίμηση του pH και της μερικής τάσης διοξειδίου του άνθρακα
- δ. Έναρξη ενδοφλέβιας ενυδάτωσης και εισαγωγή σε θάλαμο
- ε. Έναρξη ενδοφλέβιας ενυδάτωσης και παρακολούθηση στα επείγοντα για 2 ώρες πριν αποφασιστεί αν θα εισαχθεί στο νοσοκομείο

Απάντηση: α. Αυτή η ασθενής αντιπροσωπεύει ένα συχνό δίλημμα

και η σωστή απάντηση μπορεί να παρουσιάζει κάποια διακύμανση, ανάλογα με το σύστημα υγείας και τις διαθέσιμες δυνατότητες. Η ασθενής έχει οριακής βαρύτητας κλινική εικόνα για εισαγωγή στη μονάδα εντατικής θεραπείας, αλλά διατρέχει υψηλό κίνδυνο. Η σύγχυση είναι ιδιαίτερα ανησυχητικό σύμπτωμα σε προηγουμένως πλήρως λειτουργικό ενήλικα και δικαιολογεί την εισαγωγή στη μονάδα εντατικής θεραπείας σε πολύ καλά εξοπλισμένα νοσοκομεία.

Βαθμολογείται μόνο με 2 CURB-65 βαθμούς και έχει μόνο 2 IDSA/ATS ελάχιστο κριτήρια (σύγχυση, αναπνευστική συχνότητα). Ένα χαμηλό pH ή μια παθολογική PCO_2 μπορεί να δικαιολογήσουν είτε εισαγωγή στη μονάδα, ή παρατεταμένη παρακολούθηση στα επείγοντα πριν από τη μεταφορά της σε θάλαμο. Το τελευταίο σχετίζεται με χαμηλότερο κίνδυνο επείγουσας μεταφοράς από το θάλαμο στη μονάδα και με χαμηλότερη θνητότητα.⁵⁰

ΚΕΦΑΛΑΙΟ 41

Απογαλακτισμός από το Μηχανικό Αερισμό

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Ερωτήσεις Ανασκόπησης

1. Ένας 62χρονος άνδρας με ιστορικό χρόνιας αποφρακτικής πνευμονοπάθειας (ΧΑΠ) εισήχθη στη μονάδα εντατικής θεραπείας (ΜΕΘ) λόγω πολυλοβιακής πνευμονίας και παρόξυνσης ΧΑΠ. Χρειάστηκε διασωλήνωση και μηχανικό αερισμό, καθώς και ενδοφλέβια αντιβιοτικά ευρέως φάσματος και στεροειδή. Την 3^η ημέρα είχε βελτιωθεί και ήταν σε υποβοηθούμενο ελεγχόμενο αερισμό με αναπνεόμενο όγκο 400 mL, αναπνευστική συχνότητα 12 αναπνοές το λεπτό, θετική τελοεκπνευστική πίεση (PEEP) 5 cm H₂O, κλάσμα εισπνεόμενου οξυγόνου (FIO₂) 0,40 και κορεσμό οξυγόνου με οξυμετρία παλμού (SpO₂) 96%. Ξεκίνησε προσπάθεια απογαλακτισμού (αυτόματη αναπνοή με T), αλλά ο ασθενής παρουσίασε εφίδρωση και αναπνευστική συχνότητα 40 αναπνοές/λεπτό, με αναπνευστικό όγκο 250 mL και SpO₂ 88%. Ποια από τις ακόλουθες είναι η πιθανότερη αιτία της αποτυχίας απογαλακτισμού;

- Αυξημένο αναπνευστικό φορτίο και επιδείνωση της μηχανικής της αναπνοής
- Ασθενέστερη εισπνευστική προσπάθεια που οδήγησε σε ταχύπνοια
- Μείωση της αναπνευστικής ώσης
- Υπερκαπνία λόγω μείωσης του κατά λεπτό αερισμού

Απάντηση: α. Οι ασθενείς με αποτυχία απογαλακτισμού παρουσιάζουν χαρακτηριστικά επιδείνωση της αναπνευστικής μηχανικής που περιλαμβάνει σημαντικές αυξήσεις των αντιστάσεων και διαταραχές της ενδογενούς PEEP και της πνευμονικής ελαστικότητας. Οι άμεσες μετρήσεις του αναπνευστικού έργου δείχνουν ότι οι ασθενείς με αποτυχία απογαλακτισμού πραγματοποιούν μεγαλύτερη, όχι ασθενέστερη, αναπνευστική προσπάθεια, σε σύγκριση με τους ασθενείς, των οποίων ο απογαλακτισμός επιτυγχάνει. Παρομοίως, η αναπνευστική ώση είναι συνήθως αυξημένη. Η υπερκαπνία μπορεί να παρουσιαστεί κατά τη διάρκεια ενός αποτυχημένου απογαλακτισμού, αλλά συνήθως οφείλεται σε αυξημένο αερισμό νεκρού χώρου, δευτεροπαθώς λόγω ρηχής αναπνοής ή ενδογενούς PEEP, και όχι στην μείωση του κατά λεπτό αερισμού. Μια δοκιμή αυτόματης αναπνοής μπορεί επίσης να καταπονήσει σημαντικά το μυοκάρδιο καθώς αυξάνεται η φλεβική επιστροφή, το μεταφορτίο της αριστερής κοιλίας και, αν προκληθεί υποξία, υπερκαπνία, ή ενδογενής PEEP, τότε αυξάνεται και το μεταφορτίο της δεξιάς κοιλίας. Με αυτά τα δεδομένα, οι κλινικοί γιατροί πρέπει να σκέφτονται και την καρδιακή απόδοση, ως πιθανό παράγοντα που συμβάλλει στην αποτυχία απογαλακτισμού.

2. Όσον αφορά τις μεθόδους απογαλακτισμού:

- Όλες οι μέθοδοι απογαλακτισμού είναι εξίσου αποτελεσματικές.
- Ο αποτελεσματικός απογαλακτισμός περιλαμβάνει τη σταδιακή απόσυρση της υποστήριξης και της αναπνευστικής συχνότητας που χορηγείται μέσω διαλείποντος υποχρεωτικού αερισμού.
- Μια δοκιμή αυτόματης αναπνοής που διαρκεί μισή ώρα είναι εξίσου αποτελεσματική με εκείνη που διαρκεί 2 ώρες.
- Οι δοκιμές απογαλακτισμού πρέπει να διενεργούνται πολλές φορές την ημέρα, και όχι μόνο μία, επειδή τα δεδομένα υποστηρίζουν ότι έτσι επιτυγχάνεται πιο πρόωμη απελευθέρωση από τον μηχανικό αερισμό.

Απάντηση: γ. Δεν είναι όλες οι μέθοδοι απογαλακτισμού εξίσου αποτελεσματικές. Έχει αποδειχτεί ότι ο απογαλακτισμός με διαλείποντα υποχρεωτικό αερισμό είναι κατώτερη μέθοδος. Οι δοκιμές αυτόματης αναπνοής που διενεργούνται μία φορά την ημέρα είναι εξίσου αποτελεσματικές με τις πολλαπλές δοκιμές την ημέρα. Ο κλινικός γιατρός δεν πρέπει να καταδικάζει αυτόματα έναν ασθενή σε αποτυχία απογαλακτισμού για την ημέρα μετά από αποτυχία μιας δοκιμής αναπνοής. Αντ' αυτού, πρέπει να αναζητούνται και να διορθώνονται τα αίτια της αποτυχίας και να διενεργείται νέα δοκιμή αυτόματης αναπνοής, αφού είναι γνωστό ότι η βιβλιογραφία υποστηρίζει αυτή τη στρατηγική.

3. Ποια από τις ακόλουθες είναι η λιγότερο πιθανή αιτία επαναδιασωλήνωσης;

- Ανικανότητα ανοχής του αναπνευστικού φορτίου
- Απόφραξη ανώτερου αεραγωγού
- Υπερβολικές εκκρίσεις
- Μυοπάθεια στεροειδών

Απάντηση: δ. Οι ασθενείς που χρειάζονται επαναδιασωλήνωση έχουν βαρύτερη νόσο, είναι μεγαλύτερης ηλικίας και χρειάζονται μακρύτερη διάρκεια μηχανικού αερισμού, σε σύγκριση με τους ασθενείς που αποσωληνώνονται με επιτυχία. Δεν είναι σαφές αν η επαναδιασωλήνωση από μόνη της συμβάλλει στη θνητότητα, ή αν απλά αποτελεί δείκτη της βαρύτητας της νόσου. Οι επαναδιασωληνωμένοι ασθενείς έχουν πολύ μεγαλύτερη θνητότητα σε σύγκριση με τους ασθενείς που αποσωληνώνονται με επιτυχία. Η μυοπάθεια στεροειδών είναι σπάνια αιτία επαναδιασωλήνωσης. Οι υπερβολικές εκκρίσεις (16%–28% των επαναδιασωληνώσεων) και η ανικανότητα ανοχής του πρόσθετου αναπνευστικού φορτίου (28%–37% των επαναδιασωληνώσεων) είναι η συχνότερες αιτίες επαναδιασωλήνωσης. Η απόφραξη των ανώτερων αεραγωγών αναφέρεται ότι αποτελεί την αιτία επαναδιασωλήνωσης στο 15% των περιπτώσεων.

4. Ποια από τα ακόλουθα είναι αληθή σχετικά με τις δοκιμασίες πρόγνωσης απογαλακτισμού και τις δοκιμές απογαλακτισμού;

- Σε σύγκριση με το κλινικό ένστικτο, οι δοκιμασίες πρόγνωσης απογαλακτισμού δεν εντοπίζουν τον πληθυσμό των ασθενών που είναι έτοιμοι να αποσυνδεθούν από τη συσκευή αερισμού.
- Ο δείκτης ταχείας ρηχής αναπνοής (rapid shallow breathing index-RSBI) ή ο λόγος αναπνευστικής συχνότητας προς αναπνευστικό όγκο (f/VT) με τιμή 100, διακρίνουν καλύτερα μεταξύ επιτυχούς και ανεπιτυχούς προσπάθειας απογαλακτισμού.
- Η εφαρμογή υποστηρίξης πίεσης ή η συνεχής θετική πίεση αεραγωγών (CPAP) σε χαμηλά επίπεδα δεν έχουν επίδραση στην μηχανική της αναπνοής ή στην ακρίβεια της προγνωστικής ικανότητας του f/VT.
- Έχει καταδειχτεί με συνέπεια ότι οι δοκιμές απογαλακτισμού που διενεργούνται ως μέρος ενός πρωτοκόλλου ωφελούν, μειώνοντας τη διάρκεια του μηχανικού αερισμού.

Απάντηση: β. Δεδομένα δείχνουν ότι πολλοί ασθενείς ανέχονται τη διακοπή του μηχανικού αερισμού από την 1^η ημέρα αποσωλήνωσης. Αυτό υποδηλώνει ότι ένα μεγάλο εμπόδιο για την αποσωλήνωση είναι ότι ο κλινικός γιατρός δεν αναγνωρίζει κατά πόσον ένας ασθενής είναι έτοιμος να απογαλακτιστεί. Ο RSBI έχει μελετηθεί σε μυριάδες μελέτες. Αν και δεν είναι τέλειος, σε σύγκριση με άλλους προγνωστικούς δείκτες ετοιμότητας για απογαλακτισμό (π.χ. αρνητική εισπνευστική πίεση, κατά λεπτόν αερισμός), έχει διαπιστωθεί επανειλημμένως ότι είναι ο πιο αξιόπιστος δείκτης. Στις πρωτότυπες μελέτες, ο RSBI μετρήθηκε σε πλήρη απουσία υποστήριξης αερισμού. Η εφαρμογή χαμηλών επιπέδων υποστήριξης μπορεί να μειώσει σημαντικά το αναπνευστικό έργο και να υπερβίχσει της αντίστασης. Έτσι τροποποιούνται οι τιμές των προγνωστικών δεικτών απογαλακτισμού, σε σύγκριση με την απουσία υποστήριξης με T. Αν και αποτελεί κανόνα, ο απογαλακτισμός βάσει πρωτοκόλλου δεν έχει αποδειχτεί ότι βελτιώνει την έκβαση πέραν της καθιερωμένης φροντίδας. Οι αιτίες αποτυχίας πρέπει να αναζητούνται και να διορθώνονται και ο ασθενής πρέπει να παρακολουθείται από τον θεράποντα γιατρό κατά τη διάρκεια της δοκιμής απογαλακτισμού. Η απελευθέρωση από τον αναπνευστήρα πρέπει να προσαρμόζεται στον κάθε ασθενή.

ΚΕΦΑΛΑΙΟ 42

Οξεία Πνευμονική Εμβολή

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Ερωτήσεις Ανασκόπησης

1. Ένας 55χρονος άνδρας προσέρχεται στα επείγοντα και διαγιγνώσκεται με πνευμονική εμβολή βάσει αξονικής τομογραφίας. Ποια από τα ακόλουθα ευρήματα είναι αναμενόμενα σε αυτό τον ασθενή;
- α. Η αύξηση της μερικής τάσης του αρτηριακού διοξειδίου του άνθρακα (PaCO_2) είναι χαρακτηριστικό εύρημα στην ανάλυση αερίων αρτηριακού αίματος λόγω αύξησης του νεκρού χώρου.
 - β. Προκαλείται υποξαιμία μόνο λόγω χαμηλής καρδιακής παροχής.
 - γ. Η PaO_2 και η κυνελιδοαρτηριακή κλίση (A-a) είναι πάντα παθολογικά.
 - δ. Η κλίση μεταξύ τελο-εκπνευστικού CO_2 (ETCO_2) και PaCO_2 είναι αυξημένη

Απάντηση: δ. Η οξεία πνευμονική εμβολή έχει διάφορες επιπτώσεις στην ανταλλαγή αερίων και στην αιμοδυναμική. Με την απόφραξη της πνευμονικής αγγείωσης, αυξάνει τον αερισμό σε σχέση με την αιμάτωση. Αποτελεί επομένως φαινόμενο νεκρού χώρου. Η PaCO_2 είναι αυξημένη σε κρίσιμη νόσο, ως αποτέλεσμα είτε της αύξησης παραγωγής CO_2 (VCO_2), είτε της μείωσης του κατά λεπτό αερισμού (VE), ή λόγω αύξησης του αερισμού νεκρού χώρου (VD). Με αυτή τη λογική, θα περίμενε κανείς η πνευμονική εμβολή να οδηγήσει σε υπερκαπνία. Συνήθως όμως, παρατηρείται υποκαπνία λόγω της αύξησης του κατά λεπτό αερισμού που σχετίζεται με την πνευμονική εμβολή. Αν η πνευμονική εμβολή είναι αρκετά μεγάλη, ιδιαίτερα σε ασθενείς που είναι επιρρεπείς σε κατακράτηση CO_2 (π.χ. χρόνια αποφρακτική πνευμονοπάθεια), μπορεί να παρατηρηθεί αύξηση του CO_2 . Αν και υπάρχει θέμα νεκρού χώρου, η πνευμονική εμβολή προκαλεί χαρακτηριστικά υποξαιμία με φυσιολογία τύπου διαφυγής, καθώς ο τοπικός αγγειόσπασμος προάγει την ανισορροπία μεταξύ αερισμού και αιμάτωσης. Περιφερικά του θρόμβου μπορεί να προκληθεί ατελεκτασία, οδηγώντας επίσης σε διαταραχή της ισορροπίας μεταξύ αερισμού και αιμάτωσης. Οι οξείες αυξήσεις των δεξιών πιέσεων μπορεί να ανοίξουν ένα ανοιχτό ωοειδές τμήμα, οδηγώντας επίσης και σε ενδοκαρδιακή επικοινωνία. Η χαμηλή καρδιακή παροχή μπορεί να συμβάλλει στην υποξαιμία αν ο κορεσμός σε οξυγόνο του μεικτού φλεβικού πέσει αρκετά. Όμως, αυτή δεν είναι η μόνη αιτία υποξαιμίας, όπως συζητήθηκε νωρίτερα. Αν και η υποξαιμία είναι συχνή στην πνευμονική εμβολή, η μερική τάση αρτηριακού οξυγόνου (PaO_2) και η κλίση A-a αναφέρεται ότι είναι φυσιολογικά μέχρι και στο 30% των ασθενών. Η τελο-εκπνευστική καπνογραφία είναι χρήσιμη. Λόγω της πτώσης της καρδιακής παροχής και της αύξησης του νεκρού χώρου (που μειώνει το κυνελιδικό CO_2), η καμπύλη ETCO_2 θα μειωθεί, αυξάνοντας το κενό μεταξύ ETCO_2 και PaCO_2 .

2. Ποια από τα ακόλουθα είναι πιο σωστά σε σχέση με τη διάγνωση της πνευμονικής εμβολής;
- α. Το δ-διμερές έχει υψηλή θετική προγνωστική αξία και μπορεί να τεκμηριώσει τη διάγνωση όταν τα επίπεδα είναι υψηλότερα από 500 ng/mL.
 - β. Το σπινθηρογράφημα αερισμού-αιμάτωσης έχει πολύ υψηλή ευαισθησία (>90% για την παρουσία πνευμονικής εμβολής) αλλά χαμηλή ειδικότητα.
 - γ. Τα ευρήματα της ακτινογραφίας θώρακος με υψηλή ευαισθησία για πνευμονική εμβολή περιλαμβάνουν υπεζωκοτικά διηθήματα, εστιακή ολιγαμία και μειωμένη αγγείωση.
 - δ. Η υψηλή ευαισθησία της πνευμονικής αγγειογραφίας ως διαγνωστικό εργαλείο υπονομεύεται από την χαμηλή ειδικότητα.

Απάντηση: γ. Η διάγνωση της πνευμονικής εμβολής έχει καταστεί προοδευτικά πιο εκλεπτυσμένη τα τελευταία χρόνια. Το σημαντικότερο πρώτο βήμα είναι η υπόνοια και οι μελέτες έχουν επιβεβαιώσει τη χρησιμότητα της κλινικής υπόνοιας του γιατρού για πνευμονική εμβολή πριν από τον διαγνωστικό έλεγχο. Η αρχική εκτίμηση περιλαμβάνει ακτινογραφία θώρακος και εξετάσεις αίματος. Τα υπεζωκοτικά διηθήματα, η εστιακή ολιγαμία και η

μειωμένη αγγείωση ήταν συχνότερα ευρήματα σε ασθενείς με πνευμονική εμβολή, αλλά είχαν χαμηλή ευαισθησία ή ειδικότητα για αυτή τη διαταραχή. Παρομοίως, ο έλεγχος των δ-διμερών, που μπορεί να είναι θετικός σε πολλές κλινικές καταστάσεις, όπως πρόσφατη χειρουργική επέμβαση, τραύμα, κακοήθεια, σοβαρή λοίμωξη, κύηση και ηπατοπάθεια, έχει διαπιστωθεί ότι διαθέτει πολύ υψηλή αρνητική προγνωστική αξία (94%) και καθιστά την πνευμονική εμβολή απίθανη σε επίπεδα κάτω από 500 ng/mL. Το σπινθηρογράφημα αερισμού-αιμάτωσης υπήρξε η κύρια δοκιμασία για τον αποκλεισμό ή την επιβεβαίωση της νόσου. Τα δεδομένα της PIOPED (Prospective Investigation of Pulmonary Embolism Diagnosis) αποκάλυψαν ότι το σπινθηρογράφημα αερισμού-αιμάτωσης μπορεί να είναι διαγνωστικό σε δύο περιπτώσεις: αποτελέσματα υψηλής πιθανότητας με υψηλή πιθανότητα πριν την εξέταση και φυσιολογικά ευρήματα με χαμηλή πιθανότητα πριν την εξέταση. Όμως, αυτά τα δύο σενάρια αντιστοιχούν σε λιγότερο από το 30% των περιστατικών και γενικά, η εξέταση δεν είναι διαγνωστική μέχρι και στο 80% των ασθενών. Πολλά καρδιοπνευμονικά νοσήματα μπορούν να προκαλέσουν διαταραχές αερισμού-αιμάτωσης, καθιστώντας τα ευρήματα μέσης ή χαμηλής πιθανότητας μη διαγνωστικά. Γι' αυτό, η ελικοειδής αξονική τομογραφία θώρακος χρησιμοποιείται τελευταία πιο συχνά. Η ειδικότητά της είναι καλύτερη από την ευαισθησία της, ενώ είναι δυσχερής ο εντοπισμός υποπηματικών πνευμονικών εμβόλων. Η πνευμονική αγγειογραφία εξακολουθεί να είναι η εξέταση εκλογής, με ευαισθησία και ειδικότητα 95% ως 100%.

3. Ποια από τα ακόλουθα είναι αληθή σε σχέση με την αιμοδυναμική και την αντιμετώπιση ασταθούς ασθενούς με οξεία πνευμονική εμβολή;
- α. Η οξεία αύξηση των πνευμονικών αρτηριακών πιέσεων οδηγεί σε δυσλειτουργία και διάταση της δεξιάς κοιλίας, προκαλώντας μετατόπιση του μεσοκοιλιακού διαφράγματος προς την αριστερή κοιλία και μειώνοντας την παροχή της, γεγονός που οδηγεί σε καταπληξία.
 - β. Οι ασθενείς με οξεία πνευμονική εμβολή χρειάζονται επιθετική ανάνηψη με όγκο για τη διατήρηση υψηλών πιέσεων στη δεξιά καρδιά και τη διατήρηση της διαπνευμονικής ροής αίματος.
 - γ. Τα αγγειοδραστικά φάρμακα (π.χ. αγγειοσπαστικά) δεν πρέπει να χορηγούνται, επειδή μπορούν να αυξήσουν τις πνευμονικές αγγειακές αντιστάσεις, επιδεινώνοντας την αιμοδυναμική κατάσταση.
 - δ. Όπως και στους ασθενείς με σύνδρομο οξείας αναπνευστικής δυσχέρειας (ARDS), στους ασθενείς με οξεία ανεπάρκεια δεξιάς κοιλίας λόγω πνευμονικής εμβολής πρέπει να περιορίζεται η πίεση στους αεραγωγούς και να γίνεται ανεκτή κάποιου βαθμού υπερκαπνία και υποξαιμία.

Απάντηση: α. Οι αιμοδυναμικές επιπτώσεις της οξείας πνευμονικής εμβολής είναι δευτεροπαθείς λόγω ανεπάρκειας της δεξιάς κοιλίας. Φυσιολογικά, η RV αδειάζει σε κύκλωμα χαμηλής πίεσης, την πνευμονική αγγείωση. Η οξεία εμβολική απόφραξη, μαζί με την ενεργοποίηση των αιμοπεταλίων και την απελευθέρωση χυμικών μεσολαβητών (π.χ. θρομβοξάνη, ισταμίνη, σεροτονίνη), οδηγεί σε οξεία αύξηση των πνευμονικών πιέσεων, τις οποίες η δεξιά κοιλία δεν μπορεί να υπερνικήσει. Η οξεία ανεπάρκεια της τελευταίας προκαλεί μετατόπιση του μεσοκοιλιακού διαφράγματος και προοδευτική μείωση του μεγέθους της αριστερής κοιλιακής κοιλότητας και παροχής (διακοιλιακή αλληλεξάρτηση).

Ο χειρισμός του προφορτίου πρέπει να γίνεται με προσοχή σε οξεία πνευμονική εμβολή. Η υπερφόρτιση όγκου μιας ήδη οξέως υπερφορτισμένης δεξιάς κοιλίας από απόψεως πιέσεων, θα επιδεινώσει την κατάσταση. Πάντως, οι ασθενείς με οξεία πνευμονική εμβολή μπορεί να εξακολουθούν να έχουν εφεδρεία προφορτίου, καθώς και τη δυνατότητα να ανταποκριθούν σε όγκο. Αν χορηγηθεί όγκος,

πρέπει να γίνει με προσοχή. Η αντιμετώπιση της οξείας ανεπάρκειας της δεξιάς κοιλίας μπορεί να είναι δύσκολη. Αν δεν ελεγχθεί η αρτηριακή υπόταση, θα μειωθεί η στεφανιαία ροή αίματος στο τοίχωμα της δεξιάς κοιλίας, επιδεινώνοντας την ανεπάρκειά της, καθώς και ολόκληρη την αιμοδυναμική εικόνα. Με αυτή τη γνώση, αγγειοσυσπαστικές ουσίες χρησιμοποιούνται συχνά σε ανεπάρκεια δεξιάς κοιλίας για τη διατήρηση της αρτηριακής πίεσης και της στεφανιαίας ροής αίματος προς τη δεξιά καρδιά. Πολλές αγγειοσυσπαστικές ουσίες μπορούν να αυξήσουν την πνευμονική αγγειακή αντίσταση, αλλά ο λόγος κινδύνου/οφέλους υποδεικνύει τη διατήρηση της πίεσης. Άλλες σχετικά συχνές αποφάσεις που αφορούν τον χειρισμό της αιμοδυναμικής κατάστασης περιλαμβάνουν τη μείωση του μεταφορτίου της δεξιάς κοιλίας με τη χορήγηση εισπνεόμενων πνευμονικών αγγειοδιαστολέων και με ινóτροπη υποστήριξη με φάρμακα όπως είναι η δοβουταμίνη. Τέλος, η οξεία ανεπάρκεια της δεξιάς κοιλίας δεν ανέχεται την οξέωση ή την υποξία, γιατί αμφότερα θα επιδεινώσουν την οξεία πνευμονική αγγειοσύσπαση. Σε ιδανικές συνθήκες, η υπερκαπνία και η υποξαιμία μπορούν να αποφευχθούν με τις χαμηλότερες δυνατές πιέσεις αεραγωγών, αλλά η προτεραιότητα (τουλάχιστον στην οξεία φάση) πρέπει να δίνεται στη διατήρηση της ανταλλαγής αερίων για την αποφυγή επιδείνωσης της ανεπάρκειας της δεξιάς κοιλίας.

4. Μία 49χρονη γυναίκα προσέρχεται στα επείγοντα με θωρακικό άλγος και ηλεκτροκαρδιογραφικές μεταβολές που περιλαμβάνουν νέο πλήρη αποκλεισμό δεξιού σκέλους και αναστροφή των κυμάτων T σε όλο το πρόσθιο τοίχωμα. Η αξονική τομογραφία δείχνει οξεία αμφοτερόπλευρη εγγύς πνευμονική εμβολή. Η αρτηριακή πίεση είναι 120/80 mm Hg και η κλινική εικόνα της

ασθενούς είναι καλή. Ποια από τα ακόλουθα είναι σωστά σε σχέση με τις θεραπευτικές επιλογές της ασθενούς;

- α.** Η ηχοκαρδιογραφία έχει περιορισμένο ρόλο, αφού η απόφαση χορήγησης θρομβολυτικών βασίζεται μόνο στην αρτηριακή πίεση.
- β.** Υπάρχει γενική συμφωνία ότι οι νορμοτασικοί ασθενείς με πνευμονική εμβολή και δυσλειτουργία δεξιάς κοιλίας πρέπει να λαμβάνουν θρομβολυτική αγωγή.
- γ.** Η αύξηση των καρδιακών βιοδεικτών σχετίζεται με ταυτόχρονο οξύ στεφανιαίο σύνδρομο και πρέπει να διερευνηθεί με καρδιακό καθετηριασμό.
- δ.** Η απόφαση χορήγησης θρομβολυτικής θεραπείας πρέπει να λαμβάνει υπ' όψιν της όχι μόνο την αιμοδυναμική κατάσταση και την αρτηριακή πίεση, αλλά και την διαστρωμάτωση του κινδύνου σε νορμοτασικούς ασθενείς.

Απάντηση: δ. Γενικώς συνιστάται οι ασθενείς με οξεία πνευμονική εμβολή και υπόταση που δεν έχουν αντενδείξεις για θρομβολυτική θεραπεία, να θρομβολύονται. Σε όλους τους άλλους ασθενείς πρέπει να υπολογίζεται ο κίνδυνος επιπλοκών. Ακόμα πιο σημαντικό είναι ότι η διαστρωμάτωση του κινδύνου περιλαμβάνει τη διενέργεια ηχοκαρδιογραφήματος για την εκτίμηση της δυσλειτουργίας της δεξιάς κοιλίας. Οι νορμοτασικοί ασθενείς με πνευμονική εμβολή χωρίς δυσλειτουργία της δεξιάς κοιλίας έχουν πολύ καλή πρόγνωση και δεν πρέπει να θρομβολύονται. Σε νορμοτασικούς ασθενείς με δυσλειτουργία της δεξιάς κοιλίας, η απόφαση χορήγησης θρομβολυτικών πρέπει να αξιολογείται σε κάθε περίπτωση ξεχωριστά βάσει της διαστρωμάτωσης του κινδύνου. Αυτό περιλαμβάνει την κλινική εικόνα του ασθενούς, την οξυγόνωση και το αναπνευστικό έργο, τους καρδιακούς βιοδείκτες, καθώς και τα ευρήματα του ηλεκτροκαρδιογραφήματος και της αξονικής τομογραφίας.

ΚΕΦΑΛΑΙΟ 43

Πνευμονική Υπέρταση

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Ερωτήσεις Ανασκόπησης

1. Ένας 40χρονος μετρίως παχύσαρκος άνδρας εισάγεται για καρδιακό καθετηριασμό αυθημερόν λόγω επιδείνωσης ασθήματος θωρακικού βάρους, δύσπνοιας προσπαθείας και βήχα από 6μήνου. Το ηλεκτροκαρδιογράφημά του δεν παρουσιάζει ισχαιμικά ευρήματα. Το υπερηχοκαρδιογράφημα, που ήταν τεχνικά δύσκολο και δεν επέτρεψε την αξιολόγηση της αριστερής κοιλίας, έδειξε μέτρια διάταση της δεξιάς κοιλίας με σημαντική αύξηση της πνευμονικής αρτηριακής συστολικής πίεσης. Ο καθετηριασμός της αριστερής καρδιάς έδειξε μη αποφρακτική στεφανιαία νόσο. Ο καθετηριασμός της δεξιάς καρδιάς αποκάλυψε μέση πνευμονική αρτηριακή πίεση (mPAP) 45 mm Hg (πνευμονική αρτηρία 60/30 mm Hg) με πίεση ενσφύνωσης πνευμονικών τριχοειδών (PCWP) 10 mm Hg και καρδιακή παροχή 5 L/min. Σε ποια νόσο ανταποκρίνονται καλύτερα αυτά τα αιμοδυναμικά ευρήματα;
- α. Σοβαρή στένωση μιτροειδούς
 - β. Αριστερή καρδιακή ανεπάρκεια λόγω διαστολικής δυσλειτουργίας 3^{ου} βαθμού
 - γ. Χρόνια θρομβοεμβολική πνευμονική υπέρταση (CTEPH, ομάδα 4 στην κλινική ταξινόμηση της PH, βλέπε Πλαίσιο 43.1)
 - δ. Συνδυασμός προτριχοειδικής και μετατριχοειδικής πνευμονικής υπέρτασης (pulmonary hypertension-PH) λόγω συστολικής και διαστολικής δυσλειτουργίας της αριστερής κοιλίας

Απάντηση: γ. Ο ασθενής έχει αυξημένη διαπνευμονική κλίση πίεσης (transpulmonary pressure gradient-TPG) ίση με 35 (φυσιολογικά είναι κάτω από 12), η οποία σχετίζεται με PCWP <15 mm Hg. Οι πνευμονικές αγγειακές αντιστάσεις, που υπολογίζονται από την κλίση mPAP-PCWP (TPG) δια της CO είναι 7 μονάδες Wood > 3 Woods και επομένως η κατάσταση πληροί όλα τα αιμοδυναμικά κριτήρια της προτριχοειδικής PH (βλέπε Πίνακα 43.2). Η CTEPH είναι προτριχοειδική μορφή PH. Ένας ασθενής με σοβαρή στένωση μιτροειδούς (επιλογή α) θα είχε σοβαρή αύξηση της mPAP, όπως και ένας ασθενής με αριστερή καρδιακή ανεπάρκεια και προχωρημένη διαστολική δυσλειτουργία (επιλογή β). Όμως, στο πλαίσιο της καρδιακής ανεπάρκειας, η PCWP θα παρουσίαζε ακραία αύξηση (≥ 15 mm Hg με TPG 12 mm Hg ή λιγότερο). Αυτοί οι δύο τελευταίοι ασθενείς πληρούν όλα τα αιμοδυναμικά κριτήρια της μετατριχοειδικής PH. Παρομοίως, ένας ασθενής με νόσο της αριστερής καρδιάς με συνδυασμό προτριχοειδικής και μετατριχοειδικής PH (επιλογή δ) θα είχε σοβαρή αύξηση της mPAP με μεγάλη TPG και PVR ίσες ή υψηλότερες από 3 μονάδες Woods, αλλά η PCWP θα ήταν τουλάχιστον στα 15 mm Hg ή υψηλότερη.

2. Μια 27χρονη γυναίκα με ιστορικό σκληροδέρματος και σχετιζόμενη πνευμονική υπέρταση που διαγνώστηκε πριν από 5 χρόνια προσκομίζεται με συγκοπή. Λαμβάνει εισπνεόμενη προστακυκλίνη, έναν αποκλειστή υποδοχέων ενδοθηλίνης και έναν αναστολέα φωσφοδιεστεράσης. Τα ζωτικά της σημεία περιλαμβάνουν αρτηριακή πίεση 70/50 mm Hg και καρδιακή συχνότητα 88 παλμούς/min. Λαμβάνει χρονίως οξυγονοθεραπεία και ο κορεσμός οξυγόνου της είναι 96% με 3 L μέσω ρινοκαθετήρα. Λόγω υπότασης, μεταφέρεται στη μονάδα εντατικής θεραπείας και τοποθετείται καθετήρας Swan-Ganz για την υποστήριξη της αντιμετώπισής της. Η αιμοδυναμική εικόνα είναι η ακόλουθη: κεντρική φλεβική πίεση (CVP) 20 mm Hg, πνευμονική αρτηριακή πίεση (PAP) 90/40 mm Hg και PCWP 12 mm Hg με καρδιακή παροχή (CO) 3,9 L/min και περιφερικές αγγειακές αντιστάσεις (PVR) 12 μονάδες Woods. Ποιο είναι το καλύτερο επόμενο βήμα στην αντιμετώπισή της;
- α. Ινότροπα για την αύξηση της καρδιακής παροχής
 - β. Μείωση μεταφορτίου με μονοξειδίου του αζώτου
 - γ. Αγγειοσυσπαστικά φάρμακα για την αύξηση των συστηματικών αγγειακών αντιστάσεων (SVR)
 - δ. Εφ' άπαξ χορήγηση υγρών ενδοφλεβίως

Απάντηση: γ. Η ασθενής έχει PH ομάδας 1 που σχετίζεται με σκληρόδερμα. Προσκομίστηκε λόγω συγκοπής και οριακής καρδιακής παροχής με υπόταση. Το καλύτερο πρώτο βήμα είναι η διατήρηση της κλίσης πίεσης μεταξύ αορτικής και δεξιάς κοιλιακής πίεσης για τη διασφάλιση επαρκούς αιμάτωσης της δεξιάς στεφανιαίας αρτηρίας (RCA) και την παρεμπόδιση της ισχαιμίας της δεξιάς κοιλίας μέσω της αύξησης των SVR με αγγειοσυσπαστικά φάρμακα. Η εφ' άπαξ χορήγηση υγρών (επιλογή δ) είναι εσφαλμένη, αφού η CVP είναι αυξημένη και θα οδηγούσε σε υπερπλήρωση της δεξιάς κοιλίας, αύξηση της δια-διαφραγματικής κλίσης και επιδείνωση της φλεβικής συμφόρησης. Η επιλογή α είναι εσφαλμένη, αφού η αύξηση της συσπαστικότητας πριν από τη διόρθωση των SVR μπορεί να οδηγήσει σε αύξηση της δεξιάς κοιλιακής τελοδιαστολικής πίεσης και σε μείωση της πίεσης στεφανιαίας άρδευσης της δεξιάς κοιλίας. Η επιλογή β είναι λογική παρέμβαση για τη μείωση των PVR και τη βελτίωση της CO, αλλά μόνο μετά την αποκατάσταση της αιμάτωσης της δεξιάς κοιλίας.

3. Σας ζητάνε να χειριστείτε μία 35χρονη ασθενή με ιδιοπαθή πνευμονική υπέρταση (PAH) που εισήχθη στη μονάδα εντατικής θεραπείας πριν λίγες ημέρες με επιδείνωση της αναπνευστικής λειτουργίας. Η νόσος διαγνώστηκε προ 5ετίας και δεν βρέθηκε αιτία πρόκλησης PAH. Η φαρμακευτική της αγωγή χρειάστηκε κλιμάκωση με την πάροδο του χρόνου και τώρα λαμβάνει τρεπροστινίλη υποδόρια 100 μg/kg ανά λεπτό, αμπρισεντάνη 10 mg την ημέρα, σιλδεναφίλη 40 mg 3 φορές την ημέρα, σπιρονολακτόνη 50 mg 2 φορές την ημέρα, διγοξίνη 250 μg μία φορά την ημέρα και τορασεμίδη mg 2 φορές την ημέρα. Οι δόσεις δεν μπορούν να αυξηθούν περαιτέρω λόγω ανεπιθύμητων ενεργειών. Η λειτουργική της κατάταξη ως εξωτερική ασθενής ήταν NYHA II στην καλύτερη περίπτωση.

Από τότε που ήρθε στο νοσοκομείο, η αναπνοή της έχει επιδεινωθεί και χρειάστηκε μηχανικό αερισμό. Ξεκίνησε η χορήγηση κατεχολαμινών ενδοφλέβια λόγω της σταθερά μειωμένης αρτηριακής πίεσης. Τα ζωτικά της σημεία έχουν ως εξής: καρδιακή συχνότητα 110 παλμοί/min, αρτηριακή πίεση 93/67 mm Hg, κορεσμός οξυγόνου με οξυμετρία παλμού (SpO₂) 94%, CVP 23 mm Hg και κεντρικός φλεβικός κορεσμός 45%. Η αποβολή ούρων ήταν λιγότερη από 20 mL/h τις τελευταίες 6 ώρες. Το υπερηχοκαρδιογράφημα δείχνει σοβαρή διάταση της δεξιάς κοιλίας με υποκινησία. Η ακτινογραφία θώρακος δείχνει διατατεμένες πνευμονικές αρτηρίες. Ποιο από τα ακόλουθα είναι το επόμενο βήμα στην αντιμετώπισή της;

- α. Συνέχιση της ίδιας αγωγής για να της δοθεί περισσότερος χρόνος να ανταποκριθεί στη θεραπεία.
- β. Διακοπή της τρεπροστινίλης γιατί μια από τις παρενέργειές της είναι η υπόταση.
- γ. Εισαγωγή καθετήρα πνευμονικής αρτηρίας για την ακριβή μέτρηση των αιμοδυναμικών παραμέτρων και την υποστήριξη της ασθενούς με ένα ινότροπο φάρμακο. Αν αυτή η προσέγγιση αποτύχει, τότε θα ξεκινήσει μηχανική υποστήριξη.
- δ. Ο καθετηριασμός της πνευμονικής αρτηρίας και η μηχανική υποστήριξη δεν ενδείκνυνται για την ρήξη της αντιρρόπησης της δεξιάς κοιλίας.

Απάντηση: γ. Η τωρινή πορεία δεν είναι βιώσιμη και τα διαθέσιμα δεδομένα υποδηλώνουν επιδείνωση. Η διακοπή της τρεπροστινίλης (επιλογή β) σε αυτό το πλαίσιο μπορεί να αποβεί καταστροφική, οπότε πρέπει να συνεχιστεί διότι μειώνει το μεταφορτίο. Το επόμενο κατάλληλο βήμα αντιμετώπισης είναι η τοποθέτηση καθετήρα Swan-Ganz. Τα ινότροπα και η μηχανική υποστήριξη είναι πιθανές επιλογές, όπως και η υποψηφιδότητα για μεταμόσχευση πνευμόνων σε αυτή τη νέα ασθενή που δεν έχει εμφανείς αντενδείξεις.

ΚΕΦΑΛΑΙΟ 44

Μαζική Αιμόπτυση

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Ερωτήσεις Ανασκόπησης

1. Ποιος από τους ακόλουθους ασθενείς με υποτροπιάζουσα μαζική αιμόπτυση μετά από εμβολισμό βρογχικής αρτηρίας θα ήταν ο καλύτερος υποψήφιος για χειρουργική επέμβαση;

- α. Ένας 68χρονος με χρόνια αποφρακτική πνευμονοπάθεια και αιμόπτυση λόγω μικροκυτταρικού καρκίνου πνεύμονα
- β. Ένας 21χρονος με σοβαρή κυστική ίνωση και αιμόπτυση λόγω βρογχεκτασίας
- γ. Ένας 65χρονος με χρόνια λεμφοκυτταρική λευχαιμία και αιμόπτυση λόγω ασπεργιλλώματος στο δεξιό άνω λοβό
- δ. Ένας 35χρονος ασθενής που έχει υποβληθεί θα μεταμόσχευση μυελού των οστών με αιμόπτυση λόγω διάχυτης κυψελιδικής αιμορραγίας

Απάντηση: γ. Η χειρουργική επέμβαση για μαζική αιμόπτυση έχει ένδειξη όταν η αιμορραγία υποτροπιάζει μετά από εμβολισμό της βρογχικής αρτηρίας. Τα σημαντικά σημεία για την απόφαση αν ένας ασθενής είναι υποψήφιος για χειρουργική επέμβαση περιλαμβάνουν την υποκείμενη καρδιοπνευμονική εφεδρεία, την ακριβή εντόπιση της αιμορραγίας και την υποκείμενη νόσο. Ο ασθενής γ είναι ο καλύτερος υποψήφιος για χειρουργική επέμβαση λόγω της φύσης της πάθησης που προκαλεί αιμόπτυση. Ο ασθενής α είναι απίθανο να έχει επαρκή πνευμονική εφεδρεία ώστε να επιβιώσει από την πνευμονεκτομή και το ίδιο ισχύει για τον ασθενή β με διάχυτη ινώδη και βρογχεκτατική πνευμονική νόσο. Ο ασθενής δ δεν είναι καλός υποψήφιος λόγω της διάχυτης φύσης της αιμορραγίας.

2. Ένας 54χρονος ασθενής με ιστορικό θεραπευμένης φυματίωσης προσέρχεται με μαζική αιμόπτυση και εισάγεται στη μονάδα εντατικής θεραπείας για αντιμετώπιση. Τα ζωτικά σημεία κατά την εισαγωγή περιλαμβάνουν καρδιακή συχνότητα 110 παλμούς/λεπτό, αναπνευστική συχνότητα 28 αναπνοές/λεπτό, αρτηριακή πίεση 108/54 mm Hg και κορεσμό οξυγόνου με οξυμετρία παλμού 90% σε αέρα δωματίου. Ο ασθενής διασωληνώθηκε μόλις μεταφέρθηκε στην μονάδα εντατικής θεραπείας. Η ακτινογραφία θώρακος δείχνει σπηλαιώδη αλλοίωση στον δεξιό άνω λοβό και ινώδεις αλλοιώσεις στον δεξιό άνω λοβό. Η αξονική τομογραφία επιβεβαιώνει τα ίδια ευρήματα. Ποια από τις ακόλουθες είναι η επόμενη καλύτερη παρέμβαση;

- α. Εμβολισμός βρογχικής αρτηρίας
- β. Βρογχοσκόπηση με εύκαμπτο βρογχοσκόπιο οπτικής ίνας και έκπλυση με παγωμένο φυσιολογικό ορό
- γ. Εύκαμπτη βρογχοσκόπηση οπτικής ίνας με τοποθέτηση βρογχικού αποκλειστή
- δ. Αντικατάσταση του ενδοτραχειακού σωλήνα με ενδοτραχειακό σωλήνα διπλού αυλού

Απάντηση: α. Αυτός ο ασθενής έχει ήπιες μόνο αιμοδυναμικές διαταραχές και μία εστία αιμορραγίας που εντοπίστηκε στην αξονική τομογραφία, που επιτρέπει τον άμεσο εμβολισμό της βρογχικής αρτηρίας (bronchial artery embolization-BAE). Ο BAE είναι ασφαλής και αποτελεσματικός και προσφέρει ταχύ έλεγχο της αιμορραγίας. Η βρογχοσκόπηση μπορεί να καθυστερήσει την οριστική θεραπεία σε αυτόν τον ασθενή. Οι βρογχοσκοπικές παρεμβάσεις, όπως η έκπλυση με παγωμένο φυσιολογικό ορό και η τοποθέτηση βρογχικού αποκλειστή είναι μόνο προσωρινά μέτρα και ο ασθενής θα εξακολουθεί να χρειάζεται μια οριστική παρέμβαση για την διακοπή της αιμορραγίας. Παρομοίως, η τοποθέτηση ενός σωλήνα διπλού αυλού μπορεί να επιτρέψει την απομόνωση του πνεύμονα που αιμορραγεί, αλλά δεν θα ελέγξει την αιμορραγία.

3. Ποια από τις ακόλουθες είναι η συχνότερη επιπλοκή του εμβολισμού βρογχικής αρτηρίας;

- α. Ισχαιμία μυοκαρδίου
- β. Έμφρακτο ωτιαίου μυελού
- γ. Νέκρωση βρογχικού τοιχώματος
- δ. Πυρετός

Απάντηση: δ. Το θωρακικό άλγος, η δυσφαγία και ο πυρετός είναι οι συχνότερες επιπλοκές μετά από εμβολισμό βρογχικής αρτηρίας. Η μυοκαρδιακή ισχαιμία, η νέκρωση βρογχικού τοιχώματος, ή η οισοφαγική νέκρωση, είναι σπάνια. Η πιο καταστροφική επιπλοκή είναι το έμφρακτο του ωτιαίου μυελού που οφείλεται σε εμβολισμό της πρόσθιας σπονδυλικής αρτηρίας, αλλά οι υψηλής ποιότητας βρογχικές αρτηριογραφίες και οι υπερεκλεκτικές τεχνικές καθιστούν αυτή την επιπλοκή σπάνια στην εποχή μας.

ΚΕΦΑΛΑΙΟ 45

Πνευμοθώρακας και Βαρότραυμα

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Ερωτήσεις Ανασκόπησης

1. Ένας άνδρας 58 ετών με ιστορικό ΧΑΠ προσέρχεται στο τμήμα επειγόντων περιστατικών με δύσπνοια. Η ακτινογραφία θώρακα επιβεβαιώνει την παρουσία πνευμοθώρακα. Ποιος από τους ακόλουθους παράγοντες αυξάνει τον κίνδυνο εμφάνισης αυτούματου δευτερογενούς πνευμοθώρακα;

α. ΧΑΠ

β. Δείκτης μάζας σώματος (ΔΜΣ) ίσος με 28

γ. Προηγούμενο ιστορικό χρήσης καπνού

δ. Προηγούμενο ιστορικό ενδοφλέβιας χρήσης ναρκωτικών

Απάντηση: **α.** Η ΧΑΠ αποτελεί γνωστό παράγοντα κινδύνου για την ανάπτυξη πνευμοθώρακα. Η τρέχουσα και όχι η προηγούμενη κατάχρηση ενδοφλέβιων ναρκωτικών ουσιών αποτελεί παράγοντα κινδύνου που σχετίζεται με απόπειρες υποκλείδιας ή υπερκλείδιας ένεσης. Ένα προηγούμενο ιστορικό χρήσης καπνού ή ένας ΔΜΣ ίσος με 28 δεν αποτελούν παράγοντες κινδύνου.

2. Το πνευμονικό βαρότραυμα αναφέρεται σε ρήξη κυψελίδων ως αποτέλεσμα αυξημένης διακυψελιδικής πίεσης (η κυψελιδική πίεση μείον την πίεση στον παρακείμενο διάμεσο χώρο). Ποιο από τα παρακάτω έχει αναγνωριστεί ως ανεξάρτητος παράγοντας κινδύνου για βαρότραυμα;

α. ΔΜΣ μεγαλύτερος από 30

β. Πίεση plateau μικρότερη από 30 cm H₂O

γ. Σύνδρομο οξείας αναπνευστικής δυσχέρειας (ARDS)

δ. Πνευμονία

Απάντηση: **γ.** Το ARDS έχει αναγνωριστεί ως ανεξάρτητος παράγοντας κινδύνου για την ανάπτυξη βαροτραύματος. Ο ΔΜΣ μεγαλύτερος από 30 και η πνευμονία δεν έχουν αναγνωριστεί ως παράγοντες κινδύνου. Πίεση plateau μικρότερη από 30 cm H₂O συμβάλλει στην πρόληψη του βαροτραύματος.

3. Μια γυναίκα 45 ετών με ιστορικό άσθματος διασωληνώνεται επειγόντως στη μονάδα εντατικής θεραπείας (ΜΕΘ) λόγω σοβαρής παρόξυνσης του άσθματος. Τρεις ώρες μετά τη διασωλήνωση, παρά τη βαριά καταστολή, η μέγιστη πίεσης και η πίεση plateau στον αναπνευστήρα συνεχίζουν να αυξάνονται. Η συστολική αρτηριακή της πίεση έχει μειωθεί από 150 mm Hg σε 84 mm Hg. Η φυσική εξέταση αποκαλύπτει μειωμένους/απόντες αναπνευστικούς ήχους πάνω από τον δεξιό πνεύμονα. Η τραχεία της έχει απόκλιση προς τα αριστερά. Ποιο από τα παρακάτω είναι το πιο σωστό επόμενο βήμα;

α. Λήψη ακτινογραφίας θώρακα

β. Έναρξη παραλυτικών

γ. Εισαγωγή βελόνας 18 gauge στο δεύτερο μεσοπλεύριο διάστημα στη μεσοκλειδική γραμμή και στη συνέχεια αναρρόφηση αέρα

δ. Αποσύνδεση από τον αναπνευστήρα και εκτέλεση αερισμού με ασκό-μάσκα

Απάντηση: **γ.** Η ασθενής έχει σημεία πνευμοθώρακα υπό τάση που περιλαμβάνει τον δεξιό πνεύμονα με αιμοδυναμική επιβάρυνση. Η σωστή απάντηση είναι η αναρρόφηση του αέρα όπως περιγράφεται.

4. Ένας άνδρας 60 ετών προσέρχεται στον πνευμονολόγο του μετά την έξοδό του από το νοσοκομείο μετά από πνευμοθώρακα. Ο ασθενής ρωτά εάν διατρέχει κίνδυνο για υποτροπιάζοντα πνευμοθώρακα. Ποιοι από τους ακόλουθους παράγοντες κινδύνου προδιαθέτουν αποδεδειγμένα σε υποτροπή πνευμοθώρακα;

α. Ηλικία μεγαλύτερη από 50 έτη

β. ΧΑΠ

γ. Περισσότερα από ένα επεισόδια πνευμοθώρακα

δ. β και γ

Απάντηση: **δ.** Επεξήγηση: Τόσο η ΧΑΠ όσο και ένα προηγούμενο επεισόδιο πνευμοθώρακα αποτελούν αποδεδειγμένους παράγοντες κινδύνου για την ανάπτυξη επόμενου πνευμοθώρακα.

5. Ένας άνδρας 21 ετών προσέρχεται στο τοπικό τμήμα επειγόντων περιστατικών (ΤΕΠ) με αιφνίδια έναρξη θωρακικού πόνου. Η ακτινογραφία θώρακος επιβεβαιώνει την παρουσία ενός αριστερού πνευμοθώρακα 2 εκατοστών. Ενώ βρίσκεται στο ΤΕΠ ο θωρακικός πόνος του ασθενούς υποχωρεί. Τα ζωτικά του σημεία είναι σταθερά σε αέρα δωματίου. Ποιο από τα παρακάτω είναι το σωστό επόμενο βήμα;

α. Απλή αναρρόφηση με βελόνα 18 gauge και στη συνέχεια ακτινογραφία θώρακα

β. Ακτινογραφία θώρακα στο ΤΕΠ για να επιβεβαιωθεί η σταθερότητα του πνευμοθώρακα. Μόλις επιβεβαιωθεί, έξοδος από το ΤΕΠ και παρακολούθηση (follow-up) από τον ιατρό πρωτοβάθμιας φροντίδας του σε 24 έως 48 ώρες και επανάληψη της ακτινογραφίας θώρακα.

γ. Οξυγόνο υψηλής ροής και εισαγωγή στο νοσοκομείο

δ. Θωρακοστομία με σωλήνα ακολουθούμενη από εισαγωγή στο νοσοκομείο

Απάντηση: **β.** Με βάση μια μελέτη που αξιολόγησε τα αποτελέσματα των ασθενών που προσέρχονται στο ΤΕΠ με πρωτοπαθή αυτόματο πνευμοθώρακα, οι ασθενείς που είναι κλινικά σταθεροί με μικρό (<2-3 cm) πνευμοθώρακα, μπορούν να παρακολουθηθούν. Ένας μεγάλος πνευμοθώρακας (>25% του υπεζωκοτικού χώρου) ή ένας συμπτωματικός ασθενής μπορεί να χρειαστεί πιο επεμβατική θεραπεία.

ΚΕΦΑΛΑΙΟ 46

Εισπνοή Τοξικών Αερίων, Ατμών ή Καπνού

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Ερωτήσεις Ανασκόπησης

1. Ποια είναι η συχνότερη αιτία θανάτου σε ασθενείς με οξεία εισπνοή καπνού;

α. Τοξικότητα μονοξειδίου του άνθρακα

β. Τοξικότητα από κυανίδιο

γ. Θερμική βλάβη στον πνευμονικό παρεγχυματικό ιστό

δ. Υπερβολική φλεγμονώδης αντίδραση που προκαλείται από την απορρόφηση των τοξινών και την αλληλεπίδραση των ερεθιστικών ουσιών με τον βλεννογόνο.

Απάντηση: δ. Η δηλητηρίαση από μονοξείδιο του άνθρακα συμβαίνει -κυρίως σε κλειστό χώρο- ως αποτέλεσμα ενός περιβάλλοντος με έλλειψη οξυγόνου. Η τοξικότητα από κυανίδιο είναι παρόμοια, αλλά απαιτεί ένα υπόστρωμα φωτιάς με υψηλή περιεκτικότητα σε αζωτούχες ενώσεις (π.χ. τεχνητός αφρός, μαλλί). Η θερμική βλάβη σε επίπεδο κάτω από τις φωνητικές χορδές είναι ασυνήθιστη, εκτός εάν ο ασθενής βρίσκεται σε βαθύ κώμα ή εάν εμπλέκεται υπέρθερμος ατμός. Η τεράστια διεπιφάνεια κυψελίδων-τριχοειδών στον πνεύμονα σημαίνει ότι υπάρχει ταχεία μεταφορά φλεγμονωδών πρωτεϊνών και ερεθιστικών ουσιών προς τη συστηματική κυκλοφορία, οι οποίες ευθύνονται για την πλειονότητα των θανάτων στην όψιμη φάση.

2. Σε ποιο από τα ακόλουθα θα πρέπει να εστιάζεται η αρχική αντιμετώπιση της εισπνοής καπνού στον τόπο του τραυματισμού;

α. Διασωλήνωση και αερισμός σε όλα τα θύματα εισπνοής καπνού

β. Παροχή οξυγόνου υψηλής συγκέντρωσης, με αξιολόγηση των αεραγωγών και έλεγχο της αυχενικής μοίρας της σπονδυλικής στήλης

γ. Παροχή ενδοφλέβιας υδροκορτιζόνης για την ελαχιστοποίηση του οιδήματος των αεραγωγών

δ. Αξιολόγηση του μεγέθους του εγκαύματος και των απαιτήσεων σε υγρά πριν από τον προσδιορισμό του βαθμού τραυματισμού των αεραγωγών

Απάντηση: β. Οι εισπνοές καπνού συνήθως συμβαίνουν σε συνδυασμό με τραύμα και πρέπει να αντιμετωπίζονται ως πιθανή κάκωση του αυχένα μέχρι αποδείξεως του αντιθέτου. Η διασωλήνωση μπορεί να είναι επικίνδυνη σε βλάβη από εισπνοή και θα πρέπει να γίνεται μόνο όταν έχει αξιολογηθεί η σχέση κινδύνου/οφέλους και η κατάσταση της αυχενικής μοίρας της σπονδυλικής στήλης είναι σαφής. Ο τραυματισμός των αεραγωγών θα προκαλέσει γρήγορα το θάνατο, ενώ οι όποιες δυσμενείς συνέπειες λόγω απώλειας υγρών χρειάζονται σημαντικά περισσότερο χρόνο για να εμφανιστούν. Το κλειδί είναι η μεγιστοποίηση της χορήγησης οξυγόνου, καθώς έτσι μειώνεται ο χρόνος ημιζωής του συμπλόκου της καρβοξυαιμοσφαιρίνης, ελαχιστοποιώντας την κυτταροπαθητική υποξία που προκύπτει.

3. Μια 76χρονη κρατούμενη προσκομίζεται με ασθενοφόρο αφού έβαλε φωτιά στο στρώμα της στην τοπική φυλακή. Είναι νορμοτασική, αλλά παρά τη χορήγηση υγρών με bolus η αρτηριακή της πίεση είναι 114/66 mmHg, με σφύξεις 88 παλμούς/λεπτό, και με επίπεδα γαλακτικού ορού 6,8 mmol/L, παρά το έγκαυμα σε μόλις 10% της επιφάνεια σώματος (body surface area-BSA). Η ασθενής εμφανίζεται πιο ανήσυχη και ταραγμένη από ό,τι φαίνεται φυσιολογικό με ένα τέτοιο μέγεθος εγκαύματος. Το επίπεδο καρβοξυαιμοσφαιρίνης είναι 3,0 g/dl. Ποια είναι η αιτία του αυξημένου επιπέδου γαλακτικού;

α. Εγκαυματικό σοκ λόγω υποάρδευσης

β. Κατάσταση χαμηλής καρδιακής παροχής

γ. Κυτταροπαθητική υποξία

δ. Ηπατική ανεπάρκεια

Απάντηση: γ. Η αύξηση του γαλακτικού οφείλεται πιθανότατα σε κυτταροπαθητική υποξία (αποκλεισμός της ενδοκυτταρικής επεξεργασίας του οξυγόνου) λόγω κυανιδίου. Ένα περιβάλλον με έλλειψη οξυγόνου με καύση μιας αζωτούχου ένωσης (όπως τα έπιπλα) μπορεί να προκαλέσει αυξημένα επίπεδα κυανιδίου. Δεν υπάρχει ταχεία εξέταση για τον προσδιορισμό των επιπέδων και το επίπεδο μονοξειδίου του άνθρακα είναι πολύ χαμηλό για να έχει προκαλέσει τοξικότητα. Το μέγεθος του εγκαύματος είναι πολύ μικρό για να προκαλέσει τόσο υψηλά επίπεδα γαλακτικού οξέος. Η τοξικότητα από κυανίδιο πρέπει να εξετάζεται σε περιπτώσεις που ο ασθενής είναι πιο «άρρωστος» από ό,τι υποδηλώνουν η εισπνοή καπνού και το έγκαυμα. Το κλειδί είναι το περιβάλλον (μικρός χώρος) και το υλικό που καίγεται. Τα επίπεδα κυανιδίου μπορούν να μετρηθούν. Οι πολυάριθμες μέθοδοι αντιδότη για το κυανίδιο περιγράφονται στο κεφάλαιο.

ΚΕΦΑΛΑΙΟ 47

Νοσοκομειακές Λοιμώξεις στη Μονάδα Εντατικής Θεραπείας

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Ερωτήσεις Ανασκόπησης

1. Ποιο από τα παρακάτω είναι το πιο σωστό όσον αφορά την αντιμικροβιακή επιτήρηση;

α. Η παρατεταμένη χρήση αντιμικροβιακών ευρέος φάσματος δεν σχετίζεται με μικροβιακή αντοχή ή λοίμωξη από *Clostridium difficile*.

β. Μόνο ένα μικρό ποσοστό της χρήσης αντιμικροβιακών στη μονάδα εντατικής θεραπείας (ΜΕΘ) είναι είτε ακατάλληλο είτε περιττό.

γ. Τα προγράμματα αντιμικροβιακής επιτήρησης έχουν αποδειχθεί ότι βελτιώνουν τα ποσοστά ίασης των λοιμώξεων, μειώνουν τις αποτυχίες της θεραπείας, αυξάνουν τη συχνότητα της ορθής συνταγογράφησης αντιβιοτικών και μειώνουν την αντοχή στα αντιβιοτικά και τη λοίμωξη από *C. difficile*.

δ. Οι προοπτικοί έλεγχοι με παρέμβαση και ανατροφοδότηση και ο περιορισμός του συνταγολογίου και η προέγκριση δεν αποτελούν βασικές στρατηγικές της αντιμικροβιακής επιτήρησης.

Απάντηση: γ. Η παρατεταμένη χρήση αντιμικροβιακής θεραπείας ευρέος φάσματος σχετίζεται με μικροβιακή αντοχή και με το *C. difficile*. Εκτιμάται ότι έως και το 50% της χρήσης αντιμικροβιακών στα νοσοκομεία οξείας περίθαλψης των ΗΠΑ είναι είτε ακατάλληλη είτε περιττή. Η αντιμικροβιακή επιτήρηση ορίζεται ως συντονισμένες παρεμβάσεις που αποσκοπούν στη βελτίωση της κατάλληλης χρήσης των αντιβιοτικών παραγόντων με την προώθηση της επιλογής του βέλτιστου σχήματος αντιβιοτικών φαρμάκων, συμπεριλαμβανομένης της δοσολογίας, της διάρκειας της θεραπείας και της οδού χορήγησης. Τα προγράμματα αντιμικροβιακής επιτήρησης έχουν αποδειχθεί ότι βελτιώνουν τα ποσοστά ίασης των λοιμώξεων, μειώνουν τις αποτυχίες της θεραπείας, αυξάνουν τη συχνότητα της ορθής συνταγογράφησης αντιβιοτικών και μειώνουν την αντοχή στα αντιβιοτικά και τη λοίμωξη από *C. difficile*. Οι προοπτικοί έλεγχοι με παρέμβαση και ανατροφοδότηση και ο περιορισμός του συνταγολογίου και η προέγκριση αποτελούν βασικές στρατηγικές των προγραμμάτων αντιμικροβιακής επιτήρησης.

2. Ποιο από τα παρακάτω σχετίζεται με το υψηλότερο ποσοστό λοιμώξεων της κυκλοφορίας του αίματος που σχετίζονται με συσκευές στη ΜΕΘ;

α. Αρτηριακοί καθετήρες

β. Κεντρικοί φλεβικοί καθετήρες

γ. Καθετήρες αιμοκάθαρσης

δ. Καθετήρες πνευμονικής αρτηρίας

Απάντηση: γ. Τα υψηλότερα ποσοστά λοιμώξεων της κυκλοφορίας του αίματος παρατηρούνται με τη χρήση καθετήρα αιμοκάθαρσης (10% των ασθενών). Οι αρτηριακοί καθετήρες έχουν ποσοστά λοιμώξεων της κυκλοφορίας του αίματος που σχετίζονται με τη συσκευή που κυμαίνονται μόλις στο 1%. Οι καθετήρες στην υποκλείδια φλέβα ή στην έσω σφαγίτιδα έχουν ποσοστά λοιμώξεων της κυκλοφορίας του αίματος που σχετίζονται με τη συσκευή μεταξύ 3% και 5%. Η χρήση του καθετήρα πνευμονικής αρτηρίας Swan-Ganz σχετίζεται με κίνδυνο λοιμώξεων της κυκλοφορίας του αίματος σε ποσοστό 1% έως 3%. Τα ποσοστά λοιμώξεων σχετίζονται με τη χρήση της κατάλληλης αποστειρωμένης τεχνικής κατά την εισαγωγή.

3. Ποια από τις παρακάτω αποτελεί συνιστώμενη στρατηγική για τη μείωση της ουρολοίμωξης που σχετίζεται με καθετήρα (catheter-associated urinary tract infection-CAUTI);

α. Χρήση συστηματικών αντιμικροβιακών για την πρόληψη της CAUTI

β. Διατήρηση ανοικτού συστήματος παροχέτευσης

γ. Χρήση τυπικών προφυλάξεων, συμπεριλαμβανομένης της χρήσης γαντιών και ρόμπας κατά περίπτωση, κατά τη διάρ-

κεια οποιουδήποτε χειρισμού του καθετήρα ή του συστήματος συλλογής

δ. Διατήρηση του ασκού συλλογής στο επίπεδο της ουροδόχου κύστης ανά πάσα στιγμή

Απάντηση: γ. Η χρήση συστηματικών αντιμικροβιακών δεν συνιστάται για την πρόληψη της CAUTI. Η διατήρηση ενός κλειστού συστήματος παροχέτευσης είναι το κλειδί· εάν παρουσιαστεί διακοπή της άσηπτης τεχνικής, αποσύνδεση ή διαρροή, αντικαταστήστε τον καθετήρα και το σύστημα συλλογής. Συνιστάται η χρήση των συνήθων προφυλάξεων, συμπεριλαμβανομένης της χρήσης γαντιών και ρόμπας κατά περίπτωση, κατά τη διάρκεια οποιουδήποτε χειρισμού του καθετήρα ή του συστήματος συλλογής. Συνιστάται η διατήρηση της ανεμυδιστής ροής των ούρων, συμπεριλαμβανομένης της διατήρησης του ασκού συλλογής κάτω από το επίπεδο της ουροδόχου κύστης ανά πάσα στιγμή, της διατήρησης του καθετήρα και του σωλήνα συλλογής χωρίς στροφές και της τακτικής εκκένωσης του ασκού συλλογής.

4. Ποιο από τα παρακάτω έχει την ισχυρότερη αιτιολογική συσχέτιση με την πνευμονία που σχετίζεται με τον αναπνευστήρα (ventilator-associated pneumonia-VAP);

α. Στοματοφαρυγγικά βακτήρια

β. Γαστρικά βακτήρια

γ. Ρινικά βακτήρια

δ. Δερματικά βακτήρια

Απάντηση: α. Τα στοματοφαρυγγικά βακτήρια είναι η κύρια πηγή της VAP, όχι τα γαστρικά βακτήρια. Δεν φαίνεται ότι τα ρινικά βακτήρια παίζουν ανεξάρτητα σημαντικό ρόλο στην ανάπτυξη της VAP. Εξωγενώς υπάρχουν άλλες πηγές, όπως βακτήρια που μεταφέρονται στους ασθενείς από ανεπαρκώς πλυμένα χέρια, ανεπαρκώς απολυμασμένο εξοπλισμό αναπνευστικής θεραπείας, μολυσμένα φιαλίδια φαρμάκων και ανεπαρκώς απολυμασμένους νεφελοποιητές που μοιράζονται μεταξύ των ασθενών. Η εισρόφηση στοματοφαρυγγικών βακτηρίων στην κατώτερη αναπνευστική οδό και οι μειωμένοι μηχανισμοί άμυνας των πνευμόνων του ξενιστή αποτελούν παράγοντες κινδύνου για την ανάπτυξη της VAP.

5. Ένας 40χρονος άνδρας με ιστορικό αλκοολισμού και χρήσης ενέσιμων ναρκωτικών παρουσιάζεται βαριά μεθυσμένος και απαιτεί διασωλήνωση για την προστασία των αεραγωγών. Την 3η ημέρα του μηχανικού αερισμού αναπτύσσει πυρετό, λευκοκυττάρωση, νέα πνευμονικά διηθήματα, όπως φαίνεται στην ακτινογραφία θώρακος, και αυξημένες τραχειακές εκκρίσεις. Ποιο από τα παρακάτω είναι σωστό;

α. Δεν έχει VAP, καθώς πιθανότατα υπέστη εισρόφηση πριν από τη διασωλήνωση και έχει πνευμονία της κοινότητας.

β. Οι πιο πιθανοί οργανισμοί που προκαλούν VAP σε οποιοδήποτε στάδιο είναι είτε ο *Streptococcus pneumoniae* είτε ο *Haemophilus influenza*.

γ. Η Αμερικανική Θωρακική Εταιρεία (American Thoracic Society) και η Εταιρεία Εντατικής Θεραπείας (Society of Critical Care Medicine) συνιστούν μια επεμβατική διαγνωστική προσέγγιση, όπως η λήψη βρογχοκυψελιδικού εκπλύματος, καθώς έχει αποδειχθεί ότι μειώνει τη θνητότητα.

δ. Εάν τα αποτελέσματα της χρώσης κατά Gram της εν τω βάθει τραχειακής αναρρόφησης είναι αρνητικά, τότε ο ασθενής είναι απίθανο να έχει βακτηριακή VAP.

Απάντηση: δ. Ως νοσοκομειακή πνευμονία (hospital-acquired pneumonia-HAP) ορίζεται η πνευμονία που αναπτύσσεται περισσότερο από 48 ώρες μετά τη νοσηλεία. Η VAP αποτελεί υποσύνολο της HAP και ορίζεται ως πνευμονία που εμφανίζεται περισσότερο από 48 έως 72 ώρες μετά την έναρξη του μηχανικού αερισμού.

Οι μικροοργανισμοί που σχετίζονται με πρόωγη VAP εντός 4

ημερών από τη διασωλήνωση είναι ο *Streptococcus pneumoniae* και τα είδη *Haemophilus*. Το μικροβιακό φάσμα μετατοπίζεται προς τους νοσοκομειακούς παράγοντες όσο περισσότερο ο ασθενής υποστηρίζεται με μηχανικό αερισμό και εκτίθεται σε αντιβιοτικά. Η επεμβατική διαγνωστική προσέγγιση απέτυχε να δείξει βελτιωμένη θνητότητα στις 28 ημέρες και τα δεδομένα είναι ασαφή. Εάν το αρχικό αποτέλεσμα της χρώσης κατά Gram μιας εν τω βάθει τραχειακής αναρρόφησης είναι αρνητικό, ο ασθενής είναι απίθανο να έχει βακτηριακή VAP.

6. Ποια από τις ακόλουθες δηλώσεις είναι πιο σωστή όσον αφορά τη χρήση της επιλεκτικής αποστείρωσης του πεπτικού συστήματος (selective digestive decontamination-SDD) σε ασθενείς της ΜΕΘ;

α. Αυξάνει τις VAP που προκαλούνται από θετικούς κατά Gram οργανισμούς.

β. Αυξάνει τη θνητότητα στη ΜΕΘ.

γ. Μειώνει τη συχνότητα εμφάνισης VAP που προκαλούνται από αρνητικούς κατά Gram οργανισμούς.

δ. Μειώνει τη συχνότητα εμφάνισης VAP που προκαλούνται από είδη *Candida*.

Απάντηση: γ. Η επιλεκτική αποστείρωση του πεπτικού συστήματος (SDD) έχει αποδειχθεί σε ορισμένες τυχαιοποιημένες δοκιμές ότι μειώνει την επίπτωση της VAP και σε μία μεγάλη κλινική δοκιμή έχει δείξει μείωση της θνητότητας. Η SDD συνίσταται σε προγραμματισμένες εφαρμογές μη απορροφήσιμων αντιβιοτικών με δραστηριότητα έναντι αερόβιων βακτηρίων και ζυμομυκήτων, όπως η πολυμυξίνη, η τομπραμυκίνη και η αμφοτερικίνη Β. Επιπλέον, για τις πρώτες 3 ημέρες νοσηλείας στη ΜΕΘ χορηγείται ενδοφλεβίως ένα αντιβιοτικό ευρέος φάσματος. Η SDD έχει αποδειχθεί ότι μειώνει το ποσοστό των αρνητικών κατά Gram βακίλων και, σε μία μεγάλη δοκιμή, το ποσοστό της λοίμωξης από *Staphylococcus aureus*. Δεν έχει αποδειχθεί μείωση των ειδών *Candida* με τη χρήση SDD.

ΚΕΦΑΛΑΙΟ 48

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Ερωτήσεις Ανασκόπησης

1. Για τη βέλτιστη κλινική έκβαση κατά την επιλογή εμπειρικής αντιμικροβιακής θεραπείας, ποια από τις παρακάτω επιλογές είναι σωστή;

- α. Ο κλινικός ιατρός πρέπει να προσαρμόζει την αντιμικροβιακή θεραπεία τη 2^η ή την 3^η ημέρα της κλινικής πορείας.
- β. Ο χρόνος της αρχικής δοσολογίας είναι το κλειδί.
- γ. Η βέλτιστη δόση και το μεσοδιάστημα χορήγησης των δόσεων δεν έχουν διαφορά στην έκβαση.
- δ. Η στοχευμένη στους ιστούς θεραπεία δεν έχει κανένα ρόλο στη διαχείριση της λοίμωξης.

Απάντηση: β. Η αντιμικροβιακή επιτήρηση στη μονάδα εντατικής θεραπείας (ΜΕΘ) επικεντρώνεται στην πρόληψη της μικροβιακής αντοχής και στις ανεπιθύμητες συνέπειες των αντιβιοτικών εκτός από την αντοχή. Η εμπειρική θεραπεία θα πρέπει να είναι επαρκής όχι μόνο για το σωστό αντιβιοτικό με βάση την ευαισθησία του οργανισμού, αλλά και για τη βέλτιστη δόση/μεσοδιάστημα δόσεων, τη σωστή οδό χορήγησης και τη χρήση συνδυαστικής θεραπείας, εάν χρειάζεται. Άλλες μεταβλητές που παίζουν ρόλο στη βέλτιστη κλινική έκβαση περιλαμβάνουν τον χρόνο χορήγησης και τις φαρμακολογικές ιδιότητες του παράγοντα (π.χ. καταστολή της παραγωγής τοξίνης με την κλινδαμυκίνη σε λοίμωξη από στρεπτόκοκκο ομάδας Α). Ένα άλλο σημείο που πρέπει να ληφθεί υπόψη είναι η πιθανότητα επιλογής ανθεκτικότητας στα αντιβιοτικά (π.χ. κινολόνες και πολυανθεκτικές ψευδομονάδες).

2. Ποιο από τα παρακάτω αντιβιοτικά θα ήταν αποτελεσματικό στη θεραπεία μιας λοίμωξης που προκαλείται από στέλεχος του είδους *Klebsiella* που παράγει β-λακταμάση εκτεταμένου φάσματος;

- α. Πιπερακιλλίνη/ταζομπακτάμη
- β. Μεροπενέμη
- γ. Αμπικιλλίνη/σουλμπακτάμη
- δ. Κεφαζιδίμη

Απάντηση: β. Η αντοχή που εμφανίζεται με τους μικροοργανισμούς που παράγουν β-λακταμάση εκτεταμένου φάσματος (extended-spectrum β-lactamase/ESBL) έχει σημασία για την αρχική επιλογή αντιβιοτικών από δύο απόψεις. Ακόμη και τα αντιβιοτικά που είναι σταθερά παρουσία β-λακταμασών μπορεί να μην έχουν προβλέψιμη δράση. Τόσο με την κεφεπίμη όσο και με την πιπερακιλλίνη/ταζομπακτάμη έχουν παρατηρηθεί κατώτερα αποτελέσματα. Δεν υπάρχει επί του παρόντος κανένα αντιβιοτικό στην αγορά με έγκριση από τον FDA για τη θεραπεία λοιμώξεων που προκαλούνται από οργανισμό που παράγει ESBL. Τα δεδομένα που εξάγονται από την ιατρική βιβλιογραφία υποδεικνύουν ότι οι καρβαπενέμες είναι το φάρμακο εκλογής για τη θεραπεία τέτοιων λοιμώξεων.

3. Ποιο αντιβιοτικό πρέπει να αποφεύγεται κατά τη θεραπεία μιας λοίμωξης από *Enterobacter* εάν τα εργαστηριακά δεδομένα υποδεικνύουν ευαισθησία;

- α. Λεβοφλοξασίνη
- β. Bactrim
- γ. Κεφτριαξόνη
- δ. Κεφεπίμη

Απάντηση: γ. Οι β-λακταμάσες τύπου 1 (ampCs) αποτελούν προϊόν που μεσολαβείται χρωμοσωμικά από γονίδια ampC. Οι συνήθεις οργανισμοί που εκφράζουν β-λακταμάσες είναι οι οργανισμοί SPICE ή SPACE (*Serratia*, *Pseudomonas aeruginosa*, ινδολοθετικοί *Proteaeae*, *Citrobacter*, *Enterobacter*) με ορισμένους συγγραφείς να αντικαθιστούν το «I» με το «A» του *Acinetobacter*. Τα εν λόγω παθογόνα δεν εκφράζουν πάντοτε γονίδια ampC, αλλά έχουν τη δυνατότητα να το κάνουν. Καθώς οι β-λακταμάσες τύπου 1 έχουν συγγένεια με τις κεφαλοσπορίνες, οι κεφαλοσπορίνες τρίτης γενιάς δεν είναι προβλέψιμα σταθερές.

4. Η έννοια της συνέργειας περιγράφεται καλύτερα σε ποιο από τα παρακάτω;

- α. Χρήση πενικιλίνης ή αμπικιλλίνης με γενταμικίνη στην εντεροκοκκική ενδοκαρδίτιδα
- β. Συνδυασμός λινεζολίδης και βανκομυκίνης για τη θεραπεία της ενδοκαρδίτιδας του ανθεκτικού στη μεθικιλλίνη *Staphylococcus aureus* (MRSA)
- γ. Χρήση β-λακτάμης και μιας αμινογλυκοσίδης ως εμπειρική θεραπεία για τη σήψη
- δ. Συνδυασμός σιπροφλοξασίνης και λινεζολίδης για την αύξηση της *in vitro* βακτηριοκτόνου δράσης της σιπροφλοξασίνης έναντι του MRSA

Απάντηση: α. Ο ρόλος της συνδυασμένης θεραπείας χαίρει αυξημένου ενδιαφέροντος. Το πιο συχνά αναφερόμενο αποτέλεσμα είναι η συνέργεια, η οποία έχει περιγραφεί καλά με την πενικιλίνη και την αμπικιλλίνη με την γενταμικίνη στη θεραπεία της εντεροκοκκικής ενδοκαρδίτιδας. Μελέτες *in vitro* των συνδυασμών λινεζολίδης και βανκομυκίνης ή σιπροφλοξασίνης σε MRSA αποκάλυψαν κάποιο ελαφρύ ανταγωνισμό με μειωμένη βακτηριοκτόνο δράση. Τα δεδομένα απέτυχαν να δείξουν ότι ο συνδυασμός μιας β-λακτάμης με αμινογλυκοσίδη έχει κλινικό πλεονέκτημα έναντι της μονοθεραπείας. Η συνδυαστική θεραπεία απέτυχε να δείξει πλεονέκτημα στην πρόληψη της αντοχής κατά τη θεραπεία της λοίμωξης από *Pseudomonas*. Στη μονάδα εντατικής θεραπείας ένα σημαντικό πλεονέκτημα της χρήσης συνδυαστικής θεραπείας είναι ότι αυξάνει την πιθανότητα επαρκούς θεραπείας κατά την αντιμετώπιση πολυανθεκτικών οργανισμών.

ΚΕΦΑΛΑΙΟ 49

Αντιμυκητιασική και Αντιική Θεραπεία

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Ερωτήσεις Ανασκόπησης

1. Μία γυναίκα 45 ετών με ιστορικό νεοδιαγνωσμένης ρευματοειδούς αρθρίτιδας λαμβάνει 20 mg πρεδνιζόνης από το στόμα τις τελευταίες 30 εβδομάδες. Εισάγεται στη Μονάδα Εντατικής Θεραπείας (ΜΕΘ) για νεκρωτική παγκρεατίτιδα, η οποία θεωρείται ότι είναι δευτεροπαθής λόγω λίθων στα χοληφόρα. Υποβλήθηκε σε χειρουργικό καθαρισμό και τοποθέτηση πολλαπλών ενδοκοιλιακών παροχετεύσεων. Της χορηγήθηκαν ενδοφλέβια (IV) αντιβιοτικά εμπειρικά. Η ασθενής άρχισε ενδοφλέβια κασποφουνγκίνη εμπειρικά, καθώς συνέχισε να έχει πυρετό και λευκοκυττάρωση παρόλο που λάμβανε βανκομυκίνη και μεροπενέμη για 12 ημέρες. Η θεραπεία με στεροειδή συνεχίστηκε κατά τη διάρκεια της παραμονής της στη ΜΕΘ. Την 17^η ημέρα, το εργαστήριο ανέφερε ότι στην καλλιέργεια αίματος αναπτύσσεται ζυμομύκητας. Ποιο είναι το καταλληλότερο μέτρο που πρέπει να ληφθεί στη συνέχεια;

- α. Αντικαταστήτε την κεντρική γραμμή και αλλάξτε την κασποφουνγκίνη σε μικαφουνγκίνη
- β. Αντικαταστήτε τις κεντρικές φλεβικές γραμμές και αλλάξτε την κασποφουνγκίνη σε φλουконаζόλη
- γ. Αλλάξτε την κασποφουνγκίνη σε λιποσωμική αμφοτερικίνη Β
- δ. Συνεχίστε την ίδια διαχείριση και θεωρήστε ότι η καλλιέργεια είναι επιμολυσμένη

Απάντηση: γ. Η απάντηση α είναι λανθασμένη, διότι το φάσμα της αντιμυκητιασικής δράσης είναι το ίδιο μεταξύ των εγκεκριμένων σήμερα εχινοκανδινών (κασποφουνγκίνη, ανιδουλαφουνγκίνη και μικαφουνγκίνη). Αν και η απάντηση β θεωρείται σωστή σε περιπτώσεις λοίμωξης από *Candida* που σχετίζεται με τη γραμμή, δεδομένου ότι η επανεμφάνιση της μυκητιαμίας είναι ανησυχητική για ανθεκτική *Candida*, και πιθανότατα σε αυτή την περίπτωση κρυπτοκοκκική λοίμωξη, θα πρέπει να αποκλείσουμε τη μηνιγγίτιδα. Η απάντηση δ είναι σαφώς λανθασμένη. Η απάντηση γ είναι σωστή, διότι η επανεμφάνιση μυκητιαμίας ενώ η ασθενής λαμβάνει εχινοκανδίνη θα πρέπει να μας κάνει να σκεφτούμε κυρίως είδη *Cryptococcus*, *Malassezia* ή *Trichosporon*. Μόλις ολοκληρωθεί η ταυτοποίηση, δικαιολογείται αλλαγή της γραμμής για τους δύο τελευταίους μικροοργανισμούς και μετάβαση σε θεραπεία με τριαζόλη. Η περίπτωση αυτή δείχνει μία ασθενή με παράγοντα κινδύνου για κρυπτοκοκκική λοίμωξη και μέχρι να αποκλειστεί η μηνιγγίτιδα η λιποσωμική αμφοτερικίνη Β είναι επιβεβλημένη.

2. Άνδρας 61 ετών με ιστορικό ανθεκτικής οξείας μυελοειδούς λευχαιμίας με πολλαπλές χημειοθεραπείες και παρατεταμένη ουδετεροπενία. Ο ασθενής έχει ξεκινήσει σιπροφλοξασίνη, ακυκλοβίρη και βορικοναζόλη ως σχήμα προφύλαξης για παρατεταμένη ουδετεροπενία. Ο ασθενής είναι γνωστό ότι έχει πολλαπλούς πνευμονικούς όζους που πιστεύεται ότι αντιπροσωπεύουν διηθητική πνευμονική ασπεργίλλωση σύμφωνα με θετικό αποτέλεσμα εξέτασης γαλακτομαννάνης από βρογχοκυψελιδικό έκπλυμα. Ο ασθενής εισάγεται στη ΜΕΘ για σηπτική καταπληξία και τη δεύτερη ημέρα, στις καλλιέργειες αίματος αναπτύσσονται αρνητικοί κατά Gram βάκιλλοι. Ο ασθενής είχε ήδη ξεκινήσει εμπειρική αντιβιοτική θεραπεία με μεροπενέμη και βανκομυκίνη με καλή ανταπόκριση, καθώς δεν λαμβάνει ενδοφλέβια αγγειοσυσπαστικά. Ο ασθενής έχει τώρα οξεία νεφρική βλάβη με κάθαρση κρεατινίνης 18 ml/min. Λαμβάνει μόνο ενδοφλέβια θεραπεία λόγω ειλεού και μειωμένης γαστρεντερικής απορρόφησης. Ποιο είναι το επόμενο βήμα που πρέπει να εξεταστεί;

- α. Αλλάξτε τη μεροπενέμη σε κεφεπίμη και διακόψτε τη βανκομυκίνη
- β. Ξεκινήστε λιποσωμική αμφοτερικίνη Β και συνεχίστε τη βανκομυκίνη και την μεροπενέμη
- γ. Διακόψτε τη μεροπενέμη και τη βανκομυκίνη και συνεχίστε την προφύλαξη

δ. Αλλάξτε τη βορικοναζόλη σε ισαβοκοναζόλη και συνεχίστε τη μεροπενέμη

Απάντηση: δ. Η καλλιέργεια αίματος του ασθενούς έχει gram-αρνητικούς βάκιλλους και η βανκομυκίνη μπορεί να διακοπεί. Ωστόσο, η αλλαγή της μεροπενέμης σε κεφεπίμη δεν πρέπει να γίνει μέχρι να γίνουν γνωστά ο τελικός οργανισμός και οι ευαισθησίες· γι' αυτό και η απάντηση α είναι λανθασμένη. Δεν υπάρχει ανάγκη να ξεκινήσει η χορήγηση AmBisome, καθώς δεν υπάρχουν ενδείξεις μιας επανεμφανιζόμενης μυκητιασικής λοίμωξης, επομένως η απάντηση β δεν είναι σωστή. Η απάντηση γ είναι σαφώς λανθασμένη. Ο ασθενής έχει μειωμένη κάθαρση κρεατινίνης και η IV βορικοναζόλη αντενδείκνυται, καθώς έχει ένα συστατικό σουλφοβουτυλαιθερ-β-κυκλοδεξτρίνης που θα συσσωρευτεί δεδομένης της μειωμένης νεφρικής λειτουργίας, ενώ η IV ισαβοκοναζόλη δεν έχει αυτή τη σύσταση και δεν χρειάζεται προσαρμογή της δόσης ανάλογα με τη νεφρική λειτουργία.

3. Άνδρας 72 ετών με ιστορικό συμφορητικής καρδιακής ανεπάρκειας, υπέρτασης και σακχαρώδη διαβήτη παρουσιάζεται κατά τη διάρκεια του Δεκεμβρίου με ιστορικό βήχα, πυρετού και πόνων στο σώμα από 3 ημερών. Κατά την εξέταση, η θερμοκρασία του ασθενούς από το στόμα είναι 100,9°F (38,2°C), η αρτηριακή πίεση είναι 95/43 mmHg και ο σφυγμός του είναι 103 παλμοί/λεπτό με ένδειξη παλμικής οξυμετρίας 83% στον αέρα δωματίου. Η αναπνευστική κατάσταση του ασθενούς επιδεινώθηκε στο τμήμα επειγόντων περιστατικών (ΤΕΠ), με αποτέλεσμα να χρειαστεί να διασωληνωθεί. Η ακτινογραφία θώρακος έδειξε αμφοτερόπλευρες διάχυτες σκιάσεις δίκην θολής υάλου. Ποιο είναι το επόμενο βήμα στη διαχείρισή του;

- α. Ξεκινήστε εμπειρική αντιβιοτική θεραπεία και στείλτε δείγματα αίματος για καλλιέργειες και βρογχοκυψελιδικό έκπλυμα για χρώση gram και καλλιέργειες
- β. Ξεκινήστε εμπειρική αντιβιοτική θεραπεία και στείλτε δείγματα αίματος για καλλιέργειες, βρογχοκυψελιδικό έκπλυμα για χρώση gram και καλλιέργειες και πραγματοποιήστε ταχεία εξέταση αντιγόνου γρίπης
- γ. Ξεκινήστε εμπειρική αντιβιοτική θεραπεία και στείλτε δείγματα αίματος για καλλιέργειες, ξεκινήστε οσελταμιβίρη, λάβετε μια εξέταση αλυσιδωτής αντίδρασης πολυμεράσης αντίστροφης μεταγραφής για γρίπη (RT-PCR) και στείλτε δείγμα βρογχοκυψελιδικού πλύματος για χρώση gram και καλλιέργειες
- δ. Ξεκινήστε εμπειρική αντιβιοτική θεραπεία, χορηγήστε μία δόση περαμιβίρης και στείλτε δείγματα αίματος για καλλιέργειες, δείγμα βρογχοκυψελιδικού εκπλύματος για χρώση κατά Gram και καλλιέργειες και πραγματοποιήστε δοκιμή RT-PCR γρίπης

Απάντηση: γ. Ο ασθενής έχει υψηλό κίνδυνο πνευμονίας από γρίπη. Παρόλο που η έναρξη των συμπτωμάτων του έχει περάσει τις 48 ώρες του συνιστώμενου χρόνου έναρξης της οσελταμιβίρης, ο ασθενής είναι βαρέως πάσχων και οι αναστολείς της νευραμινιδάσης μπορεί να είναι αποτελεσματικοί έως και 5 ημέρες από την έναρξη των συμπτωμάτων. Οι απαντήσεις α, β και δ είναι λανθασμένες, διότι ο ασθενής πρέπει να ξεκινήσει εμπειρική θεραπεία γρίπης. Επίσης, όταν υπάρχει υψηλή κλινική υποψία λοίμωξης από γρίπη, η θεραπεία δεν πρέπει να καθυστερεί μέχρι να είναι διαθέσιμα τα αποτελέσματα των εξετάσεων γρίπης.

4. Μία 24χρονη καυκάσια γυναίκα προσήλθε στο τμήμα επειγόντων περιστατικών με διαταραχή επιπέδου συνείδησης. Ο φίλος της είναι μαζί της και δηλώνει ότι η ασθενής δεν έχει προηγούμενο ιατρικό ιστορικό. Πρόσφατα επέστρεψαν από ταξίδι διακοπών στο Μαϊάμι της Φλόριδα. Δεν θυμάται η ασθενής να είχε καμία

επαφή με ασθενείς ή να είχε κάποια εμπύρετη ασθένεια κατά τη διάρκεια ή πριν από το ταξίδι. Θυμάται ότι τα συμπτώματά της ξεκίνησαν με πονοκέφαλο και πυρετό πριν από μία ημέρα και ότι πήρε δύο χάπια ιβουπροφαίνης. Ο ιατρός των επειγόντων περιστατικών διέταξε αξονική τομογραφία κεφαλής χωρίς σκιαγραφικό, η οποία δεν υπέδειξε κάποια παθολογική εξεργασία. Στο τμήμα επειγόντων περιστατικών η ασθενής ήταν εμπύρετη και λόγω του κατεσταλμένου επιπέδου συνείδησης διασωληνώθηκε και της χορηγήθηκε μία δόση ενδοφλέβιας βανκομυκίνης (2 g) και μία δόση κεφτριαξόνης (2 g). Κατά τα άλλα, τα υπόλοιπα ζωτικά της σημεία ήταν φυσιολογικά. Υποβλήθηκε σε οσφυονωτιαία παρακέντηση με φυσιολογική πίεση εισόδου. Το εγκεφαλονωτιαίο υγρό (ENY) έδειξε πλειοκυττάρωση (επικρατούν τα λεμφοκύτταρα) και αυξημένη πρωτεΐνη. Η ασθενής άρχισε να λαμβάνει ενδοφλέβια ακυκλοβίρη 10 mg/kg κάθε 8 ώρες για υποψία ερπητικής εγκεφαλίτιδας. Την 2^η ημέρα εισαγωγής τα αποτελέσματα της αλυσιδωτής αντίδρασης πολυμεράσης του απλού έρπητα 1 (HSV-1 PCR) στο ENY ήταν θετικά και η μαγνητική τομογραφία του εγκεφάλου έδειξε αριστερή κροταφική εγκεφαλίτιδα. Την 3^η ημέρα εμφάνισε αύξηση της κρεατινίνης ορού κατά 20%. Ποια είναι η υποκείμενη παθολογία πίσω από την οξεία νεφρική βλάβη (ONB) της;

- α. Οξεία σωληναριακή νέκρωση που προκαλείται από το ιωδιούχο σκιαγραφικό
- β. Κρυσταλλική καθίζηση της ακυκλοβίρης στα νεφρικά σωληνάκια
- γ. Νεφροτοξικότητα που προκαλείται από τη βανκομυκίνη
- δ. Οξεία διάμεση νεφρίτιδα δευτεροπαθής στη χρήση μη στεροειδών αντιφλεγμονωδών φαρμάκων

Απάντηση: β. Η κρεατινίνη της ασθενούς έχει μεταβληθεί, γεγονός που εξηγείται από τη χρήση ακυκλοβίρης, η οποία τείνει να καθιζάνει στα νεφρικά σωληνάκια. Η κατάσταση είναι συνήθως ήπια και μπορεί να αποφευχθεί ή να αντιστραφεί με ενδοφλέβια ενυδάτωση. Ωστόσο, μερικές φορές μπορεί να απαιτήσει τη διακοπή της φαρμακευτικής αγωγής και τη χρήση αιμοκάθαρσης. Η ασθενής έλαβε βανκομυκίνη, αλλά επρόκειτο μόνο μια εφάπαξ δόση και δεν θεωρείται η αιτία της ONB, οπότε η απάντηση γ είναι λανθασμένη. Παρόλο που η ασθενής έλαβε ιβουπροφαίνη πριν από την είσοδό της στο νοσοκομείο, δεν θεωρείται ότι ήταν η αιτία της ONB σε αυτή την περίπτωση, καθώς η δόση ήταν χαμηλή και ως εκ τούτου η απάντηση δ είναι λανθασμένη. Η απάντηση α είναι λανθασμένη διότι η ασθενής δεν έλαβε ιωδιούχο σκιαγραφικό.

5. Ένας 37χρονος ισπανόφωνος άνδρας πάσχει από οξεία μυελοβλαστική λευχαιμία και λαμβάνει κυταραβίνη και ιδارουβική με παρατεταμένη ουδετεροπενία. Εισήχθη στη ΜΕΘ για εμπύρετο και διαπιστώθηκε ότι έχει διηθητική παραρρινοκολπίτιδα δευτεροπαθώς λόγω μουκορμύκωσης. Ξεκίνησε αγωγή με 5 mg/kg AmBisome IV και υποβλήθηκε σε χειρουργικό καθαρισμό. Στον ασθενή χορηγήθηκε ενδοφλέβια ενυδάτωση με υγρά για να αποφευχθεί η νεφρική βλάβη που προκαλείται από το AmBisome. Ποιος είναι ο πιθανός μηχανισμός πίσω από τον κίνδυνο εμφάνισης καρδιακής αρρυθμίας;

- α. Το AmBisome επηρεάζει τους καρδιακούς διαύλους Ca^{++} τύπου L
- β. Η αμφοτερικίνη απελευθερώνει φλεγμονώδεις μεσολαβητές από τα μονοκύτταρα και τα μακροφάγα
- γ. Επέρχεται διαταραχή των ηλεκτρολυτών (μαγνήσιο/κάλιο) μέσω βλάβης της σωληναριακής μεμβράνης
- δ. Ο ανθρώπινος ερπητοϊός 6 (HHV-6) προκαλεί μυοκαρδίτιδα

Απάντηση: γ. Η χρήση της αμφοτερικίνης Β σχετίζεται με συχνή νεφρική σωληναριακή βλάβη που οδηγεί σε χαμηλά επίπεδα μαγνησίου και καλίου μέσω νεφρικής σωληναριακής διαρροής ηλεκτρολυτών. Συνεπώς, είναι απαραίτητη η στενή παρακολούθηση των ηλεκτρολυτών του ορού και ορισμένοι ειδικοί συνιστούν την προληπτική χορήγηση συμπληρώματος μαγνησίου και καλίου στον ασθενή για την αποφυγή μιας τέτοιας επιπλοκής. Οι απαντήσεις α και β είναι λανθασμένες. Η ισαβουκοναζόλη είναι το φάρμακο που επηρεάζει τους καρδιακούς διαύλους Ca^{++} τύπου L, και παρόλο που η αμφοτερικίνη Β προκαλεί την απελευθέρωση φλεγμονωδών μεσολαβητών από τα μονοκύτταρα και τα μακροφάγα, δεν είναι γνωστό ότι προκαλεί καρδιακή αρρυθμία. Η απάντηση δ είναι λανθασμένη σε αυτό το σενάριο. Ωστόσο, σε σπάνιες περιπτώσεις ο HHV-6 μπορεί να προκαλέσει μυοκαρδίτιδα σε βαριά ανοσοκατεσταλμένους ασθενείς (π.χ. μετά από αλλογενή μεταμόσχευση αιμοποιητικών βλαστικών κυττάρων).

ΚΕΦΑΛΑΙΟ 50

Λοιμώδεις Επιπλοκές στον Ανοσοκατεσταλμένο Βαρέως Πάσχοντα

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Ερωτήσεις Ανασκόπησης

1. Για ασθενείς με παρατεταμένη ουδετεροπενία λόγω προπαρασκευαστικής χημειοθεραπείας για μεταμόσχευση βλαστοκυττάρων, οι οποίοι διατρέχουν κίνδυνο τόσο για λοιμώξεις από ζυμομύκητες όσο και από υφομύκητες, ποιο από τα παρακάτω είναι η προτιμώμενη προφύλαξη για μυκητιασική λοίμωξη;

- α. Φλουκοναζόλη
- β. Ποσακοναζόλη
- γ. Κασποφουνγκίνη
- δ. Μικαφουνγκίνη
- ε. Λιποσωμική αμφοτερικίνη Β

Απάντηση: β. Σε λίπτες μεταμοσχεύσεων βλαστοκυττάρων με παρατεταμένη ουδετεροπενία αμέσως πριν από τη μεταμόσχευση (π.χ., απλαστική αναιμία) και για εκείνους που αναμένεται να έχουν αργή εγκατάσταση του μοσχεύματος (>28 ημέρες) ή των οποίων η εγκατάσταση αποτυγχάνει, προτιμάται η προφύλαξη με ένα φάρμακο με δράση τόσο κατά του υφομύκητα όσο και κατά της *Candida*, σε αντίθεση με έναν στενότερου φάσματος παράγοντα κατά της *Candida*, όπως η φλουκοναζόλη. Έτσι, η ποσακοναζόλη ή η βορικοναζόλη αποτελούν τους προτιμώμενους παράγοντες σε αυτό το ερώτημα.

2. Ποιος από τους παρακάτω αντιμικροβιακούς παράγοντες είναι πιθανότερο να είναι κατασταλτικός στον μυελό των οστών;

- α. Δαπτομυκίνη
- β. Λινεζολίδη
- γ. Πιπερακιλλίνη-ταζομπακτάμη
- δ. Μετρονιδαζόλη
- ε. Κολιστίνη

Απάντηση: β. Η λινεζολίδη προκαλεί θρομβοπενία, η οποία σε ασθενείς με φυσιολογική τιμή αιμοπεταλίων προ της θεραπείας εμφανίζεται συνήθως μετά από 10-14 ημέρες. Στη συνέχεια ακολουθούν η λευκοπενία και η αναιμία. Οι κυτταροπενίες μπορεί να αναπτυχθούν ωρίτερα σε ασθενείς με εξασθενημένο μυελό των οστών (π.χ. σε εκείνους που αναρρώνουν από αντινεοπλασματική χημειοθεραπεία ή μεταμόσχευση βλαστοκυττάρων). Η λινεζολίδη επομένως αποφεύγεται στους περισσότερους πληθυσμούς με επηρεασμένη λειτουργία του μυελού των οστών, όταν αυτό είναι δυνατόν.

3. Ποιο από τα παρακάτω είναι η πιο πιθανή αιτία διάχυτων διάμεσων πνευμονικών διηθήσεων σε έναν ασθενή 2 εβδομάδες μετά τη μεταμόσχευση πνευμόνων;

- α. Ιός BK
- β. Αδενοϊός
- γ. Κυτταρομεγαλοϊός (CMV)
- δ. Ιός JC
- ε. Τοξόπλασμα

Απάντηση: γ. Ο CMV είναι μια καλά αναγνωρισμένη αιτία διάχυτων διάμεσων πνευμονικών διηθήσεων σε ασθενείς που έχουν λάβει μεταμόσχευση συμπαγών οργάνων ή αιμοποιητικών βλαστι-

κών κυττάρων. Ο αδενοϊός μπορεί επίσης να προκαλέσει παρόμοιες διηθήσεις, αλλά το κάνει πολύ λιγότερο συχνά από τον CMV. Ο αδενοϊός και ο ιός BK προκαλούν πιο τυπικά αιμορραγική κυστίτιδα. Ο ιός JC είναι η αιτία της εγκεφαλίτιδας JC, που παλαιότερα αναφερόταν ως προοδευτική πολυεστιακή λευκοεγκεφαλοπάθεια. Η τοξοπλάσμωση μπορεί να παρουσιάσει πνευμονικές διηθήσεις που μιμούνται την πνευμονία από πνευμονοκύστη, αλλά δεν είναι συχνή, ιδίως στη Βόρεια Αμερική, όπου ο επιπολασμός του τοξοπλάσματος στον ορό είναι πολύ χαμηλότερος από ό,τι στη Δυτική Ευρώπη ή στον αναπτυσσόμενο κόσμο.

4. Για έναν ασθενή με τον ιό της ανθρώπινης ανοσοανεπάρκειας (HIV) (αριθμός CD4 700 κύτταρα/μλ, ιικό φορτίο 500.000 αντίγραφα/μλ) που δεν υποβάλλεται ακόμη σε αντιρετροϊκή αγωγή, ποια είναι η πιθανότερη αιτία των διάχυτων διάμεσων διηθήσεων, του πυρετού, της υποξαιμίας και του βήχα διάρκειας 3 ημερών;

- α. *Pneumocystis jirovecii*
- β. CMV
- γ. Σύμπλεγμα *Mycobacterium avium* (MAC)
- δ. *Cryptosporidium*
- ε. Γρίπη

Απάντηση: ε. Για έναν τέτοιον ασθενή, με αριθμό CD4 700 κύτταρα/μλ, η πιθανότητα ευκαιριακής λοίμωξης είναι μικρή και επομένως η γρίπη αποτελεί τη σωστή απάντηση εδώ. Η πνευμονοκύστη δεν εμφανίζεται σχεδόν ποτέ σε τόσο υψηλούς αριθμούς CD4. Το MAC και το *Cryptosporidium* προκαλούν νόσο σε ασθενείς με αριθμό CD4 κάτω από 100 κύτταρα/μλ, αλλά κανένα από τα δύο δεν προκαλεί πνευμονική νόσο σε ασθενείς που έχουν μολυνθεί με HIV σε οποιονδήποτε αριθμό CD4, με πολύ σπάνιες εξαιρέσεις.

5. Ποιο από τα παρακάτω πρέπει να γίνει για την αξιολόγηση ενός εργαζόμενου στον τομέα της υγειονομικής περίθαλψης που μόλις έχει υποστεί σημαντικό τραυματισμό από βελόνα από ασθενή που διέφυγε από το τμήμα επείγοντων περιστατικών, ο οποίος όμως είναι γνωστό ότι είναι μολυσμένος με HIV και δεν λαμβάνει θεραπεία, αλλά ελάχιστα άλλα είναι γνωστά;

- α. Δοκιμασία αντισωμάτων τοξοπλάσματος
- β. Δοκιμασία αντισωμάτων του ιού της ηπατίτιδας C
- γ. Δοκιμασία αντισωμάτων του CMV
- δ. Δοκιμασία αντισωμάτων του ιού των ανθρώπινων θηλωμάτων (HPV)
- ε. Δοκιμασία αντισωμάτων του αδενοϊού

Απάντηση: β. Τα τρυπήματα με βελόνα είναι διαβόητα για τη μετάδοση του ιού της ηπατίτιδας Β (HBV), του HCV και του HIV. Η πιθανότητα μετάδοσης εξαρτάται από παράγοντες που σχετίζονται με την πηγή (ιικό φορτίο) και τον παραλήπτη (για τον HBV και τον HCV, προηγούμενοι τίτλοι αντισωμάτων). Ο CMV θα μπορούσε να μεταδοθεί με τρύπημα βελόνας, αλλά τέτοιες μεταδόσεις είναι εξαιρετικά σπάνιες. Το τοξόπλασμα, ο HPV και ο αδενοϊός δεν αναμένεται να μεταδοθούν με τρύπημα βελόνας.

ΚΕΦΑΛΑΙΟ 51

Ειδικές Λοιμώξεις Με Επιπτώσεις Στην Εντατική Φροντίδα

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Ερωτήσεις Ανασκόπησης

1. Ποιο από τα παρακάτω είναι σωστό σχετικά με τη χρήση της επικουρικής δεξαμεθαζόνης για τη θεραπεία της βακτηριακής μηνιγγίτιδας;
 - α. Η επικουρική δεξαμεθαζόνη μειώνει τη θνητότητα στη μηνιγγίτιδα από *Listeria*
 - β. Τα κορτικοστεροειδή πρέπει να χορηγούνται εντός 12 ωρών από την έναρξη της αντιβιοτικής θεραπείας
 - γ. Η δεξαμεθαζόνη έχει αποδειχθεί ωφέλιμη για τη θεραπεία της βακτηριακής μηνιγγίτιδας που σχετίζεται με την υγειονομική περίθαλψη
 - δ. Η δεξαμεθαζόνη έχει αποδειχθεί ότι μειώνει την απώλεια ακοής και άλλες νευρολογικές επιπλοκές σε ασθενείς με πνευμονιοκοκκική μηνιγγίτιδα

Απάντηση: δ. Οι ισχυρότερες ενδείξεις για το όφελος της δεξαμεθαζόνης στη βακτηριακή μηνιγγίτιδα είναι τα μειωμένα ποσοστά απώλειας ακοής και άλλων νευρολογικών επιπλοκών σε επιβεβαιωμένη πνευμονιοκοκκική μηνιγγίτιδα· το όφελος από τη θνητότητα στην πνευμονιοκοκκική νόσο δεν έχει αποδειχθεί με τον ίδιο σαφή τρόπο. Το όφελος των στεροειδών δεν έχει αποδειχθεί σε ενήλικες με μηνιγγίτιδα οφειλόμενη σε οποιονδήποτε άλλο οργανισμό και δεν συνιστάται για τη θεραπεία της μετεγχειρητικής μηνιγγίτιδας ή της μηνιγγίτιδας που σχετίζεται με κοιλιοστομία, καθώς αυτές σπάνια οφείλονται σε πνευμονιόκοκκο. Τα στεροειδή πρέπει να χορηγούνται πριν ή ταυτόχρονα με τις πρώτες δόσεις αντιβιοτικών· δεν υπάρχουν μελέτες που να αποδεικνύουν όφελος εάν χορηγούνται μετά την έναρξη της αντιβιοτικής θεραπείας.

2. Ποιο από τα παρακάτω είναι σωστό σχετικά με τη διάγνωση της πιθανολογούμενης βακτηριακής μηνιγγίτιδας;
 - α. Η αξονική τομογραφία (CT) κεφαλής χωρίς σκιαγραφικό πρέπει να γίνεται πριν από την οσφυονωτιαία παρακέντηση λόγω του κινδύνου εγκολασμού
 - β. Αριθμός των λευκών αιμοσφαιρίων (WBC) στο εγκεφαλονωτιαίο υγρό (ENY) μικρότερος από 100 κύτταρα/mm³ με λεμφοκυτταρική υπεροχή αποκλείει τη διάγνωση της βακτηριακής μηνιγγίτιδας
 - γ. Η χρώση κατά Gram του φυγοκεντρημένου ENY είναι θετική στο 60% έως 90% των περιπτώσεων βακτηριακής μηνιγγίτιδας
 - δ. Η έναρξη αντιβιοτικής αγωγής για πιθανολογούμενη μηνιγγίτιδα πριν από την οσφυονωτιαία παρακέντηση δεν μειώνει σημαντικά την απόδοση των καλλιιεργειών ENY

Απάντηση: γ. Η χρώση κατά Gram του ENY είναι μια πολύ χρήσιμη διαγνωστική μελέτη στη διαχείριση της βακτηριακής μηνιγγίτιδας και αναφέρεται ότι είναι θετική στο 60% έως 90% των επιβεβαιωμένων περιπτώσεων βακτηριακής μηνιγγίτιδας· η απόδοση της χρώσης κατά Gram είναι υψηλότερη για την πνευμονιοκοκκική νόσο. Η οσφυονωτιαία παρακέντηση χωρίς προηγούμενη αξονική τομογραφία έχει αποδειχθεί ότι είναι ασφαλής σε πολλούς ασθενείς με βακτηριακή μηνιγγίτιδα χωρίς ειδικά χαρακτηριστικά που να υποδηλώνουν υψηλότερο κίνδυνο εστιακών μαζικών αλλοιώσεων με υψηλότερο κίνδυνο εγκολασμού, όπως νεοεμφανιζόμενες επιληπτικές κρίσεις ή νέα εστιακά νευρολογικά ευρήματα. Παρόλο που στους περισσότερους ασθενείς με βακτηριακή μηνιγγίτιδα συνήθως ανευρίσκονται στο ENY αριθμοί λευκών αιμοσφαιρίων μεγαλύτεροι από 100 κύτταρα/mm³, ένας αριθμός μικρότερος από 100 κύτταρα/mm³ δεν αποκλείει τη διάγνωση και σε καταστροφικές λοιμώξεις μπορεί να παρατηρηθεί ένας πολύ χαμηλός αριθμός λευκών αιμοσφαιρίων στο ENY. Τα προφίλ του ENY στη μηνιγγίτιδα συνήθως δείχνουν ουδετερόφιλη υπεροχή, αλλά νωρίς κατά τη διάρκεια της λοίμωξης μπορεί να υπάρχει λεμφοκυτταρική υπεροχή. Έχει αναφερθεί ότι η χορήγηση αντιβακτηριακής θεραπείας πριν από την οσφυονωτιαία παρακέντηση μειώνει την πιθανότητα θετικής καλλιέργειας ENY έως και 20%.

3. Ποιο από τα παρακάτω είναι σωστό όσον αφορά την ιογενή εγκεφαλίτιδα;
 - α. Ο ιός του απλού έρπητα τύπου 2 προκαλεί περίπου το 10% των περιπτώσεων λοιμώδους εγκεφαλίτιδας στις Ηνωμένες Πολιτείες
 - β. Η εγκεφαλίτιδα από λύσσα είναι μια αναπόδραστα θανατηφόρος λοίμωξη
 - γ. Η μηνιγγοεγκεφαλίτιδα από τον ιό του Δυτικού Νείλου μπορεί να παρουσιαστεί με χαλαρή παράλυση ή με παρκινσονικού τύπου τρόμο
 - δ. Τελικά σε πάνω από το 75% των ασθενών που παρουσιάζουν λοιμώδη εγκεφαλίτιδα θα βρεθεί μια συγκεκριμένη αιτιολογία

Απάντηση: γ. Οι εκδηλώσεις της νευροδιδεισδυτικής νόσου του Δυτικού Νείλου περιλαμβάνουν άσηπτη μηνιγγίτιδα, μηνιγγοεγκεφαλίτιδα και σύνδρομο χαλαρής παράλυσης που μοιάζουν με την πολιομυελίτιδα. Ο παρκινσονικός τύπου τρόμος μπορεί να αποτελεί εξέχον χαρακτηριστικό της μηνιγγοεγκεφαλίτιδας του Δυτικού Νείλου. Η επίπτωση της νευροδιδεισδυτικής νόσου αυξάνεται με την ηλικία. Ακόμη και μετά από εκτεταμένες διαγνωστικές μελέτες, η αιτιολογία παραμένει αδιάγνωστη σε περισσότερους από τους μισούς ασθενείς που παρουσιάζονται με υποτιθέμενη λοιμώδη εγκεφαλίτιδα. Η λοίμωξη από τον απλό έρπητα τύπου 1 είναι η αιτία έως και 10% των διαγνωσμένων περιπτώσεων λοιμώδους εγκεφαλίτιδας. Ο απλός έρπης τύπου 2 σχετίζεται με άσηπτη μηνιγγίτιδα, αλλά πολύ λιγότερο συχνά αποτελεί αιτία εγκεφαλίτιδας. Η εγκεφαλίτιδα από λύσσα θεωρούνταν προηγουμένως αναπόδραστα θανατηφόρος, αλλά υπήρξαν αρκετές πρόσφατες τεκμηριωμένες περιπτώσεις επιβίωσης μετά από επιθετικά πρωτόκολλα εντατικής θεραπείας.

4. Ποιο από τα παρακάτω αποτελεί ένδειξη για επείγουσα (urgent) αντικατάσταση βαλβίδας σε ασθενείς με βακτηριακή ενδοκαρδίτιδα;
 - α. Λοίμωξη που προκαλείται από *Enterococcus faecalis*
 - β. Υποτροπιάζουσες σηπτικές πνευμονικές εμβολές κατά τη διάρκεια της θεραπείας
 - γ. Ανθεκτική συμφορητική καρδιακή ανεπάρκεια και βαλβιδική ανεπάρκεια
 - δ. Σηπτικό έμβολο στη μέση εγκεφαλική αρτηρία με αιμορραγία που απεικονίζεται στην αξονική τομογραφία

Απάντηση: γ. Η πιο συχνή ένδειξη για επείγουσα αντικατάσταση βαλβίδας στη λοιμώδη ενδοκαρδίτιδα είναι η ανθεκτική συμφορητική καρδιακή ανεπάρκεια και η βαλβιδική ανεπάρκεια. Αν και η πρόωγη χειρουργική επέμβαση μπορεί να ενδείκνυται για μύκητες και πολυανθεκτικούς βακτηριακούς οργανισμούς, για τους ασθενείς με πιο τυπικά παθογόνα ενδοκαρδίτιδας, όπως σταφυλόκοκκοι, στρεπτόκοκκοι και *Enterococcus faecalis*, θα πρέπει γενικά είτε να αποτυγχάνει η θεραπεία είτε να έχουν άλλες ειδικές ενδείξεις για να εξεταστεί το ενδεχόμενο επείγουσας χειρουργικής θεραπείας. Σε αντίθεση με τις συστηματικές εμβολές στην αριστερόπλευρη ενδοκαρδίτιδα, ακόμη και οι υποτροπιάζουσες πνευμονικές εμβολές δεν αποτελούν οριστική ένδειξη για χειρουργική επέμβαση στη νόσο της δεξιάς καρδιάς. Οι αιμορραγικές εμβολικές εγκεφαλικές βλάβες θα αποτελούσαν αντένδειξη για άμεση χειρουργική επέμβαση· σε τέτοιες περιπτώσεις η χειρουργική επέμβαση συνήθως αναβάλλεται για τουλάχιστον 4 εβδομάδες.

5. Ποια από τις ακόλουθες δηλώσεις είναι σωστή σχετικά με το ρόλο του υπερηχοκαρδιογραφήματος στη διάγνωση και τη διαχείριση της λοιμώδους ενδοκαρδίτιδας;
 - α. Τα υπερηχοκαρδιογραφικά ευρήματα αποτελούν βασικό στοιχείο των τροποποιημένων κριτηρίων Duke για τη διάγνωση της λοιμώδους ενδοκαρδίτιδας
 - β. Το διοισοφάγειο υπερηχοκαρδιογράφημα (transesophageal

echocardiography-TEE) προτιμάται από το διαθωρακικό υπερηχοκαρδιογράφημα (transthoracic echocardiography-TTE) ως αρχική μελέτη για τη διάγνωση της λοιμώδους ενδοκαρδίτιδας

- γ. Η ευαισθησία του TEE είναι ισοδύναμη με την ευαισθησία του TTE για τη διάγνωση της ενδοκαρδίτιδας προσθετικής βαλβίδας
- δ. Μια αρνητική μελέτη TEE σε ασθενή με υψηλή υποψία για τη διάγνωση λοιμώδους ενδοκαρδίτιδας δεν χρειάζεται να επαναληφθεί

Απάντηση: α. Η διάγνωση της ενδοκαρδίτιδας βασίζεται σε πολύ μεγάλο βαθμό στα υπερηχοκαρδιογραφικά ευρήματα και αυτά αποτελούν ένα από τα δύο κύρια κριτήρια στα τροποποιημένα κριτήρια Duke, επιπροσθέτως των αποτελεσμάτων της καλλιέργειας αίματος. Τόσο οι κατευθυντήριες οδηγίες της Αμερικανικής Καρδιολογικής Εταιρείας όσο και της Ευρωπαϊκής Καρδιολογικής Εταιρείας συνιστούν το TTE ως αρχική εξέταση διαλογής για τη διάγνωση της λοιμώδους ενδοκαρδίτιδας, αλλά η ευαισθησία του TEE είναι υψηλότερη στις περισσότερες περιπτώσεις: όταν η υποψία παραμένει μέτρια έως υψηλή και το TTE είναι είτε αρνητικό είτε όχι διαγνωστικό, θα πρέπει να πραγματοποιηθεί TEE. Η ευαισθησία του TEE είναι 90% για τη λοιμώδη ενδοκαρδίτιδα των προσθετικών βαλβίδων, η οποία είναι πολύ υψηλότερη από την ευαισθησία 50% έως 70% που αναφέρεται για το TTE. Σε ασθενείς για τους οποίους υπάρχει επίμονη υψηλή υποψία για λοιμώδη ενδοκαρδίτιδα ακόμη και μετά από μια αρνητική μελέτη TEE, είναι λογικό να επαναλαμβάνεται η μελέτη TEE σε 5 έως 7 ημέρες.

- 6. Ποιο από τα παρακάτω είναι σωστό σχετικά με τα σύνδρομα τοξικής καταπληξίας από σταφυλόκοκκο και στρεπτόκοκκο;

- α. Η αντιβιοτική θεραπεία αποτελεί βασικό συστατικό της αντιμετώπισης του σταφυλοκοκκικού συνδρόμου τοξικής καταπληξίας που οφείλεται σε υπεραπορροφητικά ταμπόν
- β. Η θεραπεία του συνδρόμου τοξικής καταπληξίας που προκαλείται από σοβαρές λοιμώξεις από στρεπτόκοκκο ομάδας A μπορεί να περιλαμβάνει αντιβιοτικά που μειώνουν την παραγωγή βακτηριακής τοξίνης, όπως η κλινδαμυκίνη
- γ. Η επίπτωση του σταφυλοκοκκικού συνδρόμου τοξικής καταπληξίας δεν έχει μεταβληθεί στις Ηνωμένες Πολιτείες τις τελευταίες 3 δεκαετίες
- δ. Το εξάνθημα του σταφυλοκοκκικού συνδρόμου τοξικής καταπληξίας είναι συνηθέστερα πετεχειώδες ή πορφυρικό

Απάντηση: β. Αντιβιοτικά όπως η κλινδαμυκίνη και η λινεζολίδη διακόπτουν την παραγωγή βακτηριακών εξωτοξινών στους στρεπτόκοκκους και συνιστώνται για τη θεραπεία σοβαρών δερματικών λοιμώξεων και λοιμώξεων μαλακών μορίων από στρεπτόκοκκο της ομάδας A και για ύποπτα σύνδρομα που προκαλούνται από τοξίνες της ομάδας A. Ο ρόλος της αντιβιοτικής θεραπείας για το σύνδρομο σταφυλοκοκκικής τοξικής καταπληξίας είναι λιγότερο σαφής από ό,τι για τα στρεπτοκοκκικά σύνδρομα τοξικής καταπληξίας, καθώς η τοξίνη συχνά παράγεται από αποικίζοντες και όχι μολυσματικούς οργανισμούς όπως στο σύνδρομο τοξικής καταπληξίας που σχετίζεται με ταμπόν. Η επίπτωση του συνδρόμου τοξικής καταπληξίας που σχετίζεται με ταμπόν, το οποίο σχετιζόταν κυρίως με τα ταμπόν υψηλής απορροφητικότητας, έχει μειωθεί σημαντικά από τις πρώτες περιγραφές αυτού του συνδρόμου στη δεκαετία του 1980. Το εξάνθημα αποτελεί εξέχουσα συνιστώσα των κλινικών εκδηλώσεων των σταφυλοκοκκικών συνδρόμων τοξικής καταπληξίας και είναι συνηθέστερα ένα εξάνθημα τύπου οστρακιάς ή ερυθροδερμικό εξάνθημα που εξελίσσεται σε απολέπιση.

ΚΕΦΑΛΑΙΟ 52

Οξεία Νεφρική Βλάβη

Βιβλιογραφία

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Ερωτήσεις Ανασκόπησης

1. Ένας 25χρονος πεζός χτυπήθηκε από αυτοκίνητο ενώ οδηγούσε το ποδήλατό του. Μεταφέρθηκε στο τμήμα επειγόντων περιστατικών με ασθενοφόρο. Η φυσική εξέταση αποκαλύπτει αρτηριακή πίεση 130/80 mm Hg, σφυγμό 70 παλμούς/λεπτό και απύρετη κατάσταση. Η καρδιολογική εξέταση αποκαλύπτει S_1 , S_2 , όχι S_3 , και ένα συστολικό φύσημα εξώθησης I/VI στο αριστερό στερνικό όριο. Οι πνεύμονες ήταν καθαροί, η κοιλία δεν ήταν ευαίσθητη, αποκαλύφθηκε ευαισθησία του αριστερού κάτω άκρου αλλά χωρίς τάση και οι σφυγμοί στο κάτω άκρο ήταν φυσιολογικοί. Ο ασθενής δεν ελάμβανε φάρμακα. Τα αποτελέσματα των εργαστηριακών εξετάσεων περιλάμβαναν ανάλυση ούρων: ίχνη πρωτεΐνης, μεγάλη ποσότητα αίματος· μικροσκοπηση ούρων: 0-1 λευκά αιμοσφαίρια (WBC) ανά πεδίο υψηλής μεγέθυνσης, 0-1 ερυθρά αιμοσφαίρια (RBC) ανά πεδίο υψηλής μεγέθυνσης, όχι κύλινδροι· ωσμωτικότητα ούρων 295 mOsm/kg H_2O · κρεατινίνη ορού 2,5 mg/dL· άζωτο ουρίας αίματος 32 mg/dL· νάτριο 144 mEq/L· κάλιο 5,1 mEq/L· διττανθρακικά 22 mEq/L· γλυκόζη 92 mg/dL· ασπαρτική αμινοτρανσφεράση 98 IU/L· αλανινική αμινοτρανσφεράση 78 IU/L.

Ποια είναι η καλύτερη αρχική αντιμετώπιση για αυτόν τον ασθενή;

- α. Λήψη άμεσου υπερηχογραφήματος νεφρών
- β. Άμεση αγγειοχειρουργική εκτίμηση
- γ. Ενδοφλέβια χορήγηση υγρών
- δ. Λήψη ούρων για ηωσινόφιλα
- ε. Λήψη τυχαίου δείγματος ούρων για μυοσφαιρίνη

Απάντηση: γ. Αυτός ο ασθενής παρουσιάστηκε με ιστορικό ανησυχητικό για ραβδομυόλυση. Τα εργαστηριακά κριτήρια που συνάδουν με την τελευταία διάγνωση είναι η ανάλυση ούρων χωρίς ερυθρά αιμοσφαίρια στη μικροσκοπηση, αλλά με μεγάλη ποσότητα αίματος στο δείγμα, καθώς και οι αυξημένες ασπαρτική αμινοτρανσφεράση (AST) και αλανινική αμινοτρανσφεράση (ALT) και η σχετιζόμενη νεφρική ανεπάρκεια. Θα αναμενόταν αυξημένο επίπεδο κρεατινικής φωσφοκινάσης (η τιμή δεν αναφέρεται). Η καλύτερη αρχική θεραπεία είναι η ενδοφλέβια χορήγηση υγρών, δηλαδή διάλυμα φυσιολογικού ορού, με στόχο όγκο ούρων 200 ml/ώρα. Κάποια στιγμή θα απαιτηθεί πιθανώς υπερηχογράφημα νεφρών, αλλά η αρχική θεραπεία είναι η ενδοφλέβια χορήγηση υγρών. Δεν υπάρχει ανάγκη λήψης επιπέδων ηωσινοφίλων ούρων σε αυτό το πλαίσιο, διότι το τελευταίο συχνά παραγγέλλεται όταν υπάρχει ανησυχία σχετικά με την πιθανότητα οξείας διάμεσης νεφρίτιδας. Η μελέτη μυοσφαιρίνης ούρων μπορεί να βοηθήσει στη διάγνωση, αλλά τα αποτελέσματα μπορεί να είναι φυσιολογικά κατά την προσέλευση. Δεν ενδείκνυται ακόμη η αγγειοχειρουργική εκτίμηση λόγω των φυσιολογικών σφυγμών των κάτω άκρων, αλλά θα ήταν απαραίτητη η συνεχής επαγρύπνηση για την πιθανότητα συνδρόμου διαμερίσματος.

2. Μια γυναίκα 25 ετών με 14ετές ιστορικό σακχαρώδη διαβήτη (ΣΔ) τύπου Ι προσέρχεται στο ιατρείο σας για τακτική παρακολούθηση. Δεν έχει νέες εννοχλήσεις, εκτός από το ότι η μητέρα της, η οποία είναι νοσηλεύτρια, της μέτρησε την αρτηριακή πίεση σε δύο περιπτώσεις τον τελευταίο μήνα και ήταν αυξημένη στα 146/92 mm Hg και 156/98 mm Hg. Η ασθενής παραδέχεται την κακή συμμόρφωση στον διαβητικό έλεγχο για πολλά χρόνια και η A_{1c} αιμοσφαιρίνη της είναι συχνά πάνω από 9,0%. Πριν από ένα χρόνο η ασθενής είχε μικροαλβουμινουρία και της είχε συνταγογραφηθεί αναστολέας του μετατρεπτικού ενζύμου της αγγιοτενσίνης (MEA), αλλά δεν εκτέλεσε ποτέ τη συνταγή. Κατά την ανασκόπηση των συστημάτων, η ασθενής αρνήθηκε πρόσφατα εξανθήματα, χρήση παράνομων ναρκωτικών, δύσπνοια, πόνο στο στήθος ή πονοκεφάλους. Η φυσική εξέταση δείχνει αρτηριακή πίεση 142/98 mm Hg, σφυγμό 88 παλμούς/λεπτό και η ασθενής είναι απύρετη. Τα αποτελέσμα-

τα των βυθοσκοπικών, καρδιακών και πνευμονικών εξετάσεων ήταν φυσιολογικά και δεν υπάρχει οίδημα των κάτω άκρων. Ο ασθενής δεν ελάμβανε φάρμακα. Τα αποτελέσματα των εργαστηριακών εξετάσεων ήταν κρεατινίνη 0,9 mg/dL, άζωτο ουρίας αίματος 24 mg/dL, νάτριο 140 mEq/L, κάλιο 4,2 mEq/L, χλώριο 94 mEq/L, διττανθρακικά 24 mEq/L, αιμοσφαιρίνη 13,0 gm/dL, λευκά αιμοσφαίρια $5,0 \times 10^3 /\mu\text{l}$, αιμοπετάλια $345.000 \times 10^3 /\mu\text{l}$, ασπαρτική αμινοτρανσφεράση 14 IU/L, αλανινική αμινοτρανσφεράση 22 IU/L. Τα αποτελέσματα της ακτινογραφίας θώρακος και του ηλεκτροκαρδιογραφήματος ήταν φυσιολογικά. Η ανάλυση ούρων έδειξε 2+ πρωτεΐνη, 1+ αίμα με ταινία ανίχνευσης· η μικροσκοπηση ούρων έδειξε 3-5 WBC, 5-10 RBC, 2 δυσμορφικά RBC, 1 κύλινδροRBC και 1-3 κύλινδρους υαλίνης ανά πεδίο υψηλής μεγέθυνσης. Ο χρόνος προθρομβίνης είναι 12,5 δευτερόλεπτα και ο χρόνος μερικής θρομβοπλαστίνης 25 δευτερόλεπτα. Το υπερηχογράφημα νεφρών δείχνει φυσιολογική ηχογένεια· δεξιός νεφρός 11,0 cm, αριστερός νεφρός 11,6 cm.

Ποιο από τα παρακάτω είναι το καταλληλότερο πρώτο βήμα για τη φροντίδα αυτής της ασθενούς;

- α. Προγραμματίστε μια νεφρική βιοψία
- β. Λάβετε ένα Doppler νεφρικής αρτηρίας
- γ. Λάβετε μια αναλογία ρενίνης/αλδοστερόνης ορού
- δ. Ξεκινήστε έναν αναστολέα MEA και μια δίαιτα με χαμηλή περιεκτικότητα σε νάτριο με στενή παρακολούθηση σε 4 εβδομάδες
- ε. Παραπέμπτε την ασθενή σε ουρολόγο

Απάντηση: α. Η παρούσα ασθενής έχει μακροχρόνιο ιστορικό ΣΔ που ελέγχεται ανεπαρκώς. Παρουσιάζει πρωτεϊνουρία στην μέτρηση με ταινία ανίχνευσης και δεν είχε συμμορφωθεί με τους συνταγογραφούμενους αναστολείς MEA και συνεπώς διατρέχει κίνδυνο για προοδευτική νεφροπάθεια από ΣΔ. Ωστόσο, η ασθενής έχει νεοεμφανιζόμενη υπέρταση στο πλαίσιο ενεργού ίζηματος (ερυθρά αιμοσφαίρια, κύλινδροι ερυθρών αιμοσφαιρίων, δυσμορφικά ερυθρά αιμοσφαίρια και επιδεινούμενη πρωτεϊνουρία). Η ασθενής αυτή έχει φυσιολογικά επίπεδα κρεατινίνης ορού, αλλά η ανάλυση ούρων της συνάδει με ενεργό υπερπλαστική σπειραματονεφρίτιδα. Πρόκειται ουσιαστικά για επείγον νεφρολογικό περιστατικό. Οποιαδήποτε καθυστέρηση στη θεραπεία είναι πιθανό να είναι επιβλαβής για την ασθενή και μπορεί να οδηγήσει σε μη αναστρέψιμη νεφρική ανεπάρκεια. Το πρώτο βήμα είναι ο προγραμματισμός μιας νεφρικής βιοψίας για την οριστική διάγνωση. Η έναρξη του αναστολέα MEA (εφόσον δεν είναι έγκυος [ή έλεγχος για αυτό πρώτα]) και μια δίαιτα με χαμηλή περιεκτικότητα σε νάτριο θα ήταν επίσης λογική, αλλά το να επιστρέψει η ασθενής σε 1 μήνα δεν συστήνεται, διότι ενδείκνυται επείγουσα νεφρική βιοψία. Το ίζημα των ούρων είναι ανησυχητικό για σπειραματική βλάβη και επομένως δεν ενδείκνυται ουρολογική αξιολόγηση. Παρόλο που η νεοεμφανιζόμενη υπέρταση εγείρει την πιθανότητα ινομυϊκής δυσπλασίας ή άλλων πιθανών δευτερογενών αιτιών, όπως ο πρωτοπαθής υπεραλδοστερονισμός, για να εξηγήσει την υπέρταση, το ενεργό ίζημα ούρων αντανakλά οξεία σπειραματονεφρίτιδα και ως εκ τούτου δεν ενδείκνυται νεφρικό Doppler και αναλογίες ρενίνης/αλδοστερόνης.

3. Ποια από τις ακόλουθες εξισώσεις εκτίμησης για τη μέτρηση του ρυθμού σπειραματικής διήθησης (GFR) είναι πιο ακριβής σε ασθενείς με φυσιολογική ή σχεδόν φυσιολογική νεφρική λειτουργία;

- α. Τύπος Cockcroft-Gault
- β. Εξίσωση (4 μεταβλητές) της μελέτης MDRD (Modification of Diet in Renal Disease)
- γ. Εξίσωση (6 μεταβλητές) της μελέτης MDRD
- δ. Εξίσωση της CKD-EPI (Chronic Kidney Disease Epidemiology

Collaboration)

ε. Κάθαρση ιωθαλαμάτης

Απάντηση: δ. Η μέτρηση ενός ακριβούς GFR στην κλινική πράξη είναι πολύπλοκη και μπορεί να είναι δυσχερής με πολλές πιθανές μεταβλητές που μπορούν να επηρεάσουν τα αποτελέσματα. Ο χρυσός κανόνας για τη μέτρηση του GFR είναι η κάθαρση της ιουλίνης, αλλά η μέτρηση είναι δύσκολο να πραγματοποιηθεί και ως επί το πλείστον δεν είναι διαθέσιμη. Οι πιο συνηθισμένες μέθοδοι μέτρησης του GFR είναι τα ούρα 24ωρου για την κάθαρση κρεατινίνης και τρεις εξισώσεις «εκτίμησης» για την αξιολόγηση

του GFR. Από τις κλινικά χρησιμοποιούμενες εξισώσεις εκτίμησης, η εξίσωση CKD-EPI είναι η πιο ακριβής σε άτομα με σχεδόν φυσιολογικό GFR. Η εξίσωση MDRD χρησιμοποιείται συχνότερα σε ασθενείς με χρόνια νεφρική ανεπάρκεια. Η εξίσωση Cockcroft-Gault χρησιμοποιείται ιστορικά για την εκτίμηση του GFR για τις κατευθυντήριες γραμμές δοσολογίας φαρμάκων και συχνά υπερεκτιμά τον GFR. Η κάθαρση της ιωθαλαμάτης, η οποία παρέχει ακριβέστερη εκτίμηση του GFR από την κάθαρση της κρεατινίνης, δεν είναι μια εξίσωση εκτίμησης αλλά μάλλον ένας μετρούμενος GFR (με τη χρήση της ιωθαλαμάτης).

ΚΕΦΑΛΑΙΟ 53

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Ερωτήσεις Ανασκόπησης

- Κατά τη φροντίδα ενός βαρέως πάσχοντος ατόμου με παθολογικό επίπεδο κρεατινίνης ορού, ποια από τις ακόλουθες δηλώσεις περιγράφει καλύτερα την αξιολόγηση της νεφρικής λειτουργίας;
 - Ένα μεμονωμένο επίπεδο κρεατινίνης ορού μπορεί να χρησιμοποιηθεί για τον υπολογισμό του εκτιμώμενου ρυθμού σπειραματικής διήθησης (eGFR) με τη χρήση της εξίσωσης της μελέτης Modification of Diet in Renal Disease Study (MDRD)
 - Η χρόνια νεφρική νόσος σταδίου 3α (XNN- e GFR 45-60 ml/ min) έχει υψηλό κίνδυνο εξέλιξης σε νεφρική νόσο τελικού σταδίου (ESRD)
 - Η πρωτεϊνουρία αυξάνει τον καρδιαγγειακό κίνδυνο ακόμη και με φυσιολογικό GFR
 - Η κρεατινίνη ορού είναι η πιο ακριβής μέτρηση της νεφρικής λειτουργίας

Απάντηση: γ. Η μέτρηση της νεφρικής λειτουργίας με τη χρήση της κρεατινίνης ορού μπορεί να είναι παραπλανητική. Θέματα που αφορούν τον ασθενή (διαφορές μεγέθους) και εξωγενείς ουσίες μπορεί να οδηγήσουν σε καταστάσεις όπου η κρεατινίνη ορού μπορεί να αντικατοπτρίζει ανακριβώς τη νεφρική λειτουργία· άλλες μετρήσεις, όπως η 24ωρη κάθαρση κρεατινίνης, μπορεί να είναι χρήσιμες κατά καιρούς. Η αξιολόγηση της νεφρικής λειτουργίας απαιτεί κρεατινίνη ορού σε σταθερή κατάσταση και μια μεμονωμένη τιμή μπορεί να παρέχει ανακριβή αποτελέσματα. Οι ασθενείς με XNN σταδίου 3α δεν έχουν υψηλό κίνδυνο εξέλιξης της νεφρικής νόσου, εκτός εάν υπάρχει σημαντική πρωτεϊνουρία. Η πρωτεϊνουρία αποτελεί πλέον αναγνωρισμένο παράγοντα κινδύνου για καρδιαγγειακή νόσο σε όλα τα επίπεδα νεφρικής λειτουργίας.

- Ένας άνδρας 56 ετών με XNN σταδίου 3b λόγω διαβητικής νεφροπάθειας αναρρώνει από πνευμονία. Κατά τη διάρκεια της νοσηλείας του έχει πάρει βάρος της τάξης των 12 kg και είναι υπέρτασικός και οιδηματώδης κατά την εξέταση. Πιστεύετε ότι χρειάζεται επιθετική διούρηση. Ένα αρχικό σχήμα φουροσεμίδης 40 mg ενδοφλεβίως (IV) δύο φορές την ημέρα (bid) δεν αποδίδει αρνητικό ισοζύγιο υγρών. Κατά την ανασκόπηση του φακέλου του, σημειώνετε ότι τα επίπεδα κρεατινίνης του είναι ελαφρώς χειρότερα από ό,τι κατά την εισαγωγή (σήμερα 3,2 mg/dL· 2,4 πριν από την εισαγωγή) και ότι λάμβανε φουροσεμίδα 80 mg δύο φορές την ημέρα πριν από την εισαγωγή. Ποιο είναι το καλύτερο πρόσθετο βήμα για τη θεραπεία της υπερφόρτωσης όγκου του;
 - Μετατρέψτε τη φουροσεμίδα σε θειαζιδικό διουρητικό, όπως η χλωροθαλιδόνη 25 mg ημερησίως
 - Αυξήστε τη φουροσεμίδα του σε 80 mg IV δύο φορές την ημέρα
 - Μετατρέψτε τη φουροσεμίδα του σε 80 mg IV ημερησίως
 - Αντικαταστήστε τη φουροσεμίδα με μετολαζόνη 5 mg ημερησίως

Απάντηση: β. Οι ασθενείς με XNN που χρησιμοποιούν διουρητικά μέτριας έως υψηλής δόσης αναπτύσσουν αντισταθμιστικούς μηχανισμούς για την κατακράτηση επιπλέον νατρίου. Ως αποτέλεσμα, συχνά απαιτούν υψηλότερες δόσεις διουρητικών ή, ενίοτε, την προσθήκη μετολαζόνης σε ένα διουρητικό σχήμα για να επιτευχθεί επαρκής διούρηση. Τα θειαζιδικά διουρητικά, όπως η χλωροθαλιδόνη ή η υδροχλωροθειαζίδη, δεν είναι τόσο αποτελεσματικά στην έναρξη της διούρησης όσο τα διουρητικά της αγκύλης. Αυτή η περίπτωση απεικονίζει ένα παράδειγμα κατάστασης υπερφόρτωσης όγκου στην οποία τα διουρητικά δεν επιτυγχάνουν επαρκή διούρηση ως αποτέλεσμα της επιδείνωσης της νεφρικής λειτουργίας και της ανάγκης για υψηλότερη δόση. Σε κατάσταση υπερφόρτωσης όγκου, τα περισσότερα διουρητικά της αγκύλης (με εξαίρεση την τορσεμίδα) πρέπει να χορηγούνται δύο φορές ημερησίως. Η μετολαζόνη χρησιμοποιείται σπάνια μόνη της.

- Φροντίζετε έναν άνδρα ασθενή 62 ετών με XNN σταδίου 4 (eGFR 22 ml/min) λόγω πολυκυστικής νεφρικής νόσου. Ο ασθενής εισήχθη για σηψαιμία που αποδίδεται σε επιλοίμωξη νεφρικής κύστης. Ο ασθενής θα ολοκληρώσει μια αντιβιοτική αγωγή και σε εσάς ζητείται να γράψετε εντολές για την έξοδό του από τη ΜΕΘ. Ποια από τις ακόλουθες δηλώσεις είναι αληθής σχετικά με τη φροντίδα ασθενών με XNN σταδίου 4;
 - Δεν πρέπει να χρησιμοποιείται γραμμή περιφερικά εισαγόμενου κεντρικού καθετήρα (PICC)
 - Μπορούν να χρησιμοποιηθούν γαστρεντερικά διεγερτικά που περιέχουν φωσφόρο, εάν ο φώσφορος του ορού βρίσκεται στο φυσιολογικό εύρος
 - Πρέπει να αποφεύγονται οι αναστολές του μετατρεπτικού ενζύμου της αγγιοτενσίνης (ΜΕΑ) και οι αναστολές των υποδοχέων της αγγιοτενσίνης (ARB)
 - Όλα τα άτομα πρέπει να ακολουθούν νεφρική δίαιτα

Απάντηση: α. Σε άτομα με προχωρημένη XNN (όλα τα άτομα με νόσο σταδίου 4) δεν συνιστώνται γραμμές PICC για την αποφυγή βλάβης της υποκλείδιας φλέβας, η οποία μπορεί να αποτελέσει σημείο για μελλοντική αγγειακή πρόσβαση για αιμοκάθαρση. Τα γαστρεντερικά διεγερτικά που περιέχουν φωσφόρο πρέπει να αποφεύγονται λόγω της πιθανότητας απορρόφησης μεγάλου φορτίου φωσφόρου και της επακόλουθης οξείας νεφρικής βλάβης. Οι αναστολές του ΜΕΑ και οι αναστολές των υποδοχέων της αγγιοτενσίνης δεν αντενδείκνυνται σε προχωρημένη αλλά σταθερή XNN, αν και απαιτείται ιδιαίτερη προσοχή στα επίπεδα καλίου. Αν και μια νεφρική δίαιτα μπορεί να ελέγξει τις καταστάσεις υπερφόρτωσης όγκου και περίσσειας καλίου, εάν τα άτομα υποσιτίζονται μπορεί να μην είναι απαραίτητη.

ΚΕΦΑΛΑΙΟ 54

Νεφρική Νόσος και Μεταβολικές Διαταραχές στον Βαρέως Πάσχοντα

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Ερωτήσεις Ανασκόπησης

1. Ποια από τις ακόλουθες δηλώσεις σχετικά με τη θεραπεία της γαλακτικής οξέωσης με διττανθρακικό νάτριο είναι η πιο ακριβής;
- α. Η χορήγηση μπορεί να οδηγήσει σε υπερασβεστιαμία
 - β. Υπάρχει κίνδυνος παράδοξης επιδείνωσης της ενδοκυττάριας οξέωσης
 - γ. Η θεραπεία της γαλακτικής οξέωσης σε ασθενείς με αρτηριακό pH μικρότερο από 7,3 έχει αποδειχθεί ότι βελτιώνει τις αιμοδυναμικές παραμέτρους αλλά όχι την επιβίωση
 - δ. Η χορήγηση είναι πιθανό να μειώσει την παραγωγή γαλακτικού

Απάντηση: β. Η θεραπεία της γαλακτικής οξέωσης με διττανθρακικό νάτριο θα προκαλέσει αύξηση της παραγωγής διοξειδίου του άνθρακα, η οποία μπορεί να μειώσει το ενδοκυττάριο pH. Αυξάνοντας το εξωκυττάριο pH, η χορήγηση διττανθρακικού θα μειώσει το ιονισμένο ασβέστιο (λανθασμένη η απάντηση α). Παρά τη θεωρητική ελκυστικότητα της αύξησης του εξωκυττάριου pH, οι μελέτες δεν έχουν δείξει καμία βελτίωση στις αιμοδυναμικές παραμέτρους ή στην επιβίωση (λανθασμένη η απάντηση γ). Προκαλώντας συστηματική αλκαλοποίηση, η χορήγηση διττανθρακικών είναι πιθανό να προκαλέσει αύξηση του ρυθμού παραγωγής γαλακτικού (λανθασμένη η απάντηση δ).

2. Αξιολογείτε έναν ασθενή 50 ετών στη μονάδα εντατικής θεραπείας (ΜΕΘ). Ο ασθενής εισήχθη με σήψη με προέλευση από το ουροποιητικό, είναι διασωληνωμένος και λαμβάνει αγγειοσυσπαστικά φάρμακα (νορεπινεφρίνη και ντοπαμίνη) τις τελευταίες 3 ημέρες. Το προηγούμενο ιατρικό ιστορικό του περιλαμβάνει διαβήτη και καλοήγη υπερπλασία του προστάτη.

Κατά την εξέταση, τα ζωτικά του σημεία είναι εντός των φυσιολογικών ορίων και φαίνεται να αισθάνεται άνετα και να μην αισθάνεται δυσφορία. Τα εργαστηριακά του ευρήματα έχουν ως εξής: νάτριο 143 mEq/L, κάλιο 5,8 mEq/L, χλωριούχα 108 mEq/L, διττανθρακικά 24 mEq/L, γλυκόζη 90 mg/dL, άζωτο ουρίας αίματος (BUN) 12 mg/dL και κρεατινίνη 0,9 mg/dL (τιμή αναφοράς 0,7 mg/dL). Όλες οι τιμές των ηλεκτρολυτών ήταν φυσιολογικές χθες. Τα αέρια του αρτηριακού αίματος δείχνουν pH 7,38, μερική πίεση του διοξειδίου του άνθρακα (PCO_2) 41 mmHg και μερική πίεση του αρτηριακού οξυγόνου (PaO_2) 180 mmHg. Οι ηλεκτρολύτες των ούρων περιλαμβάνουν τα εξής: νάτριο ούρων 87 mEq/L, κάλιο ούρων 35 mEq/L και χλωριούχα ούρων 110 mEq/L. Ποια από τις παρακάτω είναι η πιο πιθανή εξήγηση για το αυξημένο επίπεδο καλίου;

- α. Θεραπεία με νορεπινεφρίνη
- β. Νεφρική σωληναριακή οξέωση τύπου 4 (RTA)
- γ. Κέτωση από αστιτία
- δ. Ψευδοϋπερκαλιαιμία

Απάντηση: δ. Υπάρχουν διάφορες αιτίες για την υπερκαλιαιμία σε βαρέως πάσχοντες ασθενείς, όπως το υπερβολικό φορτίο καλίου, η μετατόπιση του καλίου διαμέσου της κυτταρικής μεμβράνης και η αδυναμία αποβολής της περίσσειας ισορροπίας. Η θεραπεία με νορεπινεφρίνη δεν έχει συσχετιστεί με υπερκαλιαιμία (σε αντίθεση με τη σουκκινυλοχολίνη ή τη δακτυλίτιδα) (λανθασμένη η απάντηση α) και η παρουσία φυσιολογικών εργαστηριακών ευρημάτων την προηγούμενη ημέρα καθιστά λιγότερο πιθανό την RTA (λανθασμένη η απάντηση β). Δεν υπάρχουν ενδείξεις κέτωσης χωρίς οξέωση, χωρίς χάσμα ανιόντων και με φυσιολογική γλυκόζη ορού (λανθασμένη η απάντηση γ). Η ψευδοϋπερκαλιαιμία είναι η πιο πιθανή εξήγηση λόγω των φυσιολογικών εργαστηριακών ευρημάτων την προηγούμενη ημέρα χωρίς αλλαγή της κλινικής κατάστασης. Η ψευδοϋπερκαλιαιμία έχει διάφορες πιθανές αιτίες, συμπεριλαμβανομένης της αιμόλυσης και της σύσφιξης της γροθιάς με την τοποθέτηση περιχειρίδας κατά τη διάρκεια της αιμοληψίας (σωστή η απάντηση δ).

3. Ένας άνδρας 55 ετών με μικροκυτταρικό καρκίνο του πνεύμονα και σύνδρομο απρόσφορης έκκρισης αντιδιουρητικής ορμόνης (SIADH) εισήχθη με επιληπτική κρίση και υπονατρίαμία με επίπεδο νατρίου 107 mmol/L κατά την εισαγωγή. Ξεκίνησε έγχυση χλωριούχου νατρίου 3% (NaCl) με ρυθμό 80 ml/h και μετά από 6 ώρες το επίπεδο νατρίου είναι 122 mmol/L.

Ποιο από τα ακόλουθα επόμενα βήματα είναι το καταλληλότερο σε αυτό το σημείο;

- α. Διακόψτε την έγχυση NaCl 3% και παρακολουθήστε το επίπεδο νατρίου κάθε 4 ώρες
- β. Διακόψτε την έγχυση NaCl 3% και ξεκινήστε έγχυση NaCl 0,9% στα 160 ml/h
- γ. Διακόψτε την έγχυση NaCl 3% και χορηγήστε υδροκορτιζόνη 100 mg 3 φορές την ημέρα
- δ. Διακόψτε την έγχυση NaCl 3%, ξεκινήστε έγχυση δεξτρώζης 5% σε νερό (D_5W) και δεσμοπρεσσίνης για να μειώσετε το επίπεδο νατρίου

Απάντηση: δ. Οι ασθενείς με οξεία συμπτωματική υπονατρίαμία πρέπει να αντιμετωπίζονται με έγχυση φυσιολογικού ορού 3% για την ταχεία αύξηση της συγκέντρωσης νατρίου στο πλάσμα και την πρόληψη του εγκεφαλικού οιδήματος. Ο στόχος για την αύξηση του νατρίου είναι 6 mmol/L τις πρώτες 24 ώρες, καθώς μια ταχύτερη αύξηση είναι περιττή και μπορεί να προκαλέσει σύνδρομο οσμωτικής απομυελίνωσης. Αυτός ο ασθενής είχε πολύ ταχεία αύξηση των επιπέδων νατρίου, επομένως, η συγκέντρωση νατρίου πρέπει να μειωθεί. Αυτό μπορεί να επιτευχθεί καλύτερα με τη χρήση δεσμοπρεσσίνης και D_5W (επιλογή δ). Η παρακολούθηση του νατρίου (επιλογή α) και η χορήγηση διαλύματος φυσιολογικού ορού (απάντηση β) μπορεί να οδηγήσουν σε ακόμη ταχύτερη αύξηση του νατρίου. Η υδροκορτιζόνη (απάντηση γ) δεν έχει κανένα ρόλο.

4. Ποιο από τα παρακάτω δεν αποτελεί προτιμώμενη θεραπεία για την υπερασβεστιαμία;

- α. Πλικαμυκίνη
- β. Καλσιτονίνη
- γ. Αιμοκάθαρση
- δ. Ζολεδρονικό οξύ

Απάντηση: α. Η θεραπεία της υπερασβεστιαμίας περιλαμβάνει αποβολή ασβεστίου και μειωμένη οστική απορρόφηση. Το ζολεδρονικό οξύ είναι ένα από τα πιο αποτελεσματικά διφωσφονικά που χρησιμοποιούνται για τη θεραπεία της υπερασβεστιαμίας (λανθασμένη η απάντηση δ). Η καλσιτονίνη μειώνει ταχέως τα επίπεδα ασβεστίου, αλλά τα αποτελέσματά της χάνονται εντός 72 ωρών (λανθασμένη η απάντηση β). Η αιμοκάθαρση μπορεί να χρησιμοποιηθεί σε ορισμένες περιπτώσεις για τη θεραπεία της ανθεκτικής υπερασβεστιαμίας (απάντηση γ). Παρά την επίδρασή της στα επίπεδα ασβεστίου, η χρήση της πλικαμυκίνης αποθαρρύνεται λόγω του προφίλ παρενεργειών της (τοξικότητα στους νεφρούς, στο ήπαρ και στο μυελό των οστών) (σωστή η απάντηση α).

5. Ποια από τις ακόλουθες ηλεκτρολυτικές ανωμαλίες μπορεί να προκαλέσει αυξημένο χάσμα ανιόντων;

- α. Υπερασβεστιαμία
- β. Υπερνατρίαμία
- γ. Υπερφωσφαταιμία
- δ. Υπερμαγνησιαμία

Απάντηση: γ. Το χάσμα ανιόντων είναι η διαφορά μεταξύ των μετρήσεων των θετικά φορτισμένων και των αρνητικά φορτισμένων σωματιδίων. Σε περιπτώσεις αυξημένου ασβεστίου (απάντηση α), νατρίου (απάντηση β) ή μαγνησίου (απάντηση δ), υπάρχει ταυτόχρονη αύξηση των μετρούμενων αρνητικών φορτίων, οπότε δεν αυξάνεται το χάσμα ανιόντων. Η παρουσία υπερφωσφαταιμίας

ας μπορεί να προκαλέσει μεγάλες αυξήσεις στο χάσμα ανιόντων, επειδή πρόκειται για ένα μη μετρήσιμο ανιόν.

6. Ένας καχεκτικός άστεγος άνδρας εισάγεται στη μονάδα εντατικής θεραπείας (ΜΕΘ) υποτονικός, υποτασικός και υποξαιμικός. Τα αρχικά εργαστηριακά ευρήματα πλάσματος έχουν ως εξής: νάτριο 130 mmol/L, κάλιο 3,6 mmol/L, χλωριούχα 96 mmol/L, διττανθρακικά 13 mmol/L, γλυκόζη 62 mg/dL, άζωτο ουρίας αίματος (BUN) 48 mg/dL, κρεατινίνη 1,8 mg/dL. Η ακτινογραφία θώρακος καταδεικνύει αρκετούς ακανθώδεις όζους και στα δύο πνευμονικά πεδία. Διασωληνώνεται και αρχίζει θεραπεία με ενδοφλέβιο διάλυμα φυσιολογικού ορού που περιέχει δεξ-τρόζη, θειαμίνη και φυλλικό οξύ. Ποια από τις ακόλουθες ηλεκτρολυτικές διαταραχές θα διέτρεχε ο ασθενής τον μεγαλύτερο κίνδυνο να αναπτύξει με την περιγραφόμενη θεραπεία;

α. Υπερνατρίαμία

β. Υπερκαλιαιμία

γ. Υπερμαγνησισαιμία

δ. Υπερασβεστιαϊμία

ε. Υποφωσφαταιμία

Απάντηση: ε. Ο παρών ασθενής έχει παράγοντες κινδύνου και σωματικά ευρήματα μακροχρόνιου υποσιτισμού και κινδυνεύει να αναπτύξει σύνδρομο επανασίτισης ως αποτέλεσμα της ενδογενούς έκκρισης ινσουλίνης ως απάντηση στη δεξτρόζη. Η υπερνατρίαμία είναι απίθανο να αναπτυχθεί με ισοτονικά υγρά (λανθασμένη η απάντηση α) και η μεσολαβούμενη από την ινσουλίνη είσοδος καλίου στα κύτταρα πιθανότατα θα οδηγήσει σε υποκαλιαιμία παρά σε υπερκαλιαιμία (λανθασμένη απάντηση β). Η υπερμαγνησισαιμία πιθανότατα δεν θα εμφανιζόταν χωρίς υπερβολική πρόσληψη μαγνησίου (λανθασμένη η απάντηση γ), και καθώς η μεταβολική οξέωση (πιθανώς κετοξέωση) διορθώνεται, το pH του αίματος θα αυξηθεί, θέτοντάς τον έτσι σε κίνδυνο για υπασβεστιαϊμία λόγω της μετακίνησης των δεσμευμένων στην αλβουμίνη πρωτονίων μαζί με ασβέστιο (λανθασμένη η απάντηση δ). Η υποφωσφαταιμία μπορεί να εμφανιστεί ως αποτέλεσμα της μεσολαβούμενης από την ινσουλίνη εισόδου φωσφόρου στα κύτταρα (σωστή η απάντηση ε), και αυτό μπορεί να είναι απειλητικό για τη ζωή εάν δεν παρέχεται η κατάλληλη αναπλήρωση.

ΚΕΦΑΛΑΙΟ 55

Επείγοντα Διαβητολογικά Προβλήματα, Γλυκαιμικός Έλεγχος και Υπογλυκαιμία

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Ερωτήσεις Ανασκόπησης

1. Ένας άνδρας 64 ετών προσέρχεται στο τμήμα επειγόντων περιστατικών με ζάλη, ναυτία, έμετο και κοιλιακό άλγος. Από το προηγούμενο ιατρικό ιστορικό του προκύπτει διαβήτης τύπου 2, υπέρταση και υπερλιπιδαιμία. Η φαρμακευτική του αγωγή περιλαμβάνει ινσουλίνη glargine 25 μονάδες τη νύχτα, μετφορμίνη 1000 mg δύο φορές την ημέρα, λισινοπρίλη 10 mg ημερησίως, ατορβαστατίνη 10 mg ημερησίως και καναγλιφοζίνη 100 mg ημερησίως. Αναφέρει πρόσφατη λοίμωξη του ανώτερου αναπνευστικού με μειωμένη όρεξη τις τελευταίες ημέρες. Κατά τη διάρκεια αυτής της περιόδου, σταμάτησε να λαμβάνει την ινσουλίνη αλλά συνέχισε τα άλλα φάρμακά του. Η εργαστηριακή αξιολόγηση παρατίθεται στον ακόλουθο πίνακα:

Αξιολόγηση	Επίπεδο
Νάτριο	135 mmol/L
Κάλιο	5,3 mmol/L
Χλωριούχα	97 mmol/L
Διοξείδιο του άνθρακα	12 mmol/L
Κρεατινίνη	1,3 mg/dL
Γλυκόζη	210 mg/dL
Γαλακτικό	2 mg/dL

Από την φυσική εξέταση προκύπτουν τα σημαντικά ευρήματα της αρτηριακής πίεσης 110/60 mmHg και της καρδιακής συχνότητας των 113 παλμών/λεπτό. Η καρδιαγγειακή εξέταση αποκαλύπτει ταχυκαρδία. Οι πνεύμονες είναι καθαροί και η κοιλία είναι ήπια ευαίσθητη στην ψηλάφηση διάχυτα. Υπάρχει μειωμένη σπαργή του δέρματος και ξηροί βλεννογόνοι.

Ποιο από τα παρακάτω φάρμακα δεν πρέπει να επανεκκινήσει κατά την έξοδο;

- α. Μετφορμίνη
- β. Λισινοπρίλη
- γ. Καναγλιφοζίνη
- δ. Glargine

Απάντηση: γ. Η καναγλιφοζίνη είναι η σωστή απάντηση, καθώς η εικόνα του ασθενούς συνάδει με ευγλυκαιμική διαβητική κετοξέωση από αναστολέα του συνμεταφορέα γλυκόζης νατρίου (SGLT-2). Η μετφορμίνη (απάντηση α) δεν αποτελεί τη σωστή απάντηση καθώς η κρεατινίνη του ασθενούς είναι 1,3. Μόλις αντιμετωπιστεί η διαβητική κετοξέωσή του, αυτό θα βελτιωθεί περαιτέρω και η μετφορμίνη μπορεί να ξαναρχίσει με ασφάλεια. Επιπλέον, δεδομένου ότι τα επίπεδα γαλακτικού του είναι φυσιολογικά, η μεταβολική οξέωσή του με χάσμα ανιόντων δεν σχετίζεται με γαλακτική οξέωση από τη μετφορμίνη. Η λισινοπρίλη (απάντηση β) δεν είναι σωστή, καθώς η αρτηριακή του πίεση είναι πιθανότατα χαμηλή-κανονική λόγω της διαβητικής κετοξέωσης και της αφυδάτωσης. Κατά την έξοδο θα πρέπει να είναι σε θέση να το ξαναρχίσει με ασφάλεια. Η Glargine (απάντηση δ) είναι λανθασμένη, καθώς οι περισσότεροι ασθενείς με ευγλυκαιμική διαβητική κετοξέωση από αναστολείς SGLT-2 έχουν σχετική ανεπάρκεια ινσουλίνης και αναπτύσσουν διαβητική κετοξέωση στο πλαίσιο διακοπής της ινσουλίνης. Αυτός ο ασθενής θα πρέπει να λαμβάνει ινσουλίνη μετά το εξιτήριο.

2. Ένας 56χρονος παχύσαρκος άνδρας εισήχθη και νοσηλεύεται στη μονάδα εντατικής θεραπείας (ΜΕΘ) για πνευμονία και σήψη. Κατά την εισαγωγή, τα επίπεδα γλυκόζης του ήταν αυξημένα, απαιτώντας έγχυση ινσουλίνης κατά τη διάρκεια της παραμονής του στη ΜΕΘ. Η αιμοσφαιρίνη A_{1c} (γλυκοζυλιωμένη αιμοσφαιρίνη- HbA_{1c}) που μετρήθηκε κατά την εισαγωγή ήταν 8,5%, αν και δεν είχε γνωστό ιστορικό διαβήτη. Ο τρέχων ρυθμός έγχυσης ινσουλίνης είναι 2 μονάδες/h και είναι σταθερός τις τελευταίες 2 ώρες. Η νεφρική λειτουργία έχει ομαλοποιηθεί. Πραγματοποίησε επιτυχώς μία μελέτη κατάποσης και

ανέχεται μια πλήρη διαίτα, αν και έχει μεγαλύτερη διακύμανση της γλυκόζης από τότε που άρχισε να τρώει. Ποιος από τους ακόλουθους τρόπους είναι ο καταλληλότερος για την διακοπή της συνεχούς στάγδην έγχυσης ινσουλίνης;

- α. Διακόψτε την συνεχή στάγδην έγχυση ινσουλίνης και ξεκινήστε ινσουλίνη σε κλίμακα (sliding scale)
- β. Διακόψτε την συνεχή στάγδην έγχυση ινσουλίνης και ξεκινήστε μετφορμίνη
- γ. Ξεκινήστε 48 μονάδες lantus κάθε βράδυ και σταματήστε τη συνεχή στάγδην έγχυση ινσουλίνης 2 ώρες μετά τη χορήγησή της
- δ. Ξεκινήστε τη χορήγηση 0,4 μονάδων/kg σωματικού βάρους ινσουλίνης καταμεμημένες σε 50% μακράς δράσης και 50% βραχείας δράσης και σταματήστε τη συνεχή στάγδην έγχυση ινσουλίνης 2 ώρες μετά τη χορήγηση της ινσουλίνης μακράς δράσης

Απάντηση: δ. Ασθενείς ηλικίας κάτω των 70 ετών με φυσιολογικό ρυθμό σπειραματικής διήθησης που δεν λάμβαναν προηγουμένως σταθερή δόση ινσουλίνης θα πρέπει να αρχίσουν να λαμβάνουν βασική ινσουλίνη bolus σε δόση 0,4 έως 0,5 μονάδες/kg σωματικού βάρους καταμεμημένη ως 50% βασική ινσουλίνη και 50% ινσουλίνη κατά τη διάρκεια του γεύματος. Η απάντηση α δεν είναι σωστή, διότι η χορήγηση ινσουλίνης με κλίμακα μόνο δεν είναι ποτέ κατάλληλη για τη διαχείριση του διαβήτη στο νοσοκομείο. Η απάντηση β δεν είναι σωστή, διότι οι από του στόματος παράγοντες και η προκαθορισμένη ινσουλίνη δεν είναι κατάλληλες επιλογές για το νοσοκομείο λόγω των πιθανών αλλαγών στη διατροφή και την ιατρική κατάσταση του ασθενούς. Η απάντηση γ δεν είναι σωστή, διότι η δόση ινσουλίνης του ασθενούς δεν πρέπει να υπολογίζεται με βάση τη συνεχή στάγδην έγχυση ινσουλίνης του, καθώς η συνεχής στάγδην έγχυση δεν είναι σταθερή για τουλάχιστον 6 ώρες. Επιπλέον, η βασική ινσουλινοθεραπεία χωρίς ινσουλίνη κατά τη διάρκεια του γεύματος δεν ενδείκνυται σε αυτόν τον ασθενή δεδομένου ότι σιτίζεται.

3. Ένας άνδρας 75 ετών εισάγεται στη ΜΕΘ μετά από επέμβαση Whipple που πραγματοποιήθηκε για καρκίνο του παγκρέατος. Έχει ιστορικό προϋπάρχοντος διαβήτη με χρήση μετφορμίνης και γλιπιζίδης πριν από την εισαγωγή. Μετά τη χειρουργική επέμβαση, τα επίπεδα γλυκόζης του παρέμειναν κάτω από 150 mg/dl μέχρι να αρχίσει η σίτιση με σωλήνα. Τα επίπεδα σακχάρου στο αίμα ελέγχονται τις τελευταίες 48 ώρες με NPH 14 μονάδες κάθε 8 ώρες, ενώ λαμβάνει Glucerna 1,5 στα 60 ml/h (περίπου 191 g υδατανθράκων σε 24 ώρες). Σήμερα το πρωί εμφανίσε κοιλιακή διάταση και η σίτιση με σωλήνα διακόπηκε πριν από μία ώρα (στις 9 π.μ.) με πλάνο να πραγματοποιηθεί αξονική τομογραφία κοιλίας. Έλαβε την πρωινή δόση NPH στις 8 π.μ. Το τρέχον επίπεδο γλυκόζης είναι 100 mg/dl. Ποιο από τα παρακάτω είναι το καταλληλότερο σχέδιο για την πρόληψη της υπογλυκαιμίας;

- α. Χορηγήστε τώρα μια αμπούλα δεξτρόζης 50% (D50) και παρακολουθήστε τη γλυκόζη ανά ώρα έως ότου μπορέσει να ξεκινήσει εκ νέου η σίτιση μέσω σωλήνα
- β. Ξεκινήστε διάλυμα φυσιολογικού ορού D5 στα 160 ml/h
- γ. Ξεκινήστε D10 στα 45 ml/h
- δ. Δεν χρειάζεται καμία παρέμβαση επειδή τα επίπεδα γλυκόζης είναι επί του παρόντος φυσιολογικά

Απάντηση: β. Ο ασθενής λαμβάνει Glucerna 1,5 με 191 g υδατανθράκων σε διάστημα 24 ωρών. Αυτό αντιστοιχεί σε περίπου 7 έως 8 g υδατανθράκων ανά ώρα. Η ισοδύναμη ποσότητα υδατανθράκων θα πρέπει να χορηγηθεί με υγρά που περιέχουν δεξτρόζη για την πρόληψη της υπογλυκαιμίας, δεδομένου ότι ο ασθενής έχει ήδη λάβει ινσουλίνη. Η χορήγηση D5 σε διάλυμα φυσιολογικού ορού στα 160 ml/h θα παρέχει την ισοδύναμη ποσότητα υδαταν-

θράκων ανά ώρα. Η απάντηση α δεν είναι σωστή, καθώς ο ασθενής δεν είναι υπογλυκαιμικός και επομένως δεν χρειάζεται D50 τώρα. Επιπλέον, εάν δεν του χορηγηθεί περαιτέρω γλυκόζη, είναι πολύ πιθανό να αναπτύξει υπογλυκαιμία. Η απάντηση γ δεν είναι σω-

στή καθώς το D10 στα 45 ml/h θα παρείχε μόνο 4,5 g γλυκόζης ανά ώρα. Η απάντηση δ δεν είναι σωστή, καθώς ο ασθενής διατρέχει σημαντικό κίνδυνο υπογλυκαιμίας με την αλλαγή της διατροφής.

ΚΕΦΑΛΑΙΟ 56

Επινεφριδιακή Ανεπάρκεια στον Βαρέως Πάσχοντα

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Ερωτήσεις Ανασκόπησης

1. Ποια είναι η συχνότερη αιτία δευτεροπαθούς επινεφριδιακής ανεπάρκειας;
- α. Λοίμωξη
 - β. Χορήγηση εξωγενών στεροειδών
 - γ. Χειρουργική αφαίρεση επινεφριδίων
 - δ. Δυσλειτουργία της υπόφυσης

Απάντηση: β. Η δευτεροπαθής επινεφριδιακή ανεπάρκεια οφείλεται σε μείωση της παραγωγής της αδρενοκορτικοτρόπου ορμόνης (ACTH) που προκαλείται είτε από νόσο του υποθαλάμου-υπόφυσης είτε από καταστολή του άξονα υποθαλάμου-υπόφυσης-επινεφριδίων ως αποτέλεσμα της θεραπείας με γλυκοκορτικοειδή. Παγκοσμίως, η λοιμώδης νόσος είναι η πιο συχνή αιτία πρωτοπαθούς επινεφριδιακής ανεπάρκειας. Η χειρουργική αφαίρεση των επινεφριδίων αποτελεί εξαιρετικά σπάνιο κλινικό περιστατικό και θα οδηγούσε σε πρωτοπαθή επινεφριδιακή ανεπάρκεια. Αν και η δυσλειτουργία της υπόφυσης οδηγεί σε δευτερογενή επινεφριδιακή ανεπάρκεια, η χορήγηση εξωγενών στεροειδών είναι η πιο κοινή αιτιολογία για δευτερογενή επινεφριδιακή ανεπάρκεια. Η σωστή απάντηση είναι η επιλογή β. Για κάθε ασθενή σε μονάδα εντατικής θεραπείας (ΜΕΘ) θα πρέπει να λαμβάνεται λεπτομερές φαρμακευτικό ιστορικό, για την αναζήτηση παρελθούσας ή παρούσας έκθεσης σε στεροειδή.

2. Ποιος είναι ο πρωταρχικός μηχανισμός του συνδρόμου καταπληξίας που σχετίζεται με την επινεφριδιακή ανεπάρκεια;
- α. Άμεση δράση γλυκοκορτικοειδών στον λείο μυ των αγγείων
 - β. Επιτρεπτική δράση των γλυκοκορτικοειδών στην αγγειοσυσπαστική δράση των κατεχολαμινών
 - γ. Μεταβολή των επιπέδων των προσταγλανδινών από τα γλυκοκορτικοειδή
 - δ. Προς τα άνω ρύθμιση των β-αδρενεργικών υποδοχέων από τα γλυκοκορτικοειδή
 - ε. Όλα τα παραπάνω

Απάντηση: ε. Το σύνδρομο καταπληξίας που σχετίζεται με την επινεφριδιακή ανεπάρκεια είναι σύνθετο και πολυπαραγοντικό. Η πλήρης ή σχετική ανεπάρκεια γλυκοκορτικοειδών επηρεάζει άμεσα και έμμεσα την κατάσταση όγκου, τον αγγειακό τόνο και την καρδιακή συσταλτικότητα. Οι καρδιαγγειακές επιδράσεις της επινεφριδιακής ανεπάρκειας σχετίζονται αλλά δεν περιορίζονται στις άμεσες δράσεις στον λείο μυ των αγγείων, στην επιτρεπτική επίδραση των γλυκοκορτικοειδών στην αγγειοσυσταλτική δράση των κατεχολαμινών, στη μεταβολή των επιπέδων των προσταγλανδινών και στην προς τα άνω ρύθμιση των β-αδρενεργικών υποδοχέων. Επομένως, η επιλογή ε (όλα τα παραπάνω) είναι η σωστή απάντηση.

3. Ποιος από τους ακόλουθους ασθενείς θα ήταν πιθανότερο να εμφανίσει επινεφριδιακή ανεπάρκεια μετά από μια σύνθετη χειρουργική επέμβαση στην κοιλία;
- α. Ασθενής με άσθμα που λαμβάνει εισπνεόμενα στεροειδή

β. Ασθενής με σηψηγατορροϊκή δερματίτιδα που λαμβάνει τοπική κρέμα στεροειδών

γ. Ασθενής με χρόνια αποφρακτική πνευμονοπάθεια που απαιτεί παλμική δόση (pulsedose) πρεδνιζόνης αρκετές φορές το χρόνο

δ. Ασθενής με υποτροπιάζουσα αναφυλαξία που απαιτεί θεραπεία μικρής διάρκειας με στεροειδή δύο φορές το χρόνο

Απάντηση: γ. Η έκθεση σε συστηματικά στεροειδή θέτει τους ασθενείς σε κίνδυνο για επινεφριδιακή ανεπάρκεια. Αυτό περιλαμβάνει την έκθεση μέσω διαφόρων οδών, συμπεριλαμβανομένων των δερματικών, εισπνεόμενων ή εντερικών. Όλες οι απαντήσεις που παρατίθενται μπορεί να θέσουν έναν βαρέως πάσχοντα ή τραυματισμένο ασθενή σε κίνδυνο ανάπτυξης επινεφριδιακής ανεπάρκειας. Η αυξημένη ισχύς και διάρκεια της έκθεσης σε γλυκοκορτικοειδή πιθανόν να αυξάνει τον κίνδυνο, και έτσι ο ασθενής που περιγράφεται στην επιλογή γ είναι πιθανότερο να αναπτύξει επινεφριδιακή ανεπάρκεια.

4. Ποια είναι η καταλληλότερη ακολουθία φροντίδας για έναν αιμοδυναμικά ασταθή ασθενή με υποψία επινεφριδιακής ανεπάρκειας;

α. Ισοτονικά υγρά, αγγειοσυσπαστικά, παρεντερικά στεροειδή, δοκιμασία κορτιζόλης ορού

β. Αγγειοσυσπαστικά, ισοτονικά υγρά, δοκιμασία κορτιζόλης ορού, παρεντερικά στεροειδή

γ. Δοκιμασία κορτιζόλης ορού, παρεντερικά στεροειδή, ισοτονικά υγρά, αγγειοσυσπαστικά

δ. Παρεντερικά στεροειδή, ισοτονικά υγρά, αγγειοσυσπαστικά, δοκιμασία κορτιζόλης ορού

Απάντηση: δ. Από τις ακολουθίες που παρατίθενται, η επιλογή δ είναι η καταλληλότερη ακολουθία φροντίδας. Η χορήγηση παρεντερικών στεροειδών και ισοτονικών υγρών πρέπει να γίνεται ταυτόχρονα. Η απόφαση σχετικά με τη χορήγηση αγγειοδραστικών φαρμάκων θα εξαρτηθεί από την ανταπόκριση του ασθενούς στα παρεντερικά στεροειδή και τα υγρά. Η δοκιμασία κορτιζόλης ορού δεν πρέπει ποτέ να λαμβάνει προτεραιότητα έναντι της ανάνηψης ενός ασθενούς με τεκμηριωμένη ή πιθανολογούμενη επινεφριδιακή ανεπάρκεια.

5. Ποιο από τα παρακάτω φάρμακα δεν έχει αποδειχθεί ότι προκαλεί επινεφριδιακή ανεπάρκεια;

α. Κετοконаζόλη

β. Προποφόλη

γ. Ετομιδάτη

δ. Ριφαμπικίνη

Απάντηση: β. Έχει τεκμηριωθεί ότι η κετοконаζόλη, η ετομιδάτη και η ριφαμπικίνη έχουν προκαλέσει επινεφριδιακή ανεπάρκεια. Η προποφόλη μπορεί να επηρεάσει την πραγματική μέτρηση της κορτιζόλης. Ωστόσο, οι ασθενείς που λαμβάνουν προποφόλη διατηρούν την ανταπόκριση στη δοκιμασία διέγερσης της κοσυντροπίνης. Επομένως, η σωστή απάντηση είναι η επιλογή β.

ΚΕΦΑΛΑΙΟ 57

Θυρεοειδικά Νοσήματα

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Ερωτήσεις Ανασκόπησης

1. Μια 42χρονη γυναίκα με άγνωστο ιατρικό ιστορικό μεταφέρθηκε στο τμήμα επείγοντων περιστατικών με ασθενοφόρο αφού βρέθηκε να σέρνεται σε ένα πεζοδρόμιο της πόλης έξω από ένα παντοπωλείο. Δεν ήταν σε θέση να δώσει ένα ουσιαστικό ιστορικό λόγω διανοητικής σύγχυσης. Τα ευρήματα της φυσικής εξέτασης περιελάμβαναν θερμοκρασία σώματος 38,7°C, καρδιακό ρυθμό 149 παλμούς/λεπτό, αναπνοές 34 αναπνοές/λεπτό, αρτηριακή πίεση 180/54 mmHg, αποπροσανατολισμό και διέγερση. Στον ορό δεν ανιχνεύθηκε αιθανόλη και το αποτέλεσμα της εξέτασης ούρων για ναρκωτικά ήταν αρνητικό. Άλλα αρχικά εργαστηριακά ευρήματα περιελάμβαναν νάτριο ορού 145, κάλιο 4,5, γλυκοζύχα 104, ολική περιεκτικότητα σε διοξείδιο του άνθρακα 27 mmol/L, γλυκόζη ορού 128, άζωτο ουρίας 24, κρεατινίνη 1,3 mg/dL, θυρεοτροπίνη ορού μικρότερη από 0,006 (εύρος αναφοράς 0,3-3,0) mIU/L και επίπεδο ελεύθερης θυροξίνης 4,9 (εύρος αναφοράς 0,6-1,6) ng/dL. Ο εντατικολόγος κατέληξε στο συμπέρασμα ότι η ασθενής παρουσίασε θυρεοτοξική κρίση («θυρεοειδική καταιγίδα»). Διαμορφώθηκε ένα άμεσο σχέδιο φαρμακοθεραπείας που περιελάμβανε τη χορήγηση ενός β-αδρενεργικού αναστολέα, μίας θειοναμίδης, ιωδιούχου νατρίου και δεξαμεθαζόνης. Ποια από τις ακόλουθες προειδοποιήσεις είναι πιο σημαντική όσον αφορά τη σειρά χορήγησης της αρχικής δόσης αυτών των θεραπευτικών παραγόντων;
α. Χορηγήστε το ιωδιούχο νάτριο πριν από τον β-αδρενεργικό αναστολέα
β. Χορηγήστε τη δεξαμεθαζόνη πριν από το ιωδιούχο νάτριο
γ. Χορηγήστε τη θειοναμίδα πριν από το ιωδιούχο νάτριο
δ. Χορηγήστε τον β-αδρενεργικό αναστολέα πριν από τη θειοναμίδα
ε. Χορηγήστε το ιωδιούχο νάτριο πριν από τη θειοναμίδα

Απάντηση: γ. Όλα τα αναφερόμενα φάρμακα έχουν πιθανό ρόλο στην επείγουσα θεραπεία του ασθενούς με θυρεοτοξική κρίση. Ο σκοπός ενός β-αδρενεργικού ανταγωνιστή είναι να αμβλύνει ορισμένες επιδράσεις στα τελικά όργανα που προκύπτουν από τη θυρεοτοξική κρίση. Η δεξαμεθαζόνη αναστέλλει την περιφερική μετατροπή της κυκλοφορούσας θυροξίνης στην πιο δραστική τριωδοθυρονίνη. Οι θειοναμίδες, όπως η μεθιμαζόλη και η προπυλοθειουρακίλη, αναστέλλουν τη σύνθεση των θυρεοειδικών ορμονών από τον θυρεοειδή. Ο σκοπός του ιωδιούχου νατρίου (ή άλλων αποδεκτών μορφών ιωδίου) στη θεραπεία της θυρεοειδικής καταιγίδας είναι να αποτρέψει την απελευθέρωση της ήδη συντεθειμένης θυροξίνης και τριωδοθυρονίνης από τον θυρεοειδή αδένα. Ωστόσο, χρησιμοποιώντας ως πρόσθετο υπόστρωμα, η χορήγηση ιωδίου ή ιωδιούχου μπορεί να διεγείρει την πρόσθετη σύνθεση θυρεοειδικών ορμονών εντός του θυρεοειδούς. Για να αποφευχθεί η επιδείνωση της θυρεοτοξικής κατάστασης, η αρχική δόση θειοναμίδης πρέπει να χορηγείται 1 έως 2 ώρες πριν από τη χορήγηση του ιωδιούχου νατρίου.

2. Μια 74χρονη γυναίκα βρέθηκε στο πάτωμα του σπιτιού της από έναν γείτονα. Δεν ήταν δυνατόν να ληφθεί άλλο ιστορικό. Στο τμήμα επείγοντων περιστατικών τα αρχικά ζωτικά της σημεία περιελάμβαναν θερμοκρασία στο ορθό 35,2°C, καρδιακό ρυθμό 46 παλμούς/λεπτό, αναπνοές 10 αναπνοές/λεπτό και αρτηριακή πίεση 145/83 mmHg. Η φυσική εξέταση έδειξε περικογχικό οίδημα, μια επουλωμένη χειρουργική ουλή στον τράχηλο, καθαρούς πνεύμονες, μαλακή κοιλία και οίδημα χωρίς εντόπωμα στην πρόσθια επιφάνεια της κνήμης. Ανταποκρινόταν στον έντονο απτικό ερεθισμό εντοπίζοντας τα ερεθίσματα και εκφέροντας περιστασιακά κάποιες ακατανόητες λεκτικές εκφράσεις. Η ανάλυση των αερίων του αρτηριακού αίματος που πραγματοποιήθηκε ενώ λάμβανε συμπληρωματικό οξυγόνο μέσω ρινικού σωληνίσκου έδειξε pH 7,10, μερική πίεση του αρτηριακού διοξειδίου του άνθρακα 78 torr και μερική πίεση του αρτηριακού οξυγόνου 144 torr. Μετά την ενδοτραχειακή διασωλήνω-

ση και την έναρξη του μηχανικού αερισμού, έγινε γνωστό το αποτέλεσμα της ανάλυσης θυρεοτροπίνης ορού, το οποίο ήταν 122 mIU/L. Λίγο αργότερα ανακοινώθηκε το αποτέλεσμα της ανάλυσης ελεύθερης θυροξίνης της ασθενούς, η οποία ήταν μη ανιχνεύσιμη. Διαμορφώθηκε ένα σχέδιο για την επείγουσα θεραπεία του μυξοιδηματικού κόματος. Εκτός από τη χορήγηση ενδοφλέβιας λεβοθυροξίνης, ποιος από τους ακόλουθους φαρμακολογικούς παράγοντες θα πρέπει να χορηγηθεί επείγοντως;
α. Υδροκορτιζόνη
β. Διάλυμα ιωδίου Lugol
γ. Εντερική λεβοθυροξίνη
δ. Ιοπανοϊκό οξύ
ε. Ενδοφλέβια δεξτροζή και ινσουλίνη

Απάντηση: α. Το μυξοιδηματικό κόμα είναι μια ακραία μορφή υποθυρεοειδισμού που αντιμετωπίζεται με υποκατάσταση θυρεοειδικών ορμονών, η οποία συνήθως συνίσταται σε λεβοθυροξίνη. Ο υποθυρεοειδισμός μπορεί, σε ορισμένες περιπτώσεις, να σχετίζεται με επινεφριδιακή ανεπάρκεια. Σε αυτές τις περιπτώσεις, η ανεπάρκεια των επινεφριδίων μπορεί να αντισταθμιστεί από τη γενική μείωση του βασικού μεταβολισμού που προκαλείται από τον υποκείμενο υποθυρεοειδισμό. Η χορήγηση λεβοθυροξίνης αναμένεται να αποκαταστήσει τον μεταβολικό ρυθμό και θα μπορούσε έτσι να αυξήσει τις απαιτήσεις σε κορτικοστεροειδή και να οδηγήσει στην ανάπτυξη οξείας επινεφριδιακής ανεπάρκειας. Η εμπειρική χορήγηση υδροκορτιζόνης συνιστάται ως μέσο πρόληψης της πιθανής επιπλοκής της επινεφριδιακής κρίσης.

3. Ποιο από τα ακόλουθα πρότυπα θυρεοειδικών ορμονών είναι πιθανότερο να παρατηρηθεί σε έναν βαρέως πάσχοντα ασθενή με σύνδρομο μη θυρεοειδικής νόσου (σύνδρομο ευθυρεοειδικού ασθενούς);
α. Χαμηλή ολική τριωδοθυρονίνη, υψηλή ολική θυροξίνη, υψηλή ελεύθερη θυροξίνη, υψηλή θυρεοτροπίνη
β. Υψηλή ολική τριωδοθυρονίνη, χαμηλή ολική θυροξίνη, χαμηλή ελεύθερη θυροξίνη, χαμηλή θυρεοτροπίνη
γ. Φυσιολογική ολική τριωδοθυρονίνη, χαμηλή ολική θυροξίνη, χαμηλή ελεύθερη θυροξίνη, φυσιολογική θυρεοτροπίνη
δ. Φυσιολογική ελεύθερη τριωδοθυρονίνη, υψηλή ολική θυροξίνη, φυσιολογική ελεύθερη θυροξίνη, υψηλή θυρεοτροπίνη
ε. Χαμηλή ελεύθερη τριωδοθυρονίνη, χαμηλή ολική θυροξίνη, χαμηλή ελεύθερη θυροξίνη, φυσιολογική θυρεοτροπίνη

Απάντηση: ε. Ασθενείς χωρίς ιστορικό προηγούμενης θυρεοειδικής νόσου και χωρίς σημεία ή συμπτώματα που να παραπέμπουν σε θυρεοειδική δυσλειτουργία, αλλά οι οποίοι αναπτύσσουν κρίσιμη μη θυρεοειδική νόσο συχνά βρίσκονται να έχουν μία ή περισσότερες παθολογικές εξετάσεις θυρεοειδικής λειτουργίας. Η συχνότητα αυτής της κατάστασης, που είναι γνωστή ως σύνδρομο ευθυρεοειδικού ασθενούς ή σύνδρομο μη θυρεοειδικής νόσου, συσχετίζεται με τη βαρύτητα της οξείας νόσου. Η πιο συχνή ανωμαλία των δοκιμασιών θυρεοειδικής λειτουργίας είναι η καταστολή της ολικής ή της ελεύθερης τριωδοθυρονίνης (T_3). Οι πιο βαρέως πάσχοντες ασθενείς συχνά παρουσιάζουν χαμηλές τιμές T_3 , θυροξίνης (T_4) και θυρεοτροπίνης (TSH). Τα επίπεδα της ελεύθερης T_4 είναι λιγότερο πιθανό να είναι χαμηλά σε σύγκριση με τα επίπεδα της ολικής T_4 σε αυτούς τους ασθενείς. Τα επίπεδα της T_4 μπορεί μερικές φορές να αυξηθούν παροδικά ελαφρά κατά την πρώιμη φάση της κρίσιμης νόσου. Τα επίπεδα της TSH μπορεί ομοίως να είναι ελαφρώς αυξημένα κατά την πρώιμη φάση και επίσης παροδικά αυξημένα κατά τη φάση της ανάρρωσης. Τα επίπεδα της αντίστροφης T_3 είναι συχνά αυξημένα σε ασθενείς σε κρίσιμη κατάσταση με μη θυρεοειδική νόσο. Άλλα παράγοντες, όπως η ταυτόχρονη χρήση ορισμένων φαρμάκων, μπορεί να επηρεάσουν τα επίπεδα των θυρεοειδικών ορμονών σε βαρέως πάσχοντες ασθενείς χωρίς θυρεοειδική νόσο.

ΚΕΦΑΛΑΙΟ 58

Κώμα

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Ερωτήσεις Ανασκόπησης

1. Μια γυναίκα 72 ετών προσκομίζεται στο τμήμα επειγόντων περιστατικών (ΤΕΠ) από την κόρη της λόγω μεταβολής της νοητικής της κατάστασης. Η ασθενής διαπιστώθηκε ότι είχε οξεία έναρξη σύγχυσης, διέγερσης και διαταραχής βάδισης. Το ιατρικό της ιστορικό περιλαμβάνει υπέρταση, αϋπνία και κατάθλιψη (μετά το θάνατο του συζύγου της πριν από 3 μήνες). Η ασθενής λαμβάνει υδροχλωροθειαζίδη, αμιτριπτυλίνη και χαμηλή δόση ασπιρίνης (παιδική ασπιρίνη) και πρόσφατα άρχισε να λαμβάνει φλουοξετίνη. Τα ζωτικά της σημεία έχουν ως εξής: θερμοκρασία 37,7°C (100°F), σφυγμοί 120 παλμοί/λεπτό, αρτηριακή πίεση (ΑΠ) 130/85 mmHg, αναπνοές 16 αναπνοές/λεπτό. Η φυσική εξέταση είναι θετική για σύγχυση, αταξία, διεσταλμένες κόρες, ξηρούς βλεννογόνους και ταχυκαρδία. Τα εργαστηριακά αποτελέσματα εκκρεμούν. Το ηλεκτροκαρδιογράφημα (ΗΚΓ) αποκαλύπτει ταχυκαρδία με παράταση του διαστήματος QT. Τα αποτελέσματα της εξέτασης ούρων με ταινία είναι εντός των φυσιολογικών ορίων. Ποια είναι η πιο πιθανή αιτία της οξείας αλλαγής της νοητικής κατάστασης;

- α. Υπερδοσολογία σαλικυλικών
- β. Τοξικότητα από τρικυκλικά αντικαταθλιπτικά (ΤΚΑ)
- γ. Σήψη από ουρολοίμωξη (UTI)
- δ. Οξεία δηλητηρίαση με αιθανόλη

Απάντηση: β. Η φλουοξετίνη αναστέλλει το κυτόχρωμα 2D6, γεγονός που θα προκαλέσει αύξηση των επιπέδων των ΤΚΑ. Τα σημεία και τα συμπτώματα της υπερδοσολογίας από ΤΚΑ περιλαμβάνουν αντιχολινεργικές επιδράσεις, διέγερση, ανησυχία, αταξία, ταχυκαρδία, παράταση του διαστήματος QT, υπερθερμία και σπασμούς. Η σήψη από ουρολοίμωξη είναι δυνατή αλλά μη πιθανή με το αποτέλεσμα του δείγματος ούρων εντός των φυσιολογικών ορίων. Ένα οξύ παρεγκεφαλιδικό εγκεφαλικό επεισόδιο ή μια οξεία δηλητηρίαση από αιθανόλη θα εξηγούσε ορισμένα αλλά όχι όλα τα κλινικά ευρήματα.

2. Σας ζητείται να δείτε μία ασθενή 36 ετών στα ΤΕΠ με ιστορικό επιληψίας. Είναι ληθαργική για περισσότερες από 6 ώρες και παρουσιάζει δεξιά ημιπάρεση, που περιλαμβάνει το πρόσωπο, το χέρι και το πόδι. Η αξονική τομογραφία (CT) εγκεφάλου είναι φυσιολογική. Οι διασώστες έχουν ήδη χορηγήσει γλυκόζη, θειαμίνη και ναλοξόνη χωρίς καμία βελτίωση. Ποιος από τους ακόλουθους παράγοντες αντενδείκνυται σε αυτή την περίπτωση;

- α. Λοραζεπάμη
- β. Φωσφαινοϋτίνη
- γ. Φλουμαζενίλη
- δ. Βαλπροϊκό οξύ

Απάντηση: γ. Ένας ασθενής με ιστορικό επιληψίας, εστιακά κλινικά σημεία, φυσιολογική αξονική τομογραφία και ληθαργική κατάσταση στο ΤΕΠ βρίσκεται σε επιληπτική κατάσταση χωρίς σπασμούς (nonconclusive status epilepticus-NCSE) μέχρι να αποδειχθεί το αντίθετο. Αν και το εγκεφαλικό επεισόδιο είναι μια πιθανότητα, μια φυσιολογική αξονική τομογραφία σε έναν ασθενή με εστιακά νευρολογικά σημεία θα πρέπει να αποκλείει την ενδοκρανιακή αιμορραγία ή το εγκεφαλικό έμφρακτο. Όλα τα αντιεπιληπτικά που αναφέρθηκαν θα μπορούσαν να χρησιμοποιηθούν με διαδοχική σειρά με στόχο τη διακοπή της NCSE. Η φλουμαζενίλη, από την άλλη πλευρά, ένας ανταγωνιστής των υποδοχέων του γ-αμινοβουτυρικού οξέος (GABA), αντενδείκνυται σε αυτή την περίπτωση, καθώς θα επιδείνωνε τη συνεχιζόμενη επιληπτική δραστηριότητα.

3. Ένας άνδρας 45 ετών προσκομίζεται στο ΤΕΠ μετά από σύγκρουση με μηχανοκίνητο όχημα κατά την οποία υπέστη κλειστή κρανιοεγκεφαλική κάκωση. Η αρχική βαθμολογία του στην Κλίμακα Κώματος Γλασκώβης (GCS) ήταν 6. Διασωληνώθηκε και εισήχθη στη μονάδα εντατικής θεραπείας (ΜΕΘ). Οκτώ

ώρες αργότερα ο ασθενής παραμένει σε κώμα. Ποιο από τα παρακάτω θεωρείται αξιόπιστος προγνωστικός παράγοντας κακής έκβασης στους 6 μήνες;

- α. Αριθμός και θέση των καταγμάτων του κρανίου
- β. Αρχικά αυξημένη ενδοκρανία πίεση (ICP) που απαιτεί κοιλιοστομία για την ομαλοποίηση της ICP
- γ. Αρχικά κακή προγνωστική εικόνα ηλεκτροεγκεφαλογραφήματος (HEG) με φυσιολογικά σωματοαισθητικά προκλητά δυναμικά
- δ. Απουσία αντίδρασης της κόρης και οφθαλμικών κινήσεων στις 24 ώρες

Απάντηση: δ. Οι πιο αξιόπιστοι προγνωστικοί παράγοντες της έκβασης στους 6 μήνες μετά από κρανιοεγκεφαλική κάκωση περιλαμβάνουν την ηλικία, τη βαθμολογία GCS, την αντίδραση της κόρης, την κινητική ανταπόκριση στην 1η εβδομάδα και την ανεξέλεγκτα αυξημένη ICP. Η έλλειψη αντίδρασης της κόρης στις 24 ώρες προβλέπει θάνατο ή φυτική κατάσταση στο 90% των ασθενών. Ο μηχανισμός της κρανιοεγκεφαλικής κάκωσης, η παρουσία ή απουσία καταγμάτων του κρανίου και η έκταση άλλων εξωκρανιακών κακώσεων έχουν μικρή επίδραση στην έκβαση. Τα αρχικά ευρήματα κακής πρόγνωσης στο HEG με φυσιολογικά σωματοαισθητικά προκλητά δυναμικά εξακολουθούν να επιτρέπουν την πιθανότητα νευρολογικής ανάρρωσης και ο ασθενής πρέπει να υποστηρίζεται επιθετικά. Όσον αφορά τη χρήση του αρχικού βαθμού νευρολογικού ελλείμματος, οι ασθενείς με κώμα από τραυματικά αίτια έχουν πιο πλήρη ανάρρωση από ό,τι οι ασθενείς με ιατρικό κώμα. Αν και η ανεξέλεγκτα αυξημένη ICP αποτελεί αξιόπιστο δείκτη κακής νευρολογικής έκβασης, το ίδιο δεν ισχύει για την αρχικά αυξημένη ICP (που ελέγχεται αμέσως με επέμβαση κοιλιοστομίας).

4. Μια 58χρονη γυναίκα εισάγεται λόγω μεταβολής της νοητικής κατάστασης. Κατά την εξέταση, η βαθμολογία GCS της είναι 8, έχει χαλαρή αριστερή ημιπάρεση και τα μάτια της παρουσιάζουν συζυγή απόκλιση του βλέμματος προς τα δεξιά με τη δεξιά κόρη διατεταμένη στα 6 mm, σταθερή και μη αντιδρώσα. Ποιος παθοφυσιολογικός μηχανισμός είναι πιθανότερο να σχετίζεται με αυτή την κλινική εικόνα;

- α. Υποδρεπανικός εγκολεασμός από αριστερά προς τα δεξιά
- β. Δεξιός προς τα κάτω διασκηνιδιακός εγκολεασμός
- γ. Ενδοκοιλιακή αιμορραγία με υδροκέφαλο
- δ. Μη ραγέν ανεύρυσμα της δεξιάς οπίσθιας αναστομωτικής αρτηρίας

Απάντηση: β. Η ασθενής αυτή παρουσιάζει κλασικά σημεία μαζικού εμφράκτου του δεξιού εγκεφάλου με εγκεφαλικό οίδημα και προς τα κάτω διασκηνιδιακό εγκολεασμό. Η κωματώδης κατάσταση εξηγείται από τη διάταξη του δικτυωτού ενεργοποιητικού συστήματος που προκαλείται από τη μετατόπιση από τα δεξιά προς τα αριστερά των δομών της μέσης γραμμής (διάμεσος εγκέφαλος). Η αριστερή ημιπάρεση εξηγείται από τη δυσλειτουργία ή τον τραυματισμό της πυραμидικής οδού, και η απόκλιση του βλέμματος εξηγείται από την μη αντιρροπούμενη ενεργοποίηση των αριστερών μετωπιαίων οφθαλμικών περιοχών που μετατοπίζουν τους οφθαλμούς προς τα δεξιά (ο ασθενής κοιτάζει προς τη βλάβη). Η δεξιά κόρη είναι διεσταλμένη λόγω της διάταξης του κρανιακού νεύρου III και της επακόλουθης παράλυσης. Η ενδοκοιλιακή αιμορραγία από μόνη της με υδροκέφαλο δεν θα εξηγούσε τα εστιακά ευρήματα που παρατηρούνται σε αυτή την περίπτωση. Παρομοίως, ένα μη ραγέν ανεύρυσμα της οπίσθιας αναστομωτικής θα εκδηλωθεί μόνο με παράλυση ή τραυματισμό του κρανιακού νεύρου III, αλλά όχι με μεταβολές της νοητικής κατάστασης, εξαναγκασμένη απόκλιση του βλέμματος ή ημιπάρεση. Αυτό θα ήταν, ωστόσο, ένα επείγον ιατρικό περιστατικό που θα απαιτούσε περαιτέρω διερεύνηση, όπως αξονική αγγειογραφία ή αγγειογραφία μαγνητικού συντονισμού και αποκατάσταση του ανευρύσματος.

ΚΕΦΑΛΑΙΟ 59

Νευρολογικά Κριτήρια Θανάτου στους Ενήλικες

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Ερωτήσεις Ανασκόπησης

1. Ένας άνδρας 67 ετών υπέστη αναπνευστική ανακοπή στο νοσοκομείο. Βρέθηκε από το νοσηλευτικό προσωπικό χωρίς να ανταποκρίνεται, χωρίς σφυγμό ή αρτηριακή πίεση, με άγνωστο χρόνο παραμονής σε αυτή την κατάσταση. Ο ασθενής διασωληνώθηκε και η ομάδα ανταπόκρισης ξεκίνησε την εφαρμογή των μέτρων αναζωογόνησης με βάση την Προηγμένη Καρδιαγγειακή Υποστήριξη Ζωής (Advanced Cardiac Life Support-ACLS). Στη μονάδα εντατικής θεραπείας (ΜΕΘ), ο ασθενής αναπτύσσει τονικές σπασμωδικές κινήσεις των άνω άκρων με οποιοδήποτε ερέθισμα. Οι κινήσεις αυτές δεν σταματούν με την έγχυση βενζοδιαζεπίνης ή προποφόλης. Κατά την εξέταση, τα κρανιακά νεύρα είναι άθικτα, αλλά δεν ανταποκρίνεται σε οπτικά ή ακουστικά ερεθίσματα. Ο κύκλος ύπνου/αφύπνισης διατηρείται. Τα ευρήματα της εξέτασης και η κατάστασή του παραμένουν για 1 μήνα κατά τη διάρκεια του οποίου ο ασθενής αερίζεται χρονίως αλλά είναι αιμοδυναμικά σταθερός. Ποιο από τα παρακάτω περιγράφει καλύτερα την κατάσταση αυτού του ασθενούς;
- α. Ο ασθενής είναι εγκεφαλικά νεκρός
 - β. Αυτός ο ασθενής βρίσκεται σε επίμονη φυτική κατάσταση (persistent vegetative state-PVS)
 - γ. Η διάγνωση αυτής της κατάστασης μπορεί να τεθεί 1 εβδομάδα μετά την αρχική προσβολή
 - δ. Αυτοί οι ασθενείς συνήθως δεν έχουν ενδείξεις ακράτειας της ουροδόχου κύστης ή του εντέρου

Απάντηση: β. Ο ασθενής σε αυτή την ερώτηση βρίσκεται σε κατάσταση PVS. Είναι σε κώμα αλλά διατηρεί τη λειτουργία του εγκεφαλικού στελέχους· επομένως δεν μπορεί να είναι εγκεφαλικά νεκρός. Η PVS εμφανίζεται συνήθως μετά από ανοξική ή τραυματική εγκεφαλική βλάβη. Διαφέρει από τον εγκεφαλικό θάνατο με πολλούς τρόπους. Πρώτον, η λειτουργία του εγκεφαλικού στελέχους παραμένει άθικτη στην PVS. Οι ασθενείς αυτοί δεν θεωρούνται επίσης ιατρικά ή νομικά νεκροί. Μια διεπιστημονική ομάδα εργασίας ορίζει την PVS ως «μια κατάσταση πλήρους άγνοιας του εαυτού και του περιβάλλοντος». Όπως αναφέρθηκε, η λειτουργία του εγκεφαλικού στελέχους ή η αυτόνομη λειτουργία παραμένουν ανέπαφες. Οι ασθενείς αυτοί δεν παρουσιάζουν εκούσιες, αναπαραγώγιμες ή σκόπιμες αντιδράσεις σε ερεθίσματα. Δεν έχουν καμία γλωσσική κατανόηση ή έκφραση. Επίσης, παρουσιάζουν ακράτεια. Τα αντανάκλαστικά της σπονδυλικής στήλης διατηρούνται σε ποικίλο βαθμό.

2. Η άπνοια αποτελεί ένα από τα διαγνωστικά κριτήρια του εγκεφαλικού θανάτου. Ποιο από τα παρακάτω είναι πιο σωστό όσον αφορά τη δοκιμασία άπνοιας και τον εγκεφαλικό θάνατο;
- α. Ο στόχος της αρτηριακής μερικής πίεσης του διοξειδίου του άνθρακα (P_{aCO_2}) είναι πάνω από 60 mm Hg
 - β. Σε ασθενείς με χρόνια αποφρακτική πνευμονοπάθεια (ΧΑΠ) με εικαζόμενη υποξική αναπνευστική διέγερση, τα επίπεδα P_{aO_2} πρέπει να αφήνονται να μειωθούν σε λιγότερο από 50 mm Hg πριν από τη δοκιμασία
 - γ. Θα πρέπει πάντα να ξεκινά κανείς τη δοκιμασία με φυσιολογικό pH και φυσιολογική κυψελδική μερική πίεση οξυγόνου (P_{aO_2})
 - δ. Η δοκιμασία θα πρέπει να διαρκεί 10 λεπτά και να συνεχίζεται με ήπιο αποκορεσμό (80%-90%) ή ήπια υπόταση (80-90 mm Hg συστολική)

Απάντηση: γ. Όλα τα δημοσιευμένα κριτήρια για τον εγκεφαλικό θάνατο περιλαμβάνουν τη μη αναστρεψιμότητα της εγκεφαλικής βλάβης, την απουσία νευρολογικής λειτουργίας, τη χρήση πρόσθετων επιβεβαιωτικών εξετάσεων και την παρουσία άπνοιας. Επειδή οι περισσότεροι ασθενείς αερίζονται, η παρουσία άπνοιας τεκμηριώνεται με αποτυχία της φυσιολογικής διέγερσης της αναπνοής από ένα προκαθορισμένο επίπεδο $PaCO_2$. Αυτό μπορεί να είναι δύσκολο ή σε ορισμένους ασθενείς αδύνατο (π.χ. ΧΑΠ, πνευμονοπάθεια). Επομένως, αν και ένα επίπεδο $PaCO_2$ άνω των

60 mm Hg είναι αποδεκτό σε ασθενείς με φυσιολογικούς πνεύμονες, το επίπεδο αυτό μπορεί να μην είναι κατάλληλο για όλες τις περιπτώσεις. Αν και ορισμένοι ασθενείς μπορεί να χρειάζονται ένα επίπεδο υποξαιμίας για τη διέγερση της αναπνοής (π.χ. επίπεδο $PaO_2 < 50$ mm Hg), αυτό δεν πρέπει να επιτρέπεται κατά τη διάρκεια της δοκιμής. Επιπλέον, δεν πρέπει να επιτρέπονται επεισόδια υπότασης κατά τη διάρκεια της δοκιμής. Εάν συμβεί κάτι τέτοιο, η δοκιμή πρέπει να διακοπεί και η υπόταση να διορθωθεί. Σε περίπτωση που οι ασθενείς δεν είναι κατάλληλοι για τη δοκιμασία άπνοιας, θα πρέπει να χρησιμοποιούνται άλλες επιβεβαιωτικές δοκιμασίες.

3. Μια 27χρονη ισπανόφωνη γυναίκα φτάνει σε νοσοκομείο της επαρχίας με πολλαπλές κλειστές κρανιοεγκεφαλικές κακώσεις μετά από σύγκρουση με αυτοκίνητο. Επιπλέον, η ασθενής έχει πολλαπλές εσωτερικές κοιλιακές κακώσεις που προκάλεσαν αθρόα αιμορραγία και παρατεταμένη υπόταση πριν από την ανάνηψη στον τόπο του ατυχήματος. Η αρχική αξονική τομογραφία (CT) της κεφαλής δείχνει πολλαπλές μικρές θλάσεις. Η ασθενής διαγνώστηκε με μέτρια έως σοβαρή ανοξική εγκεφαλική βλάβη. Παρέμεινε στη ΜΕΘ υποστηριζόμενη με μηχανικό αερισμό και αγγειοσυσπαστική υποστήριξη μετά την αρχική ανάνηψη και τη χειρουργική επέμβαση για την επίσχεση της εσωτερικής αιμορραγίας. Κατά τη νευρολογική εξέταση, τα αντανάκλαστικά του εγκεφαλικού στελέχους απουσίαζαν. Ποιο από τα ακόλουθα αφορά περαιτέρω εξετάσεις επιβεβαίωσης του εγκεφαλικού θανάτου;
- α. Η πιο ευαίσθητη εξέταση παραμένει η εγκεφαλική αγγειογραφία που τεκμηριώνει την απουσία ενδοεγκεφαλικής πλήρωσης στο διχασμό της καρωτίδας ή στον κύκλο του Willis
 - β. Η ανεύρεση ισοηλεκτρικού ηλεκτροεγκεφαλογράφηματος (HEG) σε μία εξέταση αποτελεί εξαιρετικά ειδική και ευαίσθητη εξέταση για τη διάγνωση του εγκεφαλικού θανάτου
 - γ. Τα ευρήματα του διακρανιακού Doppler (transcranial doppler-TCD) στον εγκεφαλικό θάνατο περιλαμβάνουν απουσία ή αναστροφή της ροής κατά τη συστολή και απότομη διαστολική κίνηση προς τα πάνω
 - δ. Τα σωματοαισθητικά προκλητά δυναμικά (somatosensory evoked potentials-SEP), τα οποία ελέγχουν την ακεραιότητα των αισθητηριακών οδών, είναι εξαιρετικά ευαίσθητες και ειδικές δοκιμασίες για τον εγκεφαλικό θάνατο
 - ε. Το σπινθηρογράφημα εγκεφάλου με τεχνήτιο ^{99m}Tc HM-PAO) δείχνει ταχεία πρόσληψη του ισότοπου σε μη λειτουργικές περιοχές του εγκεφάλου που συνάδουν με εγκεφαλικό θάνατο

Απάντηση: α. Αν και δεν απαιτούνται απαραίτητα για τη διάγνωση του εγκεφαλικού θανάτου, οι πρόσθετες επιβεβαιωτικές εξετάσεις μπορεί να είναι χρήσιμες. Η πιο ευαίσθητη εξέταση είναι η εγκεφαλική αγγειογραφία. Στα ευρήματα που συνάδουν με τον εγκεφαλικό θάνατο περιλαμβάνεται η έλλειψη ενδοεγκεφαλικής πλήρωσης στο επίπεδο του καρωτιδικού διχασμού ή του κύκλου του Willis. Η παρουσία ηλεκτροεγκεφαλικής σιγής στο ηλεκτροεγκεφαλογράφημα κατά τη διάρκεια μίας μελέτης 30 λεπτών παραμένει το διαγνωστικό κριτήριο του HEG για τον εγκεφαλικό θάνατο. Ωστόσο, η διάγνωση δεν πρέπει να βασίζεται μόνο σε ένα αποτέλεσμα εξέτασης HEG. Τα SEP είναι αμφιλεγόμενα. Οι ασθενείς σε εμμένουσα φυτική κατάσταση μπορεί να έχουν ευρήματα παρόμοια με εκείνα του εγκεφαλικού θανάτου. Το TCD είναι μη επεμβατικό και μπορεί να γίνει παρά την κλίνη. Η εξέταση απαιτεί έναν έμπειρο χειριστή και μπορεί να επηρεαστεί από τις μεταβολές της $PaCO_2$, του αιματοκρίτη και της καρδιακής παροχής. Τα συμβατά με εγκεφαλικό θάνατο ευρήματα του TCD περιλαμβάνουν απουσία ή αναστροφή της ροής στη διαστολή (όχι στη συστολή) και απότομη συστολική (όχι διαστολική) κίνηση προς τα πάνω, ή μικρές αιχμηρές κυματομορφές πάνω ή πάνω και κάτω

από τη βασική γραμμή στην αρχή της συστολής. Η απεικόνιση με ^{99m}Tc HM-PAO δεν δείχνει πρόσληψη του ισοτόπου στο εγκεφαλικό παρέγχυμα μετά από εγκεφαλικό θάνατο. Η αναφερόμενη καλή ευαισθησία (94%) και ειδικότητα (100%) αυτής της εξέτασης και η καλή συσχέτιση με την αγγειογραφία καθιστούν τη δοκιμασία αυτή υποψήφια πρότυπη εξέταση στο μέλλον.

4. Ποια από τις ακόλουθες συνθήκες δεν θα απέκλειε μια οριστική διάγνωση εγκεφαλικού θανάτου;
- α. Επίπεδο νατρίου ορού 120 mg/dL
 - β. Θερμοκρασία 35°C
 - γ. Αρτηριακή πίεση 180/90 mm Hg
 - δ. Χρήση σις-ατρακούριου για νευρομυϊκό αποκλεισμό
 - ε. Επίπεδο αλκοόλης ορού 209 mg/dL

Απάντηση: γ. Για τη διάγνωση του εγκεφαλικού θανάτου πρέπει να απουσιάζουν ορισμένοι παράγοντες, ώστε να μην τίθενται σε κίνδυνο τα αποτελέσματα της εξέτασης του εγκεφαλικού θανάτου. Οι παράγοντες αυτοί περιλαμβάνουν την απουσία (1) υποθερμίας, (2) δηλητηρίασης, (3) κατασταλτικών φαρμάκων, (4) νευρομυϊκού αποκλεισμού, (5) ηλεκτρολυτικών διαταραχών, (6) διαταραχών οξεοβασικής ισορροπίας και (7) ενδοκρινικών κρίσεων.

5. Ένας 28χρονος άνδρας με πολυσυστηματικό τραύμα που περιελάμβανε την κεφαλή εισήχθη στη ΜΕΘ. Παρέμεινε σε κώμα για 3 ημέρες, ανέπτυξε σοβαρή υποξία και σύνδρομο οξείας αναπνευστικής δυσχέρειας (ARDS), χρειάστηκε συνεχή έγχυση νοραδρεναλίνης για τη διατήρηση πίεσης εγκεφαλικής αιμάτωσης μεγαλύτερης των 60 mm Hg και ανέπτυξε ενδοκρανιακή υπέρταση με ενδοκρανιακές πιέσεις (ICP) στα μέσα της δεκάδας των 30, που διατηρήθηκαν παρά την κατάλληλη προηγμένη θερμορύθμιση (υποθερμία στους 33°C), την έγχυση πεντοβαρβιτάλης και τις φαρμακολογικές παρεμβάσεις με υπεροσμωτικά και υπερτονικά διαλύματα. Έχει εκτεταμένο τραύμα στο πρόσωπο και στο πλαίσιο της αρχικής αντιμετώπισης τοποθετήθη-

κε επείγοντως τραχειοστομία. Επί του παρόντος δεν έχει καμία ανταπόκριση στον εν τω βάθει πόνο, δεν έχει αντανακλαστικά εγκεφαλικού στελέχους, αλλά οι κόρες των οφθαλμών δεν μπορούσαν να εξεταστούν λόγω του οφθαλμικού οιδήματος, και δεν έχει καμία κινητική ανταπόκριση, όπως αποδεικνύεται από τον κύριο νευροχειρουργό και έναν νευρολόγο με συμβουλευτικό ρόλο. Ποια από τις παρακάτω ενέργειες είναι η καλύτερη αυτή τη στιγμή;

- α. Συνεχίστε την τρέχουσα διαχείριση και τοποθεήστε γαστροστομία για μακροχρόνια φροντίδα
- β. Πραγματοποιήστε μια δοκιμασία άπνοιας
- γ. Επαναθερμάνετε σε νορμοθερμία και ζητήστε ένα HEG
- δ. Είναι εγκεφαλικά νεκρός και επομένως η ομάδα μπορεί να τον «αναγγείλει» νεκρό και να τον στείλει για δωρεά οργάνων
- ε. Επαναθερμάνετε σε νορμοθερμία και ζητήστε μια εγκεφαλική αγγειογραφία ή μια απεικόνιση εγκεφαλικής αιμάτωσης

Απάντηση: ε. Αυτός ο ασθενής έχει υποστεί καταστροφική εγκεφαλική βλάβη. Η εξέτάσή του δείχνει ότι μπορεί κάλλιστα να είναι εγκεφαλικά νεκρός. Η συνεχιζόμενη ιατρική φροντίδα μπορεί να είναι αναποτελεσματική και οι γιατροί φαίνεται να έχουν εξαντλήσει όλες τις διαθέσιμες θεραπείες. Ωστόσο, δεν μπορούμε να εξετάσουμε αυτή τη διάγνωση, καθώς βρίσκεται επί του παρόντος υπό θεραπευτική υποθερμία και έλαβε πεντοβαρβιτάλη. Μια δοκιμασία άπνοιας, μόλις επαναθερμανθεί και δεν λαμβάνει πεντοβαρβιτάλη, μπορεί να είναι ιδανική, αλλά πιθανότατα δεν θα την ανεχθεί (υποξία και υπόταση). Μια επιβεβαιωτική εξέταση, όπως μια αγγειογραφία εγκεφάλου ή μια απεικόνιση αιμάτωσης, θα μπορούσε να πραγματοποιηθεί σε αυτή την περίπτωση με βάση το εκτεταμένο τραύμα του προσώπου και την αδυναμία εξέτασης των συστατικών των αντανακλαστικών του εγκεφαλικού στελέχους (κόρες) και άλλων συγγενικών παραγόντων, όπως η έκθεση σε πεντοβαρβιτάλη. Ένα HEG στην περίπτωση αυτή μπορεί να δώσει ψευδώς θετικό αποτέλεσμα.

ΚΕΦΑΛΑΙΟ 60

Εγκεφαλικό Επεισόδιο

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Ερωτήσεις Ανασκόπησης

1. Ένας 58χρονος ασθενής με ιστορικό υπέρτασης και παροξυσμικής κολλικής μαρμαρυγής (ΚΜ) εισάγεται στο τμήμα επειγόντων περιστατικών (ΤΕΠ) για νεοεμφανιζόμενη σφαιρική αφασία και πάρεση στη δεξιά πλευρά του προσώπου, στο χέρι και στο πόδι από 3 ωρών. Η βαθμολογία της κλίμακας National Institutes of Health Stroke Scale (NIHSS) είναι 18. Η μόνη θεραπευτική επιλογή που σχετίζεται με βελτιωμένη λειτουργική έκβαση στους 3 μήνες είναι ποια από τις ακόλουθες;
- α. Ενδοφλέβια (IV) συνεχής στάδην χορήγηση ηπαρίνης
 - β. Ανασυνδυσασμένος ενεργοποιητής ιστικού πλασμινογόνου (tPA)
 - γ. Ενδοαρτηριακή χορήγηση tPA
 - δ. Θεραπευτική επαγόμενη υποθερμία

Απάντηση: β. Η ενδοφλέβια θρομβόλυση με ανασυνδυσασμένο tPA είναι η μόνη παρέμβαση που σχετίζεται με βελτιωμένη λειτουργική έκβαση στους 3 μήνες. Η μελέτη του 1995 των Εθνικών Ινστιτούτων Νευρολογικών Διαταραχών (National Institutes of Neurological Disorders-NINDS) κατέδειξε επίδραση στη λειτουργική έκβαση αλλά όχι στη θνητότητα στους 3 μήνες. Οι μεταγενέστερες μελέτες και η εκ νέου ανάλυση επιβεβαίωσαν αυτό το ισχυρό αποτέλεσμα. Η ηπαρίνη μπορεί να μην ενδείκνυται σε παροξυσμικό εγκεφαλικό επεισόδιο σχετιζόμενο με ΚΜ, τουλάχιστον τις πρώτες ημέρες, λόγω του υψηλότερου κινδύνου αιμορραγικής μετατροπής. Η ενδοαρτηριακή θρομβόλυση με tPA έχει μελετηθεί σε αυτό το πλαίσιο. Υπάρχουν ορισμένα ενδιάμεσα αποτελέσματα που δείχνουν ότι τα ποσοστά επανασηράγωσης είναι καλύτερα, χωρίς ουσιαστική μετάφραση στην έκβαση. Η υποθερμία δεν έχει συσχετιστεί με βελτιωμένη έκβαση στο ισχαιμικό εγκεφαλικό επεισόδιο, αλλά τρέχουσες δοκιμές εξετάζουν αυτή την υπόθεση.

2. Ποιο από τα παρακάτω δεν αποτελεί αντένδειξη για τη χορήγηση ενδοφλέβιας tPA εντός του παραθύρου των 3 έως 4,5 ωρών;
- α. Προηγούμενο εγκεφαλικό επεισόδιο
 - β. Ιστορικό σακχαρώδη διαβήτη
 - γ. Μη ραγέν ανεύρυσμα
 - δ. Ηλικία άνω των 80 ετών

Απάντηση: γ. Το ιστορικό μη ραγέντος ή θεραπευμένου εγκεφαλικού ανeurysματος δεν αποτελεί αντένδειξη για τη χορήγηση ενδοφλέβιας tPA. Ωστόσο, πρέπει να είναι κανείς προσεκτικός για να διαπιστώσει εάν ο λόγος εισαγωγής ή τα νευρολογικά συμπτώματα σχετίζονται με ρήξη εγκεφαλικού ανeurysματος (π.χ. ο χειρότερος πονοκέφαλος της ζωής του, υπαραχνοειδής αιμορραγία στην αξονική τομογραφία [CT]). Η ηλικία άνω των 80 ετών, το ιστορικό προηγούμενου ισχαιμικού εγκεφαλικού επεισοδίου, ο σακχαρώδης διαβήτης και η αντιπηκτική αγωγή (ακόμη και αν το διεθνές κανονικοποιημένο πηλίκο [INR] είναι $< 1,7$) αποτελούν αντενδείξεις για τη χορήγηση ενδοφλέβιας tPA εντός του παραθύρου 3 έως 4,5 ωρών.

3. Ποιο από τα παρακάτω δεν αυξάνει την πιθανότητα αιμορραγικής μετατροπής μετά από ισχαιμικό εγκεφαλικό επεισόδιο;
- α. Σακχαρώδης διαβήτης
 - β. Μη ελεγχόμενη υπέρταση
 - γ. Χαμηλότερη βαθμολογία στο NIHSS
 - δ. Θρομβοπενία

Απάντηση: γ. Η βαθμολογία στο NIHSS σχετίζεται ευθέως ανάλογα με τον κίνδυνο αιμορραγικής μετατροπής. Αυτό σημαίνει ότι τα μεγαλύτερα εγκεφαλικά επεισόδια σχετίζονται με υψηλότερο κίνδυνο αιμορραγικής μετατροπής. Η υπεργλυκαιμία, η μη ελεγχόμενη υπέρταση και η θρομβοπενία αποτελούν ανεξάρτητους προγνωστικούς παράγοντες αιμορραγικής μετατροπής μετά από εγκεφαλικό έμφρακτο. Ο κίνδυνος αυξάνεται με τη χορήγηση ενδοφλέβιας tPA.

4. Ποια από τις ακόλουθες είναι η καλύτερη επιλογή θεραπείας για το εγκεφαλικό οίδημα που σχετίζεται με χαμηλότερη θνητότητα και βελτιωμένη λειτουργική έκβαση σε μια γυναίκα 48 ετών με μεγάλο έμφρακτο της αριστερής μέσης εγκεφαλικής αρτηρίας δευτεροπαθώς λόγω διαχωρισμού της αριστερής έσω καρωτίδας;
- α. Στοχευμένη διαχείριση της θερμοκρασίας για την πρόκληση υποθερμίας
 - β. Αποσυμπίεστική ημικρανιεκτομή
 - γ. Υπέρτονος φυσιολογικός ορός
 - δ. Υπεροσμωτική θεραπεία

Απάντηση: β. Η μόνη παρέμβαση, βάσει τριών μεγάλων τυχαίοποιημένων κλινικών δοκιμών, που σχετίζεται με βελτίωση της θνητότητας και της λειτουργικής έκβασης για το μεγάλο ημισφαιρικό έμφρακτο (επίσης γνωστό ως κακώθες εγκεφαλικό επεισόδιο της μέσης εγκεφαλικής αρτηρίας) είναι η αποσυμπίεστική ημικρανιεκτομή. Όλες οι άλλες παρεμβάσεις σχετίζονται με βελτιωμένα αποτελέσματα όσον αφορά το εγκεφαλικό οίδημα, την ενδοκράνια πίεση και τις εγκεφαλικές επιπλοκές, αλλά όχι όσον αφορά τη θνητότητα ή τη λειτουργική έκβαση.

ΚΕΦΑΛΑΙΟ 61

Μυασθένεια Gravis και Σύνδρομο Guillain-Barré

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Ερωτήσεις Ανασκόπησης

1. Ένας άνδρας 45 ετών παρουσίασε διαρροϊκή νόσο με χαμηλό πυρετό που διήρκεσε 4 ημέρες. Μία εβδομάδα αργότερα, παρατήρησε «μυρμήγκιασμα» και μούδιασμα στα πόδια του, ακολουθούμενο από αδυναμία στα πόδια. Την επόμενη ημέρα δεν μπορούσε να περπατήσει και πήγε στο τμήμα επειγόντων περιστατικών. Εισάγεται στη μονάδα εντατικής θεραπείας (ΜΕΘ) λόγω επικείμενης αναπνευστικής ανεπάρκειας. Η εξέτασή του αναδεικνύει χαλαρότητα των χεριών και των ποδιών του. Η οσφυονωτιαία παρακέντηση δείχνει αριθμό λευκών αιμοσφαιρίων 3 κύτταρα/ml, πρωτεΐνη 95 mg/dL, επίπεδο γλυκόζης 80 mg/dL και είναι αρνητική στην καλλιέργεια. Η μελέτη νευρικής αγωγιμότητας δείχνει επιβράδυνση με αυξημένο λανθάνοντα χρόνο. Το ηλεκτρομυογράφημα είναι φυσιολογικό. Η θεραπεία εκλογής περιλαμβάνει ποιο από τα ακόλουθα;

- α. Αζαθειοπρίνη
- β. Ενδοφλέβια ανοσοσφαιρίνη (IVIg) ακολουθούμενη από πλασμαφαίρεση
- γ. Πλασμαφαίρεση
- δ. Πρεδνιζόνη
- ε. Πυριδοστιγμίνη

Απάντηση: γ. Πρόκειται για περίπτωση συνδρόμου Guillain-Barré (GBS), μιας αυτοάνοσης νόσου που προσβάλλει ομόλογους επιτόπους στο περιφερικό νεύρο. Χαρακτηρίζεται από μια απομυελινωτική διαδικασία που έχει ως αποτέλεσμα την επιβράδυνση της ταχύτητας αγωγιμότητας των νευρών και σχετίζεται με λευκοματωκυτταρικό διχασμό με αύξηση της πρωτεΐνης του εγκεφαλονωτιαίου υγρού χωρίς πλειοκυττάρωση. Το GBS ακολουθεί μια προηγούμενη λοίμωξη του ανώτερου αναπνευστικού σε ποσοστό περίπου 38% των ασθενών, αν και σε ποσοστό περίπου 24% των περιπτώσεων μπορεί να προηγείται διαρροϊκό σύνδρομο. Το GBS δεν ανταποκρίνεται στα κορτικοστεροειδή και στη μακροχρόνια ανοσοκαταστολή με φάρμακα όπως η αζαθειοπρίνη. Ανταποκρίνεται τόσο στην IVIg όσο και στην πλασμαφαίρεση, αν και ο συνδυασμός δεν έχει αποδειχθεί ότι βελτιώνει την έκβαση, αλλά αυξάνει το κόστος περίθαλψης. Η πυριδοστιγμίνη, ένας αναστολέας της ακετυλοχολινεστεράσης, ενδείκνυται στη μυασθένεια gravis, αλλά δεν έχει ρόλο στη θεραπεία του GBS.

2. Ποιο από τα παρακάτω είναι λιγότερο πιθανό να επισπεύσει την αναπνευστική ανεπάρκεια σε ασθενή με μυασθένεια gravis;

- α. Αζιθρομυκίνη
- β. Κεφεπίμη
- γ. Γενταμικίνη
- δ. Πρεδνιζόνη
- ε. Βεραπαμίλη

Απάντηση: β. Υπάρχει ένας μακρύς κατάλογος φαρμάκων που μπορεί να επιδεινώσουν την αδυναμία σε ασθενείς με μυασθένεια gravis. Κυριότερα από αυτά είναι οι αναστολείς διαύλων ασβεστίου, οι β-αποκλειστές, οι αντιαρρυθμικοί παράγοντες και τα αντιβιοτικά όπως οι αμινογλυκοσίδες, οι μακρολίδες και οι φθοριοκινολόνες. Άλλοι περιλαμβάνουν τα ανθελονσιακά, τα κορτικοστεροειδή και τα αντιεπιληπτικά όπως η καρβαμαζεπίνη, η γκαμπαπεντίνη και η φενυτοΐνη. Οι κεφαλοσπορίνες, ωστόσο, είναι καλά ανεκτές.

3. Ένας άνδρας 65 ετών, βάρους 70 κιλών και με ύψος 1,80 μ. διαγιγνώσκεται με μυασθένεια gravis και λαμβάνει αυξανόμενες δόσεις πυριδοστιγμίνης. Εισάγεται στη ΜΕΘ με πτώσεις, δυσκολία στην κατάποση και έχει ήπια δύσπνοια. Τα ζωτικά του σημεία περιλαμβάνουν θερμοκρασία 38,5°C, καρδιακή συχνότητα 85 παλμούς/λεπτό, αρτηριακή πίεση 150/80 mm Hg, αναπνευστική συχνότητα 16 αναπνοές/λεπτό και κορεσμό οξυγόνου 96%. Οι αναπνευστικοί ήχοι του είναι φυσιολογικοί και η ακτινογραφία θώρακα δεν παρουσιάζει διηθήματα. Είναι σε θέση να κινεί όλα τα άκρα, αλλά παρουσιάζει ήπια κόπωση σε επαναλαμβανόμενες δοκιμασίες των δελτοειδών του. Η σπирομέτρηση με σπιρόμετρο χειρός δείχνει αρνητική εισπνευστική δύναμη ίση με -50 cm H₂O και ζωτική χωρητικότητα ίση με 1,8 L. Ποιο από τα παρακάτω είναι η καλύτερη άμεση θεραπεία;

- α. Κορτικοστεροειδή
- β. Ενδοτραχειακή διασωλήνωση
- γ. IVIg
- δ. Πλασμαφαίρεση
- ε. Πυριδοστιγμίνη

Απάντηση: ε. Ο ασθενής αυτός παρουσιάζει σημεία μυασθενικής κρίσης και η πιο άμεση θεραπεία για βελτίωση θα ήταν η χορήγηση ενός αναστολέα της ακετυλοχολινεστεράσης. Δεν παρουσιάζει σημεία υπερθεραπείας με χολινεργική κρίση, τα οποία θα περιλάμβαναν βραδυκαрдία, διάρροια και βρογχόρροια, και υπάρχουν λίγοι κίνδυνοι από τη χορήγηση περισσότερης πυριδοστιγμίνης. Σε μια μυασθενική κρίση, τα στεροειδή μπορεί να ενδείκνυνται, αλλά μπορεί να επιδεινώσουν τα συμπτώματα. Η πλασμαφαίρεση ή η IVIg μπορεί να ενδείκνυται αλλά δεν θα έχει άμεσο αποτέλεσμα για τη βελτίωση των συμπτωμάτων του. Η ενδοτραχειακή διασωλήνωση θα πρέπει πάντα να εξετάζεται σε έναν ασθενή σε μυασθενική κρίση· ωστόσο, εάν ο ασθενής δεν βρίσκεται σε αναπνευστική δυσχέρεια, η σπирομέτρηση με σπιρόμετρο χειρός μπορεί να βοηθήσει στον προσδιορισμό της ανάγκης για διασωλήνωση. Μια αρνητική εισπνευστική δύναμη μικρότερη από 20 cmH₂O ή ζωτική χωρητικότητα μικρότερη από 20 mL/kg θα αποτελούσαν ενδείξεις για άμεση διασωλήνωση. Αυτό δεν ισχύει στην περίπτωση αυτού του ασθενούς. Η θεραπεία με πυριδοστιγμίνη μπορεί να βοηθήσει στην αποφυγή της ανάγκης διασωλήνωσης· ωστόσο, ο ασθενής θα πρέπει να παρακολουθείται συνεχώς για σημεία επιδείνωσης.

ΚΕΦΑΛΑΙΟ 62

Επιληπτικές Κρίσεις στον Βαρέως Πάσχοντα

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Ερωτήσεις Ανασκόπησης

1. Ένας άνδρας 69 ετών παρουσιάζεται στο τμήμα επειγόντων περιστατικών μετά από τρεις ειδωθείσες από άλλους γενικευμένες τονικοκλονικές επιληπτικές κρίσεις που ξεκίνησαν 1 ώρα πριν από την άφιξη. Παρόλο που δεν έχει πλέον σπασμούς, ο ασθενής δεν έχει επιστρέψει ακόμη στο βασικό επίπεδο νοητικής κατάστασης. Ποιο από τα παρακάτω φάρμακα θα πρέπει να είναι η θεραπεία πρώτης γραμμής για αυτόν τον ασθενή;

- α. Διαζεπάμη 5 mg IV
- β. Λεβετιρακετάμη 1500 mg IV
- γ. Λοραζεπάμη 0,1 mg/kg IV
- δ. Φαινυντοΐνη 20 mg/kg IV

Απάντηση: γ. Ο ασθενής είχε τρεις επιληπτικές κρίσεις χωρίς βελτίωση της νοητικής του κατάστασης, πληρώντας τα κριτήρια για status epilepticus. Η συνεργατική μελέτη Veterans Affairs Status Epilepticus Cooperative Study επιβεβαίωσε ότι η λοραζεπάμη είναι ο πιο αποτελεσματικός παράγοντας για τον τερματισμό των επιληπτικών κρίσεων σε σύγκριση με τη διαζεπάμη ή τη φαινυντοΐνη. Η λεβετιρακετάμη δεν έχει ακόμη αποδειχθεί αποτελεσματικός παράγοντας πρώτης γραμμής για τον τερματισμό του status epilepticus.

2. Μια 82χρονη γυναίκα τρόφιμος οίκου ευγηρίας με ιστορικό χρόνιας νεφρικής ανεπάρκειας, υπέρτασης και κοιλιακής μαρμαρυγής έχει εισαχθεί στη μονάδα εντατικής θεραπείας (ΜΕΘ) για θεραπεία πνευμονίας. Η ασθενής χρειάστηκε διασωλήνωση κατά την προσέλευσή της λόγω υποξαιμικής αναπνευστικής ανεπάρκειας. Έχει λάβει αντιβιοτικά για 3 ημέρες με υποχώρηση του πυρετού, της λευκοκυττάρωσης και έχει πλέον απογαλακτιστεί επιτυχώς από την αγγειοσυσπαστική υποστήριξη. Την 3η ημέρα νοσηλείας δεν έχει ακόμη αφυπνιστεί, μετά τη διακοπή των ηρεμιστικών για περισσότερες από 24 ώρες. Ποιο από τα παρακάτω αυξάνει περισσότερο τον κίνδυνο εμφάνισης επιληπτικής κατάστασης (status epilepticus) χωρίς σπασμούς;

- α. Χρόνια νεφρική ανεπάρκεια
- β. Μεγάλη ηλικία
- γ. Χορήγηση βανκομυκίνης
- δ. Σηπτική καταπληξία

Απάντηση: δ. Παρόλο που ο Oddo και οι συνεργάτες του¹² διαπίστωσαν ότι η χρόνια νεφρική ανεπάρκεια αποτελεί παράγοντα κινδύνου για υποκλινικές επιληπτικές κρίσεις σε ασθενείς παθολογικής ΜΕΘ, οι πολυπαραγοντικές αναλύσεις αποκάλυψαν ότι η σηπτική καταπληξία είναι ο μόνος ανεξάρτητος προγνωστικός παράγοντας, με έως και 32% των ασθενών αυτών να έχουν παθολογικά συνεχή ηλεκτροεγκεφαλογραφήματα (cEEG). Τα αντιβιοτικά που σχετίζονται με τη μείωση του ουδού των επιληπτικών κρίσεων περιλαμβάνουν τις πενικιλίνες, τις καρβαπενέμες και την κεφεπίμη.

3. Μια γυναίκα 25 ετών έχει εισαχθεί στη ΜΕΘ για την αντιμετώπιση ανθεκτικής επιληπτικής κατάστασης (status epilepticus). Κατά τα άλλα είναι υγιής, αλλά άρχισε να εμφανίζει αλλαγές στην προσωπικότητά της 2 εβδομάδες πριν από την προσέλευση. Παρουσίασε την πρώτη γενικευμένη τονικοκλονική κρίση πριν από 2 ημέρες και έχει εξελιχθεί σε επιληπτική κατάσταση χωρίς σπασμούς στο cEEG, ανθεκτική στις βενζοδιαζεπίνες, τη φαινυντοΐνη, τη φαινοβαρβιτάλη, τη λεβετιρακετάμη και σε μια έγχυση προποφόλης. Η αξονική τομογραφία κεφαλής (CT) κατά την εισαγωγή της δεν έδειξε οξείες ή χρόνιες ανωμαλίες και τα αποτελέσματα των τοξικολογικών εξετάσεων ήταν αρνητικά. Ποιες από τις ακόλουθες μελέτες θα πρέπει να πραγματοποιηθούν στη συνέχεια;

- α. Ανάλυση εγκεφαλονωτιαίου υγρού (ENY)
- β. Μαγνητική τομογραφία (MRI) εγκεφάλου
- γ. Αξονική τομογραφία θώρακος/κοιλίας/πυέλου
- δ. Ψυχιατρική αξιολόγηση

Απάντηση: α. Η ασθενής αυτή εμφανίζει νεοεμφανιζόμενη ανθεκτική επιληπτική κατάσταση άγνωστης αιτιολογίας. Τα προηγούμενα ψυχιατρικά συμπτώματα υποδηλώνουν ένα φαινόμενο από το μεταιχμιακό σύστημα. Αν και η μαγνητική τομογραφία εγκεφάλου θα μπορούσε να δείξει μεσοκροταφικές ανωμαλίες που υποδηλώνουν αυτοάνοση μεταιχμιακή εγκεφαλίτιδα, είναι σημαντικό να αποκλειστεί οποιαδήποτε λοιμώδης αιτιολογία, όπως η ερπητική εγκεφαλίτιδα, πριν από την έναρξη ανοσοκατασταλτικών θεραπειών, όπως τα στεροειδή. Θα πρέπει επίσης να ζητηθεί μια σειρά αντισωμάτων αυτοάνοσης εγκεφαλίτιδας από το ENY καθώς και τον ορό, αλλά η ανοσοθεραπεία δεν θα πρέπει να καθυστερήσει εν αναμονή αυτών των μελετών, τα αποτελέσματα των οποίων μπορεί να καθυστερήσουν έως και 3 εβδομάδες.

ΚΕΦΑΛΑΙΟ 63

Κακώσεις Κεφαλής

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Ερωτήσεις Ανασκόπησης

1. Ένας συνάδελφος σας αναφέρει ότι η βαθμολογία της Κλίμακας Κώματος της Γλασκώβης (GCS) ενός ασθενούς είναι E (άνοιγμα των οφθαλμών) 3, V (λεκτική ανταπόκριση) 4, M (κινητική ανταπόκριση) 5. Πώς θα το ερμηνεύατε αυτό;
- α. Οι οφθαλμοί ανοίγουν στον πόνο, είναι προσανατολισμένος, αποσύρει στα επώδυνα ερεθίσματα
 - β. Οι οφθαλμοί ανοίγουν αυθόρμητα, είναι προσανατολισμένος, ακολουθεί εντολές
 - γ. Οι οφθαλμοί ανοίγουν στη φωνή, είναι σε σύγχυση, αποσύρει στα επώδυνα ερεθίσματα
 - δ. Οι οφθαλμοί ανοίγουν στη φωνή, είναι σε σύγχυση, εντοπίζει τα επώδυνα ερεθίσματα
 - ε. Οι οφθαλμοί ανοίγουν αυθόρμητα, η ομιλία είναι ακατάλληλη, αποσύρει στα επώδυνα ερεθίσματα

Απάντηση: δ. Ανατρέξτε στην ενότητα «Κλίμακα Κώματος Γλασκώβης» και στον Πίνακα 66.1.

2. Ποια από τις ακόλουθες θεραπευτικές επιλογές συνιστάται για την αντιστροφή της βαρφαρίνης σε ασθενείς με τραυματική ενδοεγκεφαλική αιμορραγία;
- α. Ανασυνδυασμένος παράγοντας VIIa (rFVIIa) και αιμοπετάλια
 - β. Βιταμίνη K και θειική πρωταμίνη
 - γ. Βιταμίνη K και συμπυκνώματα συμπλόκου προθρομβίνης (prothrombin complex concentrates-PCC)
 - δ. rFVIIa και δεσμοπρεσίνη
 - ε. PCC και idarucizumab

Απάντηση: γ. Ανατρέξτε στην ενότητα «Αντιπηκτική Αγωγή».

3. Η πίεση της εγκεφαλικής αιμάτωσης μπορεί να οριστεί ως ποιο από τα ακόλουθα; Οι συντομογραφίες είναι MABP (mean arterial blood pressure), μέση αρτηριακή αιματική πίεση, CVR (cerebrovascular resistance), εγκεφαλοαγγειακή αντίσταση, ICP (intracranial pressure), ενδοκράνια πίεση.
- α. MABP - CVR
 - β. MABP + ICP
 - γ. (MABP - ICP)/CVR
 - δ. MABP – ICP

Απάντηση: δ. Ανατρέξτε στην ενότητα «Δευτερογενής Κρανιοεγκεφαλική Κάκωση».

4. Ποιες από τις ακόλουθες τιμές-στόχους συνιστούν οι κατευθυντήριες οδηγίες του 2016 του Brain Trauma Foundation σε σοβαρή τραυματική εγκεφαλική βλάβη;

- α. ICP < 20 mm Hg και CPP > 70 mm Hg
- β. ICP < 22 mm Hg και CPP 60 έως 70 mm Hg
- γ. ICP < 20 mm Hg και CPP 60 έως 70 mm Hg
- δ. ICP < 22 mm Hg και CPP > 70 mm Hg
- ε. ICP < 22 mm Hg και CPP 50-60 mm Hg

Απάντηση: β. Ανατρέξτε στις ενότητες «Πίεση Εγκεφαλικής Αιμάτωσης» και «Διαχείριση Ενδοκράνιας Υπέρτασης».

5. Τα αντιεπιληπτικά φάρμακα όπως η φαινυτοΐνη και η λεβετιρακετάμη έχει αποδειχθεί ότι μειώνουν τη συχνότητα εμφάνισης πρώιμων μετατραυματικών επιληπτικών κρίσεων. Η επίδραση αυτή δεν έχει βρεθεί ότι επεκτείνεται πέραν ποιου χρονικού διαστήματος;
- α. 12 ώρες
 - β. 1 ημέρα
 - γ. 1 εβδομάδα
 - δ. 1 μήνας
 - ε. 1 έτος

Απάντηση: γ. Ανατρέξτε στην ενότητα «Προφύλαξη από Επιληπτικές Κρίσεις».

ΚΕΦΑΛΑΙΟ 64

Εντατική Θεραπεία των Ασθενών με Εκτεταμένα Εγκαύματα

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Ερωτήσεις Ανασκόπησης

1. Σε ασθενείς με σοβαρού βαθμού εγκαύματα συνολικής επιφάνειας σώματος (TBSA) μεγαλύτερης ή ίσης με 40%, ποια από τις ακόλουθες είναι η πιο συχνή πρόωμη και οξεία αιματολογική ανωμαλία;
- α. Θρομβοπενία
 - β. Λευκοπενία
 - γ. Αναιμία
 - δ. Αιμοσυμπύκνωση

Απάντηση: δ. Στην οξεία φάση, η πιο συχνή ειδική για το έγκαυμα αιματολογική ανωμαλία που αντιμετωπίζουν οι εντατικολόγοι είναι η αιμοσυμπύκνωση. Σε μεγάλα εγκαύματα, τα επίπεδα αιματοκρίτη συχνά υπερβαίνουν το 60%. Η αιμοσυμπύκνωση που αποτυγχάνει να ομαλοποιηθεί κατά τη διάρκεια μιας αναζωογόνησης με υγρά μπορεί να είναι ενδεικτική υποαναζωογόνησης. Μια αντιδραστική λευκοκυττάρωση είναι συχνή αμέσως μετά τα εγκαύματα, αντανακλώντας μια γενικευμένη αντίδραση στο στρες. Σε ποσοστό έως και 46% των ασθενών, ακολουθείται από σχετική λευκοπενία. Η θρομβοπενία (ορίζεται ως $<150.000/\mu\text{l}$ αίματος) έχει αναφερθεί ότι εμφανίζεται σε ποσοστό έως και 60% των εγκαυμάτων. Γενικά, στη συνέχεια, μια αντιδραστική λευκοκυττάρωση και θρομβοκυττάρωση θεωρούνται φυσιολογικές σωματικές απαντήσεις στο στρες των εγκαυμάτων και σε μια ποικιλία επακόλουθων φυσιολογικών προσβολών κατά τη διάρκεια της περίθαλψης του εγκαυματία.

2. Η οξεία νεφρική βλάβη (ONB) εμφανίζεται σε βαρέως πάσχοντες ασθενείς με μεγάλα εγκαύματα (πάνω από 40% της συνολικής επιφάνειας του σώματος) περίπου σε ποιο ποσοστό των περιπτώσεων;
- α. 2%
 - β. 25%
 - γ. 10%
 - δ. 50%

Απάντηση: β. Ιστορικά, ο επιπολασμός της ONB μεταξύ των εγκαυματιών ήταν δύσκολο να προσδιοριστεί, λόγω της έλλειψης ενός τυποποιημένου ορισμού. Αυτό που έχει τεκμηριωθεί καλά είναι η συσχέτισή της με εξαιρετικά υψηλή θνητότητα. Κατά την τελευταία δεκαετία, έχουν εφαρμοστεί τυποποιημένοι ορισμοί της ONB στον πληθυσμό των εγκαυματιών. Μια πρόσφατη συνολική ανασκόπηση καθόρισε ότι η ONB εμφανιζόταν στο 25% των ασθενών μεταξύ των εγκαυματιών και σχετιζόταν με μια μέση θνητότητα 35% όταν οριζόταν από την ταξινόμηση συναίνεσης Risk, Injury, Failure, Loss, and End-stage renal disease (RIFLE). Μεταξύ εκείνων που χρειάστηκαν θεραπεία νεφρικής υποκατάστασης (RRT), η θνητότητα αναφέρθηκε στο 80%.

ΚΕΦΑΛΑΙΟ 65

Δηλητηριάσεις

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Ερωτήσεις Ανασκόπησης

1. Ένας ασθενής 28 ετών βρέθηκε αναισθητός σε ένα πάρκο. Στο τμήμα επειγόντων περιστατικών, τα ζωτικά του σημεία ήταν: καρδιακή συχνότητα 62 παλμοί/λεπτό, αρτηριακή πίεση 88/40 mmHg, αναπνευστική συχνότητα 10 αναπνοές/λεπτό και θερμοκρασία 36,6°C. Παρατηρήθηκε ότι είχε μικρές κόρες που αντιδρούσαν ελάχιστα και δεν απέσυρε από τον πόνο σε κανένα άκρο. Ο γιατρός του τμήματος επειγόντων περιστατικών χορήγησε 0,2 mg ναλοξόνης χωρίς αποτέλεσμα. Κλήθηκε ο εντατικολόγος για εκτίμηση και εισαγωγή. Ποια από τις ακόλουθες ενέργειες είναι η καταλληλότερη παρέμβαση αυτή τη στιγμή;
- α. Χορήγηση νορεπινεφρίνης
 - β. Διασωλήνωση του ασθενούς
 - γ. Χορήγηση μεγαλύτερης δόσης ναλοξόνης
 - δ. Χορήγηση φλουμαζενίλης

Απάντηση: γ. Η εικόνα του ασθενούς είναι κλασική εικόνα τοξικού συνδρόμου από οπιοειδή με κατασταλμένο επίπεδο συνείδησης, αναπνευστική καταστολή και μύση. Το επόμενο βήμα στη φροντίδα του ασθενούς είναι η χορήγηση υψηλότερων δόσεων ναλοξόνης για την αξιολόγηση της ανταπόκρισης, δεδομένου ότι πολλά συνθετικά οπιοειδή όπως η μεθαδόνη, η οξυκωδόνη και η φαιντανύλη απαιτούν υψηλότερες δόσεις για την αναστροφή των επιδράσεών τους. Παρόλο που μπορεί να εξεταστεί το ενδεχόμενο διασωλήνωσης, συνήθως δεν απαιτείται εάν επιτευχθεί επαρκής αποκατάσταση της εγρήγορσης με τη ναλοξόνη. Η υπόταση ανταποκρίνεται συχνά στα υγρά και τη ναλοξόνη και τα αγγειοσυσπαστικά θα πρέπει να διαφυλάσσονται για ανθεκτικές περιπτώσεις. Η φλουμαζενίλη δεν θα πρέπει να χορηγείται λόγω της πιθανότητας επιληπτικών κρίσεων και η κλινική εικόνα είναι πιο συμβατή με υπερδοσολογία οπιοειδών.

2. Ένας άνδρας 40 ετών εισάγεται στη ΜΕΘ μετά από κατάποση συνολικά 60 δισκίων ακεταμινοφαίνης των 500 mg και 50 δισκίων υδροκωδόνης/ακεταμινοφαίνης (5 mg/325 mg) σε πολλαπλές περιπτώσεις κατά τις τελευταίες 48 ώρες. Είναι ληθαργικός αλλά αφυπνίζεται. Τα ζωτικά του σημεία είναι αρτηριακή πίεση 118/70 mmHg, καρδιακή συχνότητα 96 παλμοί/λεπτό, αναπνευστική συχνότητα 18 αναπνοές/λεπτό και θερμοκρασία 37°C. Τα επίπεδα ακεταμινοφαίνης είναι 50 µg/ml. Τα αποτελέσματα των εξετάσεων ηπατικής λειτουργίας είναι ολική χολερυθρίνη 1,0 mg/dL, αλανινική αμινοτρανσφεράση 100 IU/L, ασπαρτική αμινοτρανσφεράση 85 IU/L και αλκαλική φωσφατάση 110 IU/L. Ποια από τις παρακάτω παρεμβάσεις είναι η καταλληλότερη;
- α. Ελέγξτε το νομόγραμμα Rumack-Matthew για να προσδιορίσετε την ανάγκη χορήγησης N-ακετυλοκυστεΐνης
 - β. Συνεχίστε την υποστηρικτική φροντίδα και παρακολουθήστε τα αποτελέσματα των εξετάσεων ηπατικής λειτουργίας
 - γ. Ξεκινήστε θεραπεία με N-ακετυλοκυστεΐνη
 - δ. Χορηγήστε λακτουλόζη

Απάντηση: γ. Οι ενδείξεις για πλήρη αγωγή με N-ακετυλοκυστεΐνη σε αυτόν τον ασθενή με τις πολλαπλές λήψεις ακεταμινοφαίνης σε βάθος χρόνου είναι η παρουσία οποιουδήποτε επιπέδου ακεταμινοφαίνης και οι αυξημένες τρανσαμινάσες. Το νομόγραμμα Rumack-Matthew δεν βοηθά σε αυτή την περίπτωση, διότι αναπτύχθηκε για μεμονωμένες οξείες λήψεις σε ασθενείς που παρουσιάζονται εντός 24 ωρών. Η συνέχιση της υποστηρικτικής φροντίδας και της παρακολούθησης χωρίς τη χορήγηση N-ακετυλοκυστεΐνης θα είχε πιθανότατα ως αποτέλεσμα τη συνεχιζόμενη επιδείνωση της ηπατικής βλάβης. Η ηπατική βλάβη δεν είναι επαρκής σε αυτό το σημείο για να προκαλέσει ηπατική εγκεφαλοπάθεια, οπότε η λακτουλόζη για τη βελτίωση της νοητικής κατάστασης δεν θα ήταν χρήσιμη.

3. Μια γυναίκα 65 ετών εισάγεται στη μονάδα εντατικής θεραπείας (ΜΕΘ) με υπόταση. Ο σύζυγός της βρήκε στο σπίτι πολλαπλά άδεια μπουκάλια χαπιών. Τα τακτικά της φάρμακα περιλαμβάνουν βεραπαμίλη παρατεταμένης αποδέσμευσης, λισινοπρίλη και πραβαστατίνη. Κατά την άφιξη στη ΜΕΘ τα ζωτικά της σημεία είναι: αρτηριακή πίεση 78/40 mmHg, καρδιακή συχνότητα 38 παλμοί/λεπτό, αναπνευστική συχνότητα 16 αναπνοές/λεπτό, θερμοκρασία 34°C. Χορηγείται φυσιολογικός ορός (1 L) και χλωριούχο ασβέστιο 1 g δύο φορές, χωρίς βελτίωση της αρτηριακής πίεσης. Ποια από τις ακόλουθες ενέργειες είναι η επόμενη καλύτερη παρέμβαση;
- α. Διαδερμική βηματοδότηση
 - β. Ενδοφλέβια ατροπίνη
 - γ. Γαλάκτωμα λιπιδίων
 - δ. Υψηλή δόση ινσουλίνης

Απάντηση: δ. Η θεραπεία με υψηλή δόση ινσουλίνης συνιστάται ως επόμενη παρέμβαση για την τοξικότητα των αναστολέων διαύλων ασβεστίου, εάν το ασβέστιο είναι αναποτελεσματικό. Αν και η ατροπίνη χορηγείται συχνά, είναι συνήθως αναποτελεσματική. Η διαδερμική βηματοδότηση μπορεί να αυξήσει τον καρδιακό ρυθμό αλλά όχι την αρτηριακή πίεση, επειδή η υπόταση οφείλεται συνήθως στις αρνητικές ινότροπες επιδράσεις του φαρμάκου. Το γαλάκτωμα λιπιδίων είναι μια επιλογή για εκείνους τους ασθενείς που μπορεί να είναι ανθεκτικοί στην υψηλή δόση ινσουλίνης, αλλά δεν συνιστάται ως αρχική παρέμβαση.

ΚΕΦΑΛΑΙΟ 66

Υποθερμία, Υπερθερμία και Ραβδομύλωση

Βιβλιογραφία

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Ερωτήσεις Ανασκόπησης

1. Ποια από τις παρακάτω προτάσεις είναι η πιο σωστή δήλωση σχετικά με τη ρύθμιση της θερμότητας;
 - α. Η διατήρηση της θερμότητας επιτυγχάνεται μέσω της περιφερικής αγγειοδιαστολής
 - β. Η παραγωγή θερμότητας επιτυγχάνεται μέσω του ρίγους και συνεχίζεται ανεξάρτητα από τη βαρύτητα της υποθερμίας
 - γ. Η θερμογένεση χωρίς ρίγος επιτυγχάνεται μέσω των αυξημένων επιπέδων της αυξητικής ορμόνης
 - δ. Ο υποθάλαμος παίζει κεντρικό ρόλο στη ρύθμιση της θερμότητας κατά την έκθεση στο κρύο

Απάντηση: δ. Κατά την έκθεση στο κρύο, ο υποθάλαμος εκκινεί μηχανισμούς για τη διατήρηση της θερμότητας και την παραγωγή θερμότητας. Η διατήρηση της θερμότητας επιτυγχάνεται μέσω της περιφερικής αγγειοσύσπασης, της μείωσης της αγωγής θερμότητας προς το δέρμα και των συμπεριφορικών αντιδράσεων, όπως η χρήση περισσότερων ρούχων και η αναζήτηση θερμότερου περιβάλλοντος. Η παραγωγή θερμότητας επιτυγχάνεται μέσω της διέγερσης της μυϊκής δραστηριότητας μέσω του ρίγους, το οποίο μπορεί να αυξήσει τον βασικό μεταβολικό ρυθμό κατά δύο έως πέντε φορές. Θερμογένεση χωρίς ρίγος συμβαίνει μέσω αυξημένων επιπέδων κατεχολαμινών και θυροξίνης. Αυτή η συντονισμένη φυσιολογική απόκριση εμφανίζεται συνήθως για θερμοκρασίες μεταξύ 32°C και 35°C. Διαρκεί μόνο για λίγες ώρες, και στη συνέχεια ακολουθεί μυϊκή κόπωση και εξάντληση του γλυκογόνου. Καθώς η θερμοκρασία πυρήνα πέφτει κάτω από τους 32°C (90°F), η θερμογένεση με ρίγος μειώνεται και η θερμογένεση χωρίς ρίγος επιβραδύνεται. Σε θερμοκρασίες κάτω των 20°C έως 24°C, οι μηχανισμοί παραγωγής θερμότητας αποτυγχάνουν εντελώς.

2. Ποιο από τα ακόλουθα κλινικά σενάρια περιγράφει έναν ασθενή που είναι πιθανότερο να έχει προδιάθεση για υποθερμία;
 - α. 79χρονος άνδρας που νοσηλεύεται λαμβάνοντας αλοπεριδόλη (Haldol) με οξεία έναρξη διέγερσης και μυϊκής ακαμψίας
 - β. 45χρονη υγιής γυναίκα που τρέχει σε μαραθώνιο τον Ιούνιο
 - γ. 28χρονη γυναίκα που νοσηλεύεται στο τμήμα επειγόντων περιστατικών με ταχυκαρδία, απώλεια βάρους και εφίδρωση
 - δ. 75χρονος άνδρας με νόσο του Πάρκινσον και ψωρίαση, που λαμβάνει μετοπρολόλη για υπέρταση, που περπατάει στην άγρια φύση τον Ιανουάριο

Απάντηση: δ. Ο πρώτος ασθενής διατρέχει κίνδυνο κακώθους νευροληπτικού συνδρόμου με σχετίζεται με υπερθερμία. Η δεύτερη ασθενής θα μπορούσε να διατρέχει κίνδυνο θερμοπληξίας, η οποία σχετίζεται με την υπερθερμία, αν και είναι λιγότερο πιθανό λόγω του γεγονότος ότι είναι δραστήρια και μπορεί να κρίνει σωστά σχετικά με την πρόσβαση σε νερό και καταφύγιο. Η τρίτη ασθενής θα πρέπει να αξιολογηθεί για πιθανό υπερθυρεοειδισμό, ο οποίος σχετίζεται με υπερθερμία. Ο τελευταίος ασθενής έχει πολλαπλούς παράγοντες κινδύνου για υποθερμία, συμπεριλαμβανομένης της μειωμένης θερμογένεσης λόγω ηλικίας, της νόσου του Πάρκινσον και της χρήσης β-αναστολέων. Η αυξημένη απώλεια θερμότητας προκύπτει ως αποτέλεσμα του κρύου καιρού και της ψωρίασης.

3. Ποια από τις ακόλουθες δηλώσεις είναι η πιο ακριβής όσον αφορά την καρδιακή ανάνηψη κατά την υποθερμία;
 - α. Η υποθερμική καρδιά ανταποκρίνεται επαρκώς στα αγγειοδραστικά φάρμακα
 - β. Κάθε καρδιακή συχνότητα κάτω από 50 παλμούς/λεπτό πρέπει να βηματοδοτείται
 - γ. Η άσφυγη κοιλιακή μαρμαρυγή απαιτεί αρχική απινίδωση με μέγιστη ενέργεια
 - δ. Τα αδρενεργικά φάρμακα πρέπει να χρησιμοποιούνται για θερμοκρασίες κάτω των 30°C σύμφωνα με το συνηθισμένο πρωτόκολλο Advanced Cardiac Life Support

Απάντηση: γ. Ανατρέξτε στην ενότητα «Καρδιακή Αναζωογόνηση».

4. Ένας αθλητής 28 ετών που χτυπήθηκε από χιονοστιβάδα διασώθηκε και μεταφέρθηκε στο τμήμα επειγόντων περιστατικών χωρίς σφυγμό με θερμοκρασία 28°C. Εκτός από το ABC (αεραγωγοί, αναπνοή, κυκλοφορία), ποια είναι η πιο σωστή δήλωση σχετικά με τη διαχείριση;

- α. Συνεχίστε την καρδιοαναπνευστική αναζωογόνηση (ΚΑΡΠΑ) και ξεκινήστε αιμοκάθαρση
- β. Συνεχίστε την ΚΑΡΠΑ και ξεκινήστε συνεχή φλεβο-φλεβική αιμοδιύθηση (ΣΦΦΑ)
- γ. Συνεχίστε την ΚΑΡΠΑ και ξεκινήστε φλεβοαρτηριακή οξυγόνωση με εξωσωματική μεμβράνη (VA-ECMO)
- δ. Συνεχίστε την ΚΑΡΠΑ και ξεκινήστε καρδιοπνευμονική παράκαμψη (CPB)

Απάντηση: γ. Οι επιλογές α και β απαιτούν την απουσία κυκλοφορικής κατάρρευσης. Τα πλεονεκτήματα της VA-ECMO έναντι της CPB περιλαμβάνουν την αυξανόμενη διαθεσιμότητα της τεχνολογίας, τη δυνατότητα συνέχισης της καρδιοπνευμονικής υποστήριξης για αρκετές ημέρες ακόμη και μετά την επαναθέρμανση, και τη χαμηλότερη απαίτηση ηπαρινισμού. Η χαμηλότερη απαίτηση αντιπηκτικής αγωγής καθιστά την VA-ECMO προτιμότερη για ασθενείς με τραύμα. Το σύστημα VA-ECMO μπορεί να παρέχει τον ίδιο ρυθμό επαναθέρμανσης με την CPB (8°C-12°C ανά ώρα) και δεν απαιτεί στερνοτομή.^{35,38}

5. Ένας άνδρας 22 ετών προσέρχεται στο τμήμα επειγόντων περιστατικών αναφέροντας διάχυτες κράμπες και μειωμένη παραγωγή ούρων τις τελευταίες 24 ώρες. Είναι body builder και έχει αυξήσει το πρόγραμμα προπόνησής του την τελευταία εβδομάδα. Για 2 ημέρες είχε πτωχή πρόσληψη από το στόμα, με διαλείποντες εμέτους. Τα ζωτικά σημεία έχουν ως εξής: σφυγμοί 110 παλμοί/λεπτό, αρτηριακή πίεση 112/84 mm Hg, θερμοκρασία 96,2°F (35,6°C) και αναπνευστική συχνότητα 22 αναπνοές/λεπτό. Ζυγίζει 90 kg. Τα αποτελέσματα των εργαστηριακών εξετάσεων αποκαλύπτουν κρεατινίνη 3,6 mg/dL, κάλιο 5,8 mmol/L και διττανθρακικά 20 mmol/L. Τα ούρα του παρουσιάζουν ίχνη πρωτεΐνης, ειδικό βάρος 1020, μεγάλη ποσότητα αίματος στην εξέταση ούρων με ταινία και 0 έως 5 ερυθρά αιμοσφαίρια στη μικροσκόπηση. Τα επίπεδα κίνησης της κρεατίνης (CK) είναι 62.000 μονάδες/L. Παρά την ενδοφλέβια χορήγηση 3 L υγρών παραμένει ολιγουρικός. Ποια από τις ακόλουθες δηλώσεις είναι η πιο σωστή;

- α. Η μαννιτόλη είναι κατάλληλη για τη διέγερση της παραγωγής ούρων
- β. Πιθανόν να χρειαστεί αιμοκάθαρση για τον έλεγχο της υπερκαλιαιμίας
- γ. Η έγχυση ασβεστίου για την υπερκαλιαιμία αντενδίδνεται λόγω της ενδεχόμενης υπερασβεστιαϊμίας από αναπήδηση με τη ραβδομύλυση
- δ. Η επαρκής αρχική αναζωογόνηση όγκου σε αυτή την κατάσταση είναι συνήθως περίπου 30 ml/kg IV κρυσταλλοειδούς

Απάντηση: β. Το περιστατικό αυτό παρουσιάζει ένα σενάριο ραβδομύλωσης μετά από άσκηση με ολιγουρική οξεία νεφρική βλάβη και υπερκαλιαιμία. Το περιστατικό απεικονίζει τη δυνητική σοβαρότητα κατά την αρχική παρουσίαση της ραβδομύλωσης. Υπό το πρίσμα της χαμηλής παραγωγής ούρων του ασθενούς και της πρόβλεψης ότι η υπερκαλιαιμία από τη βλάβη των μυϊκών κυττάρων μπορεί να επιδεινωθεί, η αιμοκάθαρση θα πρέπει να εξεταστεί ως πρώτη παρέμβαση σε αυτή την περίπτωση. Πέρα από άλλες μορφές αναζωογόνησης του όγκου και την αποφυγή των επιβλαβών παραγόντων, υπάρχουν περιορισμένες θεραπευτικές επιλογές. Η μαννιτόλη αντενδίδνεται στην ολιγουρική ONB λόγω του κινδύνου επακόλουθης υπεροσμωτικότητας. Το ασβέστιο μπορεί να χορηγηθεί για την επείγουσα υπερκαλιαιμία, αλλά θα πρέπει να υπάρχει υψηλότερο όριο για την αντικατάστασή του

ασβεστίου λόγω υπασβεστιασίας στην περίπτωση της ραβδομυόλυσης. Τέλος, η ανάνηψη με ενδοφλέβια υγρά συχνά πρέπει να είναι πολύ πιο επιθετική από ό,τι σε άλλες περιπτώσεις κρίσιμης νόσου, επειδή τα κατεστραμμένα μυϊκά κύτταρα δεσμεύουν τα ενδοφλέβια υγρά.

6. Ένας άνδρας 35 ετών παρουσιάζει ραβδομυόλυση μετά από άσκηση και στην αξιολόγηση δεν βρέθηκαν ενδείξεις συνδρόμου διαμερίσματος. Είναι αιμοδυναμικά σταθερός. Οι εργαστηριακές εξετάσεις περιλαμβάνουν ανάλυση αερίων αρτηριακού αίματος που δείχνει pH 7,28 και επίπεδο καλίου 5,2 mmol/L. Το επίπεδο γαλακτικού είναι 3,2 mmol/L. Έχει προγραμματιστεί για μια επιπλέον συνεδρία αιμοκάθαρσης σήμερα. Μετά από μια αρχική μείωση της CK, το επίπεδο τώρα αυξάνεται. Ποιο από τα παρακάτω είναι πιο σημαντικό αυτή τη στιγμή;

- α.** Χορήγηση 1 αμπούλας διττανθρακικού για τη γαλακτική οξέωση
- β.** Επανεκτίμηση για σύνδρομο διαμερίσματος
- γ.** Αυξημένη χορήγηση ενδοφλέβιων υγρών
- δ.** Χορήγηση μαννιτόλης

Απάντηση: β. Ο ασθενής παρουσιάζει τώρα την πιθανή ανάπτυξη συνδρόμου διαμερίσματος που σχετίζεται εν μέρει με την κατακράτηση υγρών παρά την αρχική αρνητική αξιολόγηση. Θα πρέπει να επαναληφθεί η μέτρηση της ενδοδιαμερισματικής πίεσης. Επί ιστικής ισχαιμίας με σταθερή αιμοδυναμική κατάσταση, η χορήγηση ενδοφλέβιων υγρών δεν θα είναι χρήσιμη και μπορεί να είναι επιβλαβής. Η χορήγηση διττανθρακικών μπορεί να είναι παρομοίως επιβλαβής λόγω της πιθανότητας υπερβολικής αύξησης του pH, ιδίως καθώς η αιμοκάθαρση θα αυξήσει το pH ανεξάρτητα. Τέλος, η μαννιτόλη αντενδείκνυται σε καταστάσεις ολιγουρικής νεφρικής ανεπάρκειας.

7. Μια γυναίκα 64 ετών νοσηλεύεται στο νοσοκομείο λόγω πρόσφατων πτώσεων. Η αρτηριακή της πίεση κατά την εισαγωγή είναι 80/40 mm Hg, η οποία βελτιώνεται με 2 L ενδοφλέβιων υγρών. Σας ζητείται να την εκτιμήσετε για ραβδομυόλυση και

οξεία νεφρική βλάβη. Η ασθενής έχει ιστορικό στεφανιαίας νόσου (προηγούμενη αορτοστεφανιαία παράκαμψη), υπέρτασης υπό λισινοπρίλη 20 mg/ημερησίως και οστεοαρθρίτιδας. Λαμβάνει ατορβαστατίνη 10 mg/ημέρα και ιβουπροφαίνη 400 mg/ημέρα. Τα αποτελέσματα των εργαστηριακών εξετάσεων κατά την εισαγωγή έχουν ως εξής: κάλιο 4,6 mg/dL, κρεατινίνη 1,8 mg/dL (βασική τιμή 0,8) και CK 1800 μονάδες/L. Η ανάλυση ούρων της δείχνει 1+ πρωτεΐνη, ειδικό βάρος 1030 και καθόλου αίμα. Ποια από τις παρακάτω είναι η πιο σωστή δήλωση;

- α.** Τα επίπεδα της CK δεν σχετίζονται με το επίπεδο του μυϊκού τραύματος
- β.** Η οξεία νεφρική βλάβη της οφείλεται σε ραβδομυόλυση
- γ.** Η ατορβαστατίνη δεν πρέπει να συνεχιστεί μετά το εξιτήριο
- δ.** Η νεφρική αγγειοσύσπαση από την εξάντληση όγκου, η χρήση αναστολέα του μετατρεπτικού ενζύμου της αγγειοτενσίνης (MEA) και η χρήση μη στεροειδούς αντιφλεγμονώδους φαρμάκου (ΜΣΑΦ) είναι η πιθανή αιτία της οξείας νεφρικής βλάβης (ONB)

Απάντηση: δ. Το περιστατικό αυτό δείχνει μια γυναίκα που παρουσιάζει ONB από ένδεια όγκου. Η νεφρική της λειτουργία είναι επηρεασμένη από την εξάντληση του όγκου και την χρήση αναστολέα MEA και ΜΣΑΦ. Είναι απίθανο αυτό το επίπεδο αύξησης της CK να προκαλέσει οξεία νεφρική βλάβη· συνήθως επίπεδα CK μικρότερα από 5000 μονάδες/L θα πρέπει να οδηγούν κάποιον να εξετάσει άλλες διαγνώσεις ONB. Η έλλειψη αίματος στα ούρα και το υψηλό ειδικό βάρος ούρων υποστηρίζουν την εξάντληση όγκου και όχι τη ραβδομυόλυση ως αιτία της ONB. Κατά συνέπεια, η συνέχιση της ατορβαστατίνης της δεν αντενδείκνυται κατά την έξοδο. Αν και η αιτία της ONB στη ραβδομυόλυση είναι η επαγόμενη από μυοσφαιρίνη νεφρική σωληναριακή βλάβη, τα επίπεδα της CK χρησιμοποιούνται συνήθως ως δείκτης μυϊκής βλάβης, καθώς μετρώνται συχνότερα από τη μυοσφαιρίνη. Η μόνη σημαντική προειδοποίηση σε αυτό είναι ότι τα επίπεδα της CK μπορεί να μην κορυφωθούν μέχρι αρκετές ημέρες μετά τον μυϊκό τραυματισμό, οπότε τα επίπεδα θα πρέπει να συνεχίσουν να παρακολουθούνται μέχρι να μειωθούν.

ΚΕΦΑΛΑΙΟ 67

Βελτίωση της Απόδοσης και Συστήματα Αξιολόγησης της Βαρύτητας στην Εντατική Θεραπεία

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Ερωτήσεις Ανασκόπησης

1. Σύμφωνα με τη διαθέσιμη βιβλιογραφία, ποιο από τα ακόλουθα αποτελέσματα είναι πιθανότερο να ισχύει όσον αφορά την εφαρμογή της ομάδας ταχείας ανταπόκρισης (rapid response team-RRT);

- α. Μείωση των εισαγωγών στη μονάδα εντατικής θεραπείας (ΜΕΘ) σε ορισμένες αλλά όχι σε όλες τις μελέτες
- β. Μείωση της επίπτωσης της σοβαρής σήψης σε ορισμένες αλλά όχι σε όλες τις μελέτες
- γ. Μείωση της θνητότητας του εμφράγματος του μυοκαρδίου με ανάσπαση του ST (STEMI)
- δ. Η RRT δεν απαιτεί εκπαίδευση των παρά την κλίνη παρόχων εκτός του περιβάλλοντος εντατικής θεραπείας

Απάντηση: α. Οι RRT αναπτύχθηκαν ως μέσο για την παροχή και την ανάπτυξη εξειδίκευσης στην εντατική φροντίδα για τους υγειονομικούς λειτουργούς που απασχολούνται σε διάφορες περιοχές του νοσοκομείου κατά την πρώιμη φάση της πιθανής επιδείνωσης της κατάστασης ενός ασθενούς. Ο αντίκτυπος των RRTs, σύμφωνα με κλινικές δοκιμές, έχει αποφέρει μικτά αποτελέσματα, συμπεριλαμβανομένης της μείωσης της καρδιακής ανακοπής και των μη προγραμματισμένων εισαγωγών στη ΜΕΘ σε ορισμένες αλλά όχι σε όλες τις μελέτες (επιλογή α σωστή). Δεν υπήρξε αντίκτυπος των RRT στην επίπτωση της σοβαρής σήψης (επιλογή β) ή του STEMI (επιλογή γ). Η εκπαίδευση των παρόχων που βρίσκονται δίπλα στην κλίνη εκτός της ΜΕΘ είναι απαραίτητη για την εφαρμογή μιας ομάδας ταχείας ανταπόκρισης, καθώς οι κλήσεις RRT προέρχονται συνήθως από ιατρικούς και χειρουργικούς τομείς του νοσοκομείου (επιλογή δ).

2. Ποιο από τα παρακάτω είναι το πιο σωστό όσον αφορά την πρόληψη των συμβάντων που σχετίζονται με τον αναπνευστήρα (ventilator-associated events/VAE);

- α. Η πνευμονία που σχετίζεται με τον αναπνευστήρα (ventilator-associated pneumonia/VAP) απαιτεί μηχανικό αερισμό για περισσότερο από 24 ώρες
- β. Η βακτηριαμία είναι ένα VAE
- γ. Η συνήθης φροντίδα του στόματος αποτελεί μέρος της δέσμης φροντίδας του αναπνευστήρα
- δ. Η επιλογή του αντιβιοτικού για τη χειρουργική προφύλαξη του μετεγχειρητικού ασθενούς με μηχανικό αερισμό αποτελεί μέρος της δέσμης ABCDEF

Απάντηση: γ. Η μείωση των VAE σε μηχανικά αεριζόμενους ασθενείς υψηλού κινδύνου ασθενείς περιλαμβάνει την τήρηση βασισμένων σε ενδείξεις παρεμβάσεων. Ο κλινικός ορισμός της VAP απαιτεί οι ασθενείς να υποστηρίζονται με μηχανικό αερισμό για περισσότερες από 48 ώρες (επιλογή α). Τα VAE περιλαμβάνουν τη VAP, το πεπτικό έλκος, τη γαστρεντερική αιμορραγία, την εισρόφηση, τα φλεβικά θρομβοεμβολικά επεισόδια και τη δυσκολία στην διαχείριση των εκκρίσεων (επιλογή β). Η συνήθης στοματική φροντίδα με χλωρεξιδίνη 0,12% περιλαμβάνεται στη δέσμη φροντίδας των αναπνευστήρων ως στοιχείο για την πρόληψη των VAE (σωστή επιλογή γ). Η χορήγηση αντιβιοτικών δεν αποτελεί στοιχείο της δέσμης ABCDEF. Το A στο ABCDEF συνδέεται με την αξιολόγηση, την πρόληψη και τη διαχείριση του πόνου (απάντηση δ).

3. Ποιο από τα παρακάτω είναι αληθές όσον αφορά την πρόληψη των ουρολοιμώξεων που σχετίζονται με καθετήρες;

- α. Εξέταση εναλλακτικών λύσεων για τη χρήση μόνιμου καθετήρα ουροδόχου κύστης σε επιλεγμένους ασθενείς
- β. Καθημερινή έκπλυση της κύστης με αντιβιοτικά
- γ. Αλλαγή των καθετήρων της κύστης κάθε 3 ημέρες
- δ. Επιθετική ενυδάτωση για την αύξηση της ροής των ούρων

Απάντηση: α. (CAUTI)

Οι κατευθυντήριες γραμμές της Συμβουλευτικής Επιτροπής Πρακτικών Ελέγχου Λοιμώξεων στον τομέα της Υγείας (Healthcare Infection Control Practices Advisory Committee) περιλαμβάνουν την κατάλληλη χρήση ουροκαθετήρα, την εξέταση εναλλακτικών λύσεων για την τοποθέτηση μόνιμου ουρηθρικού καθετήρα σε επιλεγμένους ασθενείς, την εφαρμογή άσηπτης τεχνικής κατά την εισαγωγή του καθετήρα, την τήρηση των κατάλληλων τεχνικών συντήρησης του καθετήρα και την ενσωμάτωση ενός επίσημου προγράμματος βελτίωσης της ποιότητας του νοσοκομείου με τις απαραίτητες στρατηγικές επιτήρησης (σωστή επιλογή η α). Οι επιλογές β, γ και δ δεν έχει αποδειχθεί ότι προλαμβάνουν τις λοιμώξεις του ουροποιητικού συστήματος που σχετίζονται με τον καθετήρα.

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Ηθικά Ζητήματα στη Διαχείριση του Βαρέως Πάσχοντα

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Ερωτήσεις Ανασκόπησης

1. Ποιος αποφασίζει; Σε έναν άνδρα 70 ετών τοποθετείται προσθετική αορτική βαλβίδα και στη συνέχεια απαιτείται βηματοδότης για κολλοκοιλιακό αποκλεισμό τρίτου βαθμού. Ο ασθενής δεν συμμορφώνεται επαρκώς με το σχήμα αντιπηκτικής αγωγής και παθαίνει πολλαπλά εμβολικά εγκεφαλικά επεισόδια κατά την επόμενη δεκαετία, με αποτέλεσμα να μην ανταποκρίνεται επαρκώς στα ερεθίσματα του περιβάλλοντος. Η σύζυγός του ζητά την απενεργοποίηση του βηματοδότη με την αιτιολογία ότι ο ασθενής δεν θα επέλεγε να συνεχίσει να ζει σε αυτή την κατάσταση. Το μοναχοπαίδι του ασθενούς αγρυπνεί δίπλα στο κρεβάτι του ασθενούς και υποστηρίζει ότι πρέπει να συνεχιστούν όλες οι θεραπείες που διατηρούν τη ζωή. Ο ασθενής διόρισε τη σύζυγό του μόνιμο πληρεξούσιο για τη φροντίδα της υγείας του αρκετά χρόνια πριν από την τρέχουσα νευρολογική του έκπτωση. Ποια απάντηση είναι σωστή;

- α.** Η βηματοδότηση πρέπει να συνεχιστεί επειδή νομικά οι «εσωτερικές» θεραπείες δεν μπορούν να αποσυρθούν
- β.** Η βηματοδότηση πρέπει να συνεχιστεί επειδή η διακοπή της θα συνιστούσε ευθανασία (παράνομη)
- γ.** Η βηματοδότηση δεν μπορεί να διακοπεί χωρίς δικαστική απόφαση
- δ.** Η βηματοδότηση μπορεί να διακοπεί, καθώς η σύζυγος είναι ο νόμιμος αντικαταστάτης του ασθενούς
- ε.** Η βηματοδότηση πρέπει να συνεχιστεί, αλλά οι μπαταρίες μπορούν να αφεθούν να λήξουν χωρίς αντικατάσταση

Απάντηση: δ. Όταν οι ασθενείς δεν έχουν την ικανότητα λήψης αποφάσεων που απαιτείται για τη συγκατάθεση μετά από ενημέρωση, οι αποφάσεις πρέπει να λαμβάνονται από έναν αντικαταστάτη. Ιδανικά, ο ασθενής έχει συμπληρώσει μια εκ των προτέρων οδηγία, στην οποία αναφέρεται το άτομο στο οποίο έχει αναθέσει τη λήψη αυτών των αποφάσεων. Το έγγραφο αυτό είναι επίσης γνωστό ως πληρεξούσιο υγειονομικής περίθαλψης ή διαρκές πληρεξούσιο για τη λήψη αποφάσεων υγειονομικής περίθαλψης.

2. Ποια απάντηση είναι σωστή όσον αφορά το δικαίωμα άρνησης της θεραπείας που συντηρεί τη ζωή;

- α.** Οι ασθενείς, ή οι νομίμως εξουσιοδοτημένοι αντικαταστάτες τους, έχουν ουσιαστικά απεριόριστο δικαίωμα να αρνούνται ανεπιθύμητες θεραπείες που συντηρούν τη ζωή
- β.** Υπάρχει διαφορά μεταξύ της παρακράτησης και της απόσυρσης της θεραπείας
- γ.** Όλες οι θεραπείες μπορούν να παρακρατηθούν ή να αποσυρθούν εκτός από την εξωσωματική οξυγόνωση μέσω μεμβράνης
- δ.** Όλες οι θεραπείες μπορούν να παρακρατηθούν ή να αποσυρθούν εκτός από τους βηματοδότες

Απάντηση: α. Στις Ηνωμένες Πολιτείες υπάρχει μια σταθερά εδραιωμένη και σαφώς καθορισμένη νομική και ηθική συναίνεση ότι ένας ενήλικος ασθενής με ικανότητα λήψης αποφάσεων, ή ο νόμιμος αντικαταστάτης του, εάν ο ασθενής δεν έχει ικανότητα λήψης αποφάσεων, έχει το δικαίωμα να αρνηθεί οποιαδήποτε ιατρική και/ή χειρουργική επέμβαση, ακόμη και αν ο γιατρός του ασθενούς πιστεύει ότι η προτεινόμενη θεραπεία είναι δυνητικά σωτήρια για τη ζωή.

3. Ποια από τις παρακάτω επιλογές, αν υπάρχει, αντιπροσωπεύει άριστη φροντίδα στο τέλος της ζωής;

- α.** Καθόλου μορφίνη
- β.** Μορφίνη ακολουθούμενη από χλωριούχο κάλιο
- γ.** Μεγάλη δόση μορφίνης bolus πριν από την αποσωλήνωση
- δ.** Νευρομυϊκός αποκλεισμός πριν από την αποσωλήνωση
- ε.** Τιτλοποιημένη χορήγηση μορφίνης

Απάντηση: ε. Αντίστοιχα, η καταστολή και/ή η αναλγησία πρέπει να τιτλοποιούνται ανάλογα με το αποτέλεσμα (ουσιαστικά, κάποιο αντικειμενικό σημείο ή σύμπτωμα που υποδηλώνει πόνο ή ταλαιπωρία), η δόση δεν πρέπει να περιορίζεται μόνο με βάση τις «συνιστώμενες» ή «προτεινόμενες» δόσεις και η παρεχόμενη φροντίδα πρέπει να τεκμηριώνεται σαφώς ως φροντίδα του τέλους της ζωής.

ΚΕΦΑΛΑΙΟ 69

Παραλήρημα, Ύπνος ,και Διαταραχές Ψυχικής Υγείας στην Κρίσιμη Νόσο

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Ερωτήσεις Ανασκόπησης

1. Ποια από τις ακόλουθες δηλώσεις είναι η πιο σωστή για τη θεραπεία του παραληρήματος;

- α. Τα φάρμακα πρέπει να εξετάζονται για το παραλήρημα μόνο μετά από αποτυχία αποκατάστασης των κύκλων ύπνου/αφύπνισης και του συχνού επαναπροσανατολισμού
- β. Τα αντιψυχωσικά έχουν εγκριθεί από την αμερικανική Υπηρεσία Τροφίμων και Φαρμάκων (FDA) και συνιστώνται από τις κατευθυντήριες οδηγίες Pain Agitation Delirium (PAD) του 2013 για τη θεραπεία του παραληρήματος
- γ. Η προφύλαξη από το παραλήρημα με φάρμακα ενθαρρύνεται στις κατευθυντήριες οδηγίες του PAD
- δ. Πρόσφατες μελέτες δεν διαπίστωσαν κανένα ρόλο στη φαρμακολογική αντιμετώπιση του παραληρήματος με τη δεξαμεδετομιδίνη, έναν ηρεμιστικό α2-αγωνιστή

Απάντηση: α. Το παραλήρημα θα μπορούσε να αποτελεί εκδήλωση ενός οξέος, απειλητικού για τη ζωή προβλήματος που απαιτεί άμεση αντιμετώπιση (όπως υποξία, υπερκαπνία, υπογλυκαιμία, μεταβολική διαταραχή ή καταπληξία). Αφού αντιμετωπιστούν αυτές οι ανησυχίες, μπορεί να εξεταστεί το ενδεχόμενο φαρμακολογικής αντιμετώπισης. Θα πρέπει να αναγνωριστεί ότι παρόλο που οι παράγοντες που χρησιμοποιούνται για τη θεραπεία του παραληρήματος αποσκοπούν στη βελτίωση της νόησης και της ασφάλειας, όλοι έχουν ψυχοδραστικές επιδράσεις που μπορεί να θολώσουν περαιτέρω την αντίληψη και να προκαλέσουν αύξηση της συνολικής διάρκειας της γνωστικής εξασθένησης. Ο κύριος άξονας της προσέγγισής μας ως επαγγελματίες υγείας πρέπει να ξεκινά με τη θεραπεία των υποκείμενων νοσογόνων διεργασιών που οδηγούν στη δυσλειτουργία του εγκεφάλου, ακολουθούμενη από την αφαίρεση των φαρμάκων και στη συνέχεια την τροποποίηση των περιβαλλοντικών παραγόντων (βοηθήματα ακοής και όρασης, αφαίρεση των περιορισμών, πρώιμη κινητικότητα και υγιεινή του ύπνου), η οποία μπορεί να συνοψιστεί μέσω του μνημονικού Dr. DRE (Diseases, Drug Removal, Environment). Τα φάρμακα θα πρέπει να διαφυλάσσονται για εξαιρετικά δύσκολα συμπτώματα, συμπεριφορές που απειλούν την ασφάλεια των ασθενών ή του προσωπικού ή για την απόσυρση από το αλκοόλ ή τις βενζοδιαζεπίνες.

2. Ποιο από τα παρακάτω εργαλεία είναι το πιο ακριβές για τη διάγνωση του παραληρήματος στη ΜΕΘ;

- α. Η Folstein Mini Mental State Examination
- β. Για ασθενείς που μπορούν να αφυπνιστούν στη φωνή, (βαθμολογία Richmond Agitation Sedation Scale [RASS] -3 και άνω), η Confusion Assessment Method for the Intensive Care Unit (CAM-ICU)
- γ. Για ασθενείς που δεν αφυπνίζονται, (βαθμολογία RASS -4 ή -5), το Intensive Care Delirium Screening Checklist (ICDSC)
- δ. Δεν έχουν επικυρωθεί εργαλεία για την παρά τη κλίνη διάγνωση του παραληρήματος σε ασθενείς της ΜΕΘ

Απάντηση: β. Η διάγνωση του παραληρήματος είναι μια διαδικασία δύο βημάτων. Το επίπεδο αφύπνισης μετράται πρώτα με τη χρήση μιας τυποποιημένης κλίμακας καταστολής, όπως η RASS. Πρόκειται για μια κλίμακα 10 σημείων με βαθμολογίες που κυμαίνονται από -5 έως +4, με τη βαθμολογία 0 να δηλώνει έναν ήρεμο και σε εγρήγορση ασθενή. Οι θετικές βαθμολογίες RASS υποδηλώνουν θετική ή επιθετική συμπτωματολογία που κυμαίνεται από +1 (ήπια ανησυχία) έως +4 (επικίνδυνη διέγερση). Οι αρνητικές βαθμολογίες RASS διαφοροποιούν την ανταπόκριση στις λεκτικές εντολές (βαθμολογίες -1 έως -3) και τα σωματικά ερεθίσματα (βαθμολογίες -4 και -5). Εάν η βαθμολογία RASS του ασθενούς

είναι -4 ή -5 ή ο ασθενής δεν διεγείρεται με λεκτικές εντολές, δεν πραγματοποιείται περαιτέρω αξιολόγηση για παραλήρημα, διότι ο ασθενής είναι σε κόμα και δεν μπορεί να αξιολογηθεί για παραλήρημα. Για τους ασθενείς που μπορούν να αφυπνιστούν (βαθμολογία RASS -3 και άνω), το παραλήρημα μπορεί να αξιολογηθεί από το ICDSC ή το CAM-ICU. Το ICDSC αξιολογεί οκτώ χαρακτηριστικά του παραληρήματος: μεταβαλλόμενο επίπεδο συνείδησης, απροσεξία, αποπροσανατολισμός, ψευδαισθήσεις, ψυχοκινητική διέγερση/επιβράδυνση, ακατάλληλη διάθεση/ομιλία, διαταραχή του κύκλου ύπνου/αφύπνισης και διακύμανση των συμπτωμάτων. Η ευαισθησία και η ειδικότητα αυτού του εργαλείου είναι 99% και 64%, αντίστοιχα. Το CAM-ICU, το οποίο μπορεί να εκτελεστεί σε περίπου 60 έως 90 δευτερόλεπτα, αποτελείται από τέσσερα χαρακτηριστικά που αξιολογούν τα εξής: οξεία μεταβολή ή διακύμανση της ψυχικής κατάστασης (χαρακτηριστικό 1), απροσεξία (χαρακτηριστικό 2), αποδιοργανωμένη σκέψη (χαρακτηριστικό 3) και μεταβαλλόμενο επίπεδο συνείδησης (χαρακτηριστικό 4).

Για να διαγνωστεί ως παραληρηματικός, ο ασθενής πρέπει να έχει βαθμολογία RASS -3 ή υψηλότερη, με οξεία αλλαγή ή διακύμανση της ψυχικής κατάστασης (χαρακτηριστικό 1 του CAM-ICU), συνοδευόμενη από απροσεξία (χαρακτηριστικό 2) και είτε αποδιοργανωμένη σκέψη (χαρακτηριστικό 3), είτε μεταβαλλόμενο επίπεδο συνείδησης (χαρακτηριστικό 4).

3. Ποια από τις ακόλουθες δηλώσεις σχετικά με τη μακροχρόνια γνωστική διαταραχή (long-term cognitive impairment-LTCI) μετά από κρίσιμη νόσο είναι η πιο σωστή;

- α. Περίπου ένας στους τέσσερις επιζώντες της ΜΕΘ έχει LTCI που επιμένει 12 μήνες μετά τη ΜΕΘ
- β. Οι νευρογνωστικές διαταραχές εμφανίζονται σε λιγότερο από το 15% των επιζώντων κρίσιμης νόσου χωρίς προϋπάρχουσα άνοια
- γ. Η διάρκεια του παραληρήματος της ΜΕΘ δεν αποτελεί παράγοντα κινδύνου για LTCI σε επιζώντες κρίσιμης νόσου
- δ. Οι νευρογνωστικές διαταραχές έχουν αναφερθεί μόνο σε επιζώντες του συνδρόμου οξείας αναπνευστικής δυσχέρειας

Απάντηση: α. Κατά την τελευταία μιάμιση δεκαετία, μελέτες ομάδων διεξήγαγαν αξιολογήσεις της γνωστικής λειτουργίας μεταξύ των επιζώντων κρίσιμης νόσου και ανέφεραν σημαντική έκπτωση σε όσους επιβιώνουν από κρίσιμη νόσο. Αυτές οι μελέτες οδήγησαν στην έννοια του συνδρόμου μετά την εντατική θεραπεία (post-intensive care syndrome - PICS), που ορίζεται ως νέα ή επιδεινούμενα συμπτώματα γνωστικής εξασθένησης, δυσλειτουργία στις δραστηριότητες καθημερινής ζωής (activities of daily living-ADL) και διαταραχές της ψυχικής υγείας που προκύπτουν μετά από κρίσιμη ασθένεια και επιμένουν και μετά τη νοσηλεία για την οξεία νόσο. Η μακροχρόνια γνωστική εξασθένηση μετά τη ΜΕΘ μπορεί να περιλαμβάνει προβλήματα μνήμης και προσοχής ή/και εκτελεστικής λειτουργίας και οδηγεί σε αδυναμία επιστροφής στην εργασία, σε μειωμένες ADLs, σε αυξημένο κίνδυνο νοσηλείας και σε μειωμένη ποιότητα ζωής. Σε μία από τις μεγαλύτερες πολυκεντρικές προοπτικές ομάδες σε ΜΕΘ μέχρι σήμερα, διαπιστώθηκε ότι η μεγαλύτερη διάρκεια παραληρήματος στη ΜΕΘ ήταν ο σημαντικότερος ανεξάρτητος παράγοντας κινδύνου για μακροχρόνια γνωστική δυσλειτουργία έως και 12 μήνες μετά την επιβίωση από κρίσιμη ασθένεια. Σε αυτόν τον πληθυσμό, ένας στους τέσσερις ασθενείς της ΜΕΘ είχε γνωστική εξασθένηση μετά από 12 μήνες μετά από κρίσιμη ασθένεια, που ήταν παρόμοια σε σοβαρότητα με εκείνη των ασθενών με ήπια νόσο Αλτσχάιμερ και μέτρια τραυματική εγκεφαλική βλάβη.

ΚΕΦΑΛΑΙΟ 70

Διοίκηση και Εκπαίδευση στη Μονάδα Εντατικής Θεραπείας

Βιβλιογραφία

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Ερωτήσεις Ανασκόπησης

1. Ποιο από τα παρακάτω είναι περισσότερο αληθές σχετικά με τις συγκρούσεις στην εντατική φροντίδα;
- α. Οι συγκρούσεις θα πρέπει να περιορίζονται στη διοικητική σουίτα («C-suite»)
 - β. Οι συγκρούσεις είναι εγγενώς καταστροφικές
 - γ. Η επίλυση των συγκρούσεων αποτελεί βασική δεξιότητα για τους παρόχους και τους διοικητικούς υπαλλήλους
 - δ. Οι συγκρούσεις είναι η βασική αιτία της επαγγελματικής εξουθένωσης στη ΜΕΘ

Απάντηση: γ. Οι συγκρούσεις, οι οποίες ορίζονται ως η ύπαρξη διαφορετικών προοπτικών σε μια κατάσταση ή εναλλακτικών προσεγγίσεων για την επίλυση ενός προβλήματος, είναι εγγενείς σε όλες τις πτυχές της εντατικής φροντίδας. Επομένως, η επίλυση των συγκρούσεων αποτελεί βασική δεξιότητα για τους παρόχους παρά την κλίση και τους διοικητικούς υπαλλήλους σε όλα τα επίπεδα. Δεν υπάρχουν ενδείξεις ότι η σύγκρουση αποτελεί τη βασική αιτία της επαγγελματικής εξουθένωσης στη ΜΕΘ.

2. Οι προτεραιότητες των ηγετών της εντατικής θεραπείας περιλαμβάνουν καθολικά καθεμία από τις ακόλουθες, ΕΚΤΟΣ ΑΠΟ:
- α. Εξισορρόπηση εσόδων και εξόδων
 - β. Διαχείριση διαπροσωπικών συγκρούσεων
 - γ. Εξασφάλιση αξιόπιστου και εξειδικευμένου προσωπικού
 - δ. Ενίσχυση της ανακάλυψης και της καινοτομίας

Απάντηση: δ. Ενώ η έρευνα (ανακάλυψη και καινοτομία) αποτελεί κοινό αγαθό, δεν αποτελεί βασική προτεραιότητα. Οι ηγέτες πρέπει να διασφαλίζουν τη συνεχιζόμενη περίθαλψη των ασθενών, να διαχειρίζονται τα χρονοδιαγράμματα με ακρίβεια και να εξασφαλίζουν ότι οι διαπροσωπικές συγκρούσεις δεν επηρεάζουν την ασφάλεια και την αποτελεσματικότητα της φροντίδας, καθιστώντας τα ζητήματα αυτά κορυφαίες προτεραιότητές τους.

3. Ποιο από τα παρακάτω είναι το πιο σωστό σχετικά με τη σύγκριση των ολοκληρωμένων οργανισμών εντατικής θεραπείας (CCO) με τις ιστορικά απομονωμένες («silo'ed») ΜΕΘ;
- α. Δεν έχει παρουσιαστεί καμία άμεση σύγκριση μεταξύ των επιδόσεων των δύο μοντέλων στη βιβλιογραφία μέχρι το 2018.
 - β. Οι CCO προσφέρουν ένα πιο ευέλικτο και αξιόπιστο μοντέλο στελέχωσης
 - γ. Οι CCO προσφέρουν μια πιο αποδοτική ως προς το κόστος προσέγγιση της εντατικής θεραπείας
 - δ. Οι CCO ενισχύουν την ανακάλυψη και την καινοτομία

Απάντηση: α. Παρά την ευρέως αποδεκτή άποψη, η υπόθεση ότι οι CCO υπερτερούν έναντι των παραδοσιακών μοντέλων δεν έχει ποτέ ελεγχθεί άμεσα και προοπτικά.

4. Όσον αφορά τη χρήση κινήτρων για την αλλαγή της απόδοσης στις ΜΕΘ:
- α. Τα κίνητρα πληρωμής ως προς την απόδοση είναι εγγενώς εχθρικά προς την απόδοση της ομάδας
 - β. Τα κίνητρα είναι εγγενώς κακά, επειδή ενθαρρύνουν τη δουλοπρεπή τήρηση ενός πρωτοκόλλου
 - γ. Τα κίνητρα έχει αποδειχθεί ότι αλλάζουν συμπεριφορές και βελτιώνουν τα αποτελέσματα στην εντατική φροντίδα
 - δ. Τα κίνητρα είναι καλύτερο να απευθύνονται σε διευθυντές και προϊσταμένους στις ΜΕΘ

Απάντηση: γ. Τα κίνητρα έχει αποδειχθεί ότι αλλάζουν συμπεριφορές και βελτιώνουν τα αποτελέσματα. Τα κίνητρα απευθύνονται συνήθως στα αποτελέσματα και όχι στη μέθοδο· οι ομάδες καλούνται να είναι δημιουργικές στην προσέγγισή τους. Για βέλτιστο αποτέλεσμα, τα ομαδικά κίνητρα που περιλαμβάνουν όλα τα μέλη της ομάδας προτιμώνται από εκείνα που ανταμείβουν απλώς τους διευθυντές και τους προϊσταμένους.

ΚΕΦΑΛΑΙΟ 71

Διάγνωση και Αντιμετώπιση της Ηπατικής Ανεπάρκειας στον Ενήλικα

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Ερωτήσεις Ανασκόπησης

1. Μια 27χρονη γυναίκα με ιστορικό κατάθλιψης και άγχους προσέρχεται στο τοπικό τμήμα επειγόντων περιστατικών με πόνο στην άνω κοιλιακή χώρα, ίκτερο και λήθαργο. Τα εργαστηριακά της υποδηλώνουν σοβαρή, οξεία ηπατική βλάβη. Οι ορολογικές της εξετάσεις έχουν σταλεί στο εργαστήριο, αλλά τα αποτελέσματα εκκρεμούν. Ποια από τις ακόλουθες θεραπείες έχει αποδειχθεί ότι βελτιώνει την έκβαση των ασθενών με την αντίστοιχη αιτιολογία οξείας ηπατικής ανεπάρκειας (ΟΗΑ);
- α. Λαμβουδίνη: ηπατίτιδα Β
β. Ανοσοσφαιρίνη έναντι ηπατίτιδας Α: ηπατίτιδα Α
γ. Ν-ακετυλοκυστεΐνη (NAC): ιδιοσυγκρασιακή ηπατική βλάβη που προκαλείται από φάρμακα
δ. Μεθυλπρεδνιζολόνη: αυτοάνοση οξεία ηπατική ανεπάρκεια
ε. Ακυκλοβίρη: ιός του απλού έρπητα

Απάντηση: γ. Η χρήση της NAC σε οξεία ηπατική ανεπάρκεια (ΟΗΑ) που δεν σχετίζεται με ακεταμινοφαίνη μπορεί να βελτιώσει την επιβίωση χωρίς μεταμόσχευση. Πολύ λίγες μελέτες είχαν τη στατιστική ισχύ για να εξαχθούν ασφαλή συμπεράσματα σχετικά με την αποτελεσματικότητα συγκεκριμένων θεραπειών για την ΟΗΑ ανά αιτιολογία. Μια τυχαιοποιημένη, ελεγχόμενη μελέτη σε ασθενείς με σοβαρή ηπατίτιδα Β δεν διαπίστωσε καμία βελτίωση στους ασθενείς που έλαβαν λαμβουδίνη σε σύγκριση με το εικονικό φάρμακο. Δεν υπάρχουν δεδομένα που να υποστηρίζουν τη χρήση ανοσοσφαιρίνης για την ηπατίτιδα Α. Μια αναδρομική ανασκόπηση των κορτικοστεροειδών για την αυτοάνοση ΟΗΑ δεν βρήκε κανένα όφελος. Οι αναφορές περιστατικών δεν υποδηλώνουν όφελος από την ακυκλοβίρη σε ασθενείς με ΟΗΑ λόγω του ιού του απλού έρπητα. Αυτά τα αρνητικά αποτελέσματα δεν συνηγορούν κατά της χρήσης τους, διότι όλα τα δεδομένα είναι ελαττωματικά σε κάποιο βαθμό.

Αν και η NAC έχει σαφώς αποδειχθεί ότι βελτιώνει την κλινική πορεία των ασθενών με ΟΗΑ που προκαλείται από ακεταμινοφαίνη, η χρήση της σε ΟΗΑ που δεν προκαλείται από ακεταμινοφαίνη είναι λιγότερο καλά τεκμηριωμένη. Σε μια πολυκεντρική τυχαιοποιημένη, ελεγχόμενη με εικονικό φάρμακο μελέτη, διαπιστώθηκε ότι η NAC βελτίωσε την επιβίωση χωρίς μεταμόσχευση ήπατος σε ασθενείς με μη επαγόμενη από ακεταμινοφαίνη ΟΗΑ χωρίς υψηλού βαθμού ηπατική εγκεφαλοπάθεια. Οι δύο ομάδες με το μεγαλύτερο όφελος ήταν εκείνες με ηπατίτιδα Β και ιδιοσυγκρασιακή ηπατική βλάβη που προκαλείται από φάρμακα.

2. Μια 35χρονη γυναίκα με ιστορικό προηγούμενων απόπειρων αυτοκτονίας κατάπιε μια «χούφτα» δισκία ακεταμινοφαίνης αυξημένης ισχύος σε αδιευκρίνιστη χρονική στιγμή και βρέθηκε σε κατάσταση μη ανταπόκρισης από την αδελφή της. Τα αποτελέσματα των εργαστηριακών εξετάσεων εισαγωγής της στο τοπικό τμήμα επειγόντων περιστατικών περιλαμβάνουν τα ακόλουθα:

Ασπαρτική αμινοτρανσφεράση (AST)	4567 IU/L
Αλανινική αμινοτρανσφεράση (ALT)	8459 IU/L
Ολική χολερυθρίνη	1,4 mg/dL
Κρεατινίνη	3,8 mg/dL
Διεθνές κανονικοποιημένο πηλίκο (INR)	9,6
Αμμωνία	105 μmol/L

Ποιο από τα ακόλουθα είναι το μόνο προφυλακτικό μέτρο για την πρόληψη του εγκεφαλικού οιδήματος σε ασθενείς με ΟΗΑ, που υποστηρίζεται από τυχαιοποιημένη, ελεγχόμενη κλινική δοκιμή;

- α. Μαννιτόλη
β. Λακτουλόζη
γ. Υπέρτονο αλατούχο διάλυμα
δ. Υποθερμία
ε. Θεραπεία νεφρικής υποκατάστασης

Απάντηση: γ. Το υπέρτονο αλατούχο διάλυμα έχει αποδειχθεί αποτελεσματικό ως προφύλαξη από το εγκεφαλικό οίδημα σε ασθενείς με ΟΗΑ. Οι Murphy et al. πραγματοποίησαν τη μοναδική τυχαιοποιημένη και ελεγχόμενη κλινική δοκιμή για την πρόληψη του εγκεφαλικού οιδήματος και της ενδοκράνιας υπέρτασης. Η δοκιμή έδειξε ότι η αύξηση του νατρίου του ορού στα 145 έως 155 mEq/L με υπέρτονο αλατούχο διάλυμα μείωσε τη μέση ενδοκράνια πίεση των ατόμων της μελέτης με ΟΗΑ και υψηλού βαθμού ηπατική εγκεφαλοπάθεια σε σύγκριση με τους ασθενείς που αντιμετωπίστηκαν με τη συνήθη φροντίδα χωρίς υπέρτονο αλατούχο διάλυμα. Η υποθερμία διερευνήθηκε πρόσφατα σε μια τυχαιοποιημένη, ελεγχόμενη, πολυκεντρική μελέτη και δεν φάνηκε να βελτιώνει την έκβαση ή την ανάπτυξη ενδοκράνιας υπέρτασης.

Τα άλλα προφυλακτικά μέτρα που απαριθμούνται δεν έχουν μελετηθεί συστηματικά σε κλινικές δοκιμές. Ωστόσο, υπάρχουν εύλογοι λόγοι πίσω από τη χρήση τους και η εφαρμογή τους μπορεί να εξεταστεί, ιδίως η έγκαιρη έναρξη θεραπείας νεφρικής υποκατάστασης παρουσία σημαντικής υπεραμμωναιμίας (>150 μmol/L), ακόμη και ελλείψει αζωθαιμίας.

3. Ένας άνδρας 27 ετών εισάγεται με ίκτερο και μεταβολή της νοητικής κατάστασης. Δεν υπάρχει ιστορικό προηγούμενης ηπατικής νόσου ή κατάποσης ακεταμινοφαίνης και ο ασθενής δεν λαμβάνει φάρμακα χωρίς συνταγή ή φυτικά φάρμακα.

Μετά την εισαγωγή στη μονάδα εντατικής θεραπείας, λαμβάνονται τα ακόλουθα δεδομένα:

Νάτριο	147 mEq/L
ALT	3798 IU/L
AST	2857 IU/L
INR	8,5
Φλεβική αμμωνία	135 μmol/L
Ολική χολερυθρίνη	2 mg/dL
Κρεατινίνη	0,8 mg/dL
Αριθμός αιμοπεταλίων	56×10^9 /L

Το αντιγόνο επιφανείας της ηπατίτιδας Β (HBsAg) και τα αντισώματα IgM κατά του πυρήνα της ηπατίτιδας Β (HBcAB) είναι θετικά.

Ο ασθενής έχει μέση αρτηριακή πίεση 70 mm Hg χωρίς αγγειοσυσπαστικά. Είναι ληθαργικός και προσανατολίζεται μόνο στα πρόσωπα.

Έχετε εισάγει τα παραπάνω δεδομένα στην εφαρμογή ALF Study Group Prognostic Score στο smartphone σας και προσδιορίζετε ότι ο ασθενής έχει προβλεπόμενη επιβίωση χωρίς μεταμόσχευση ~5% στις 21 ημέρες. Η ταχεία αξιολόγηση της μεταμόσχευσης ήπατος έχει σχεδόν ολοκληρωθεί. Ποια από τις ακόλουθες επιλογές διαχείρισης θα πρέπει να εισαχθεί στη συνέχεια;

- α. Χορηγήστε λακτουλόζη μέσω ρινογαστρικού σωλήνα για να πραγματοποιήσετε τρεις κενώσεις.
β. Χορηγήστε πλάσμα και αιμοπετάλια.
γ. Τοποθετήστε συσκευή παρακολούθησης ενδοκράνιας πίεσης.
δ. Διασωληνώστε τον ασθενή.
ε. Χορηγήστε ενδοφλέβια (IV) μαννιτόλη 0,5 g/kg bolus

Απάντηση: δ. Η εξέλιξη της ηπατικής εγκεφαλοπάθειας σε βαθμό μεγαλύτερο του 2 αποτελεί απόλυτη ένδειξη για ενδοτραχειακή διασωλήνωση και κατ' επέκταση προστασία των αεραγωγών. Ένα από τα χειρότερα λάθη που μπορεί να κάνει ένας κλινικός ιατρός κατά τη διαχείριση ενός ασθενούς με ΟΗΑ είναι η καθυστέρηση της διασωλήνωσης και η απώλεια του ελέγχου του αεραγωγού του ασθενούς για αρκετό χρονικό διάστημα με αποτέλεσμα την εισρόφηση. Αυτός ο ασθενής έχει ηπατική εγκεφαλοπάθεια βαθμού 3, η οποία αποτελεί άτυπη, αλλά ευρέως αποδεκτή ένδειξη για άμεση καταστολή και διασωλήνωση. Η λακτουλόζη είναι πολύ απίθανο να οδηγήσει σε σημαντική μείωση της αμμωνίας ώστε

να αποφευχθεί η ανάγκη διασωλήνωσης ή να μειωθεί ο κίνδυνος ενδοκράνιας υπέρτασης. Η μαννιτόλη χορηγείται θεραπευτικά μετά από υποψία ενδοκράνιας υπέρτασης ή μετά από τεκμηρίωση με κριτήρια αξονικής τομογραφίας κεφαλής (CT) ή παρακολούθησης της ενδοκράνιας πίεσης (ICP). Η απόφαση για την τοποθέτηση συσκευής παρακολούθησης της ICP είναι αμφιλεγόμενη και εξαρτάται από το κέντρο και τον ιατρό, αλλά συνήθως προορίζεται για τη διαχείριση ασθενών σε βαθύ κώμα που διατρέχουν υψηλό κίνδυνο ενδοκράνιας υπέρτασης (δηλαδή, όσοι λαμβάνουν αγγειοσπαστικά, θεραπεία νεφρικής υποκατάστασης και με σοβαρή υπεραμμονιαμία).

Υπάρχει μια αναδυόμενη συναίνεση ότι το INR δεν πρέπει να διορθώνεται εκτός εάν ο ασθενής αιμορραγεί ενεργά. Οι λόγοι περιλαμβάνουν ότι (1) οι ασθενείς με OHA σπάνια έχουν κλινικά σημαντική αυτόματη (μη σχετιζόμενη με επέμβαση) αιμορραγία, (2) η μετάγγιση πλάσματος αλλοιώνει την τάση μεταβολής του INR, ενός βασικού προγνωστικού δείκτη, και (3) η μετάγγιση πλάσματος μπορεί να είναι επιβλαβής. Η βλαπτική επίδραση μπορεί να οφείλεται στην επιδείνωση μιας σχετικής υπερπηκτικής κατάστασης σε ασθενείς με OHA, την υπερφόρτωση όγκου, τη σχετιζόμενη με τη μετάγγιση πνευμονική βλάβη και άλλες αιτίες. Δεν υπάρχουν δεδομένα που να υποστηρίζουν τη μετάγγιση αιμοπεταλίων σε ασθενείς με OHA. Προεκτείνοντας από δεδομένα *in vitro* σε ασθενείς με κίρρωση, ένας αριθμός αιμοπεταλίων άνω των 60×10^9 /L υποστηρίζει την παραγωγή θρομβίνης στο 90% εκατοστημόριο του φυσιολογικού. Ως εκ τούτου, οι μεταγγίσεις αιμοπεταλίων σε ασθενείς με OHA θα πρέπει να διαφυλάσσονται για ασθενείς με σημαντική αυτόματη αιμορραγία ή σε ασθενείς με αριθμό αιμοπεταλίων κάτω από 60×10^9 /L πριν υποβληθούν σε διαδικασίες υψηλού κινδύνου, όπως η τοποθέτηση συσκευής παρακολούθησης της ICP.

4. Ένας ασθενής με OHA ως αποτέλεσμα ηπατίτιδας B βρίσκεται σε βαθύ κώμα χωρίς καταστολή για 48 ώρες και έχει λάβει προσφορά ήπατος από θανόντα δότη. Ποιο από τα παρακάτω πρέπει να εκτελεστεί αμέσως πριν μεταβεί στο χειρουργείο για τη μεταμόσχευση ήπατος;

- α.** Τοποθέτηση συσκευής παρακολούθησης της ICP
- β.** Ηλεκτροεγκεφαλογράφημα (HEG)
- γ.** Αξονική τομογραφία κεφαλής
- δ.** Διάμετρος θήκης οπτικού νεύρου
- ε.** Υπερηχογράφημα διακρανιακού Doppler

Απάντηση: γ. Σε έναν κωματώδη ασθενή με OHA, πρέπει να αποκλειστεί η μη αναστρέψιμη εγκεφαλική βλάβη με αξονική τομογραφία κεφαλής κατά τη μετάβαση στο χειρουργείο για μεταμόσχευση ήπατος. Η πρόβλεψη της νευρολογικής έκβασης μετά τη μεταμόσχευση ήπατος συχνά δεν είναι δυνατή σε ασθενείς σε βαθύ κώμα με OHA. Το πρωταρχικό ερώτημα τη στιγμή που ένας ασθενής έχει λάβει προσφορά μοσχεύματος ήπατος είναι ποιος

ασθενής δεν πρέπει με κανένα τρόπο να προχωρήσει σε μεταμόσχευση. Η τοποθέτηση συσκευής παρακολούθησης της ICP παραμένει μια αμφιλεγόμενη απόφαση διαχείρισης σε ασθενείς με OHA, καθώς αρκετές έρευνες και αναδρομικές μελέτες δεν έχουν καταδείξει βελτίωση της έκβασης ή της νευρολογικής αποκατάστασης. Επιπλέον, η διαδικασία σχετίζεται με ασυνήθιστες αλλά δυνητικά θανατηφόρες αιμορραγικές επιπλοκές. Η τοποθέτηση συσκευής παρακολούθησης της ICP εξαρτάται από τον ιατρό και το κέντρο, αλλά συνήθως διαφυλάσσεται για τους υποψηφίους για μεταμόσχευση ήπατος που περιμένουν την προσφορά μοσχεύματος με την ελπίδα να βελτιωθεί η διαχείριση του εγκεφαλικού οιδήματος και δεν θα τοποθετούνταν καθ' οδόν προς το χειρουργείο. Ωστόσο, έχει αποδειχθεί ότι ασθενείς με παρατεταμένη ενδοκράνια υπέρταση ή χαμηλές πιέσεις εγκεφαλικής αιμάτωσης που εκτιμώνται με παραμένονσα συσκευή παρακολούθησης της ICP έχουν κακή νευρολογική αποκατάσταση μετά τη μεταμόσχευση ήπατος. Ομοίως, θα μπορούσε να εξεταστεί το ενδεχόμενο ενός HEG κατά τη διάρκεια της περιόδου αναμονής εάν εξετάζεται το ενδεχόμενο επιληπτικών κρίσεων. Το διακρανιακό Doppler και η διάμετρος της θήκης του οπτικού νεύρου είναι μη επεμβατικές διαδικασίες για την εκτίμηση της ICP. Η μόνη καλύτερη εξέταση για να καθοριστεί εάν ένας ασθενής δεν πρέπει με κανένα τρόπο να υποβληθεί σε μεταμόσχευση ήπατος είναι η διενέργεια αξονικής τομογραφίας κεφαλής για την αναζήτηση ενδείξεων μη αναστρέψιμης εγκεφαλικής βλάβης, όπως ο εγκολεασμός του εγκεφαλικού στελέχους.

5. Η νοητική κατάσταση ενός ασθενούς με OHA που προκλήθηκε από υπερδοσολογία ακεταμινοφαίνης έχει επιδεινωθεί από ηπατική εγκεφαλοπάθεια βαθμού 1/2 σε μη αντιδρώσα κατάσταση κατά τις προηγούμενες 12 ώρες. Ποιο από τα παρακάτω πρέπει να αποκλειστεί επείγοντως;

- α.** Εγκολεασμός εγκεφαλικού στελέχους
- β.** Λοίμωξη
- γ.** Οξεία νεφρική βλάβη
- δ.** Σύνδρομο οξείας αναπνευστικής δυσχέρειας και υποξαιμία
- ε.** Υπονατρίαμια

Απάντηση: β. Η αιφνίδια εξέλιξη από χαμηλού βαθμού σε υψηλού βαθμού ηπατική εγκεφαλοπάθεια σε ασθενή με OHA πρέπει να θεωρείται ένδειξη λοίμωξης μέχρι αποδείξεως του αντιθέτου. Ο πιο συχνός παράγοντας κινδύνου για αιφνίδια, ταχεία, επιδείνωση της ηπατικής εγκεφαλοπάθειας από ήπιου σε υψηλού βαθμού είναι η λοίμωξη. Οι άλλες επιπλοκές της OHA που απαριθμούνται θα ήταν ασφαλώς αναμενόμενο να οδηγήσουν σε επιδείνωση της εγκεφαλοπάθειας, αλλά θα εμφανίζονταν σε ασθενή με προϋπάρχουσα εγκεφαλοπάθεια υψηλού βαθμού (εγκολεασμός εγκεφαλικού στελέχους) ή πιο σταδιακά.

ΚΕΦΑΛΑΙΟ 72

Αιμορραγία Πεπτικού Συστήματος

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Ερωτήσεις Ανασκόπησης

1. Ένας άνδρας 46 ετών χωρίς σημαντικά ιατρικά προβλήματα προσέρχεται στο τμήμα επειγόντων περιστατικών μετά από πολλαπλές μέλαινες κενώσεις με αίσθημα παλμών και ζάλη. Λαμβάνει ΜΣΑΦ για οξεία εμφάνιση πόνου στην πλάτη εδώ και 1 εβδομάδα. Κατά την προσέλευση, ο σφυγμός του είναι 122 παλμοί/λεπτό και η αρτηριακή πίεση 98/52 mm Hg. Η αιμοσφαιρίνη του είναι 7,8 g/dl και τα αποτελέσματα των ηπατικών εξετάσεων και των παραγόντων πήξης είναι φυσιολογικά. Ποια από τις ακόλουθες δηλώσεις είναι περισσότερο σωστή;

- α. Η παρουσία μέλαινας υποδεικνύει με υψηλό βαθμό ββαιότητας την προέλευση της αιμορραγίας ως αιμορραγία από τον ανώτερο γαστρεντερικό σωλήνα εγγύς του συνδέσμου του Treitz
- β. Εκτός από την αιμοδυναμική αναζωογόνηση, πρέπει να χορηγηθεί αμέσως μετάγγιση αίματος με στόχο την επίτευξη επιπέδου αιμοσφαιρίνης 10 mg/dl
- γ. Η ενδοσκόπηση θα πρέπει να διενεργείται εντός 6 ωρών από την προσέλευση, καθώς αυτό θα μειώσει τόσο τον κίνδυνο επαναιμορραγίας όσο και τη συνολική θνητότητα
- δ. Η τοποθέτηση ρινογαστρικού σωλήνα θα πρέπει να αποφεύγεται, δεδομένης της έλλειψης αποδεδειγμένου οφέλους στη μείωση της θνητότητας ή των ποσοστών επαναιμορραγίας και στην πρόβλεψη της υπεύθυνης βλάβης

Απάντηση: δ. Η πηγή της μέλαινας μπορεί να είναι το λεπτό έντερο άνω του συνδέσμου του Treitz και μερικές φορές ακόμη και το εγγύς τμήμα του παχέος εντέρου. Η μετάγγιση αίματος πρέπει να αποφεύγεται εάν η αιμοσφαιρίνη είναι πάνω από 7 g/dl. Σε μελέτη αξιολόγησης της μετάγγισης αίματος για αιμορραγία από το ανώτερο πεπτικό διαπιστώθηκε σημαντικά υψηλότερο ποσοστό επιβίωσης και χαμηλότερο ποσοστό επαναιμορραγίας όταν ακολουθήθηκε ένα περιοριστικό κατώφλι μετάγγισης που προέβλεπε μετάγγιση μόνο εάν το επίπεδο αιμοσφαιρίνης ήταν κάτω από 7 g/dL σε σύγκριση με ένα κατώφλι 9 g/dL. Αν και η επείγουσα ενδοσκόπηση (εντός 12 ωρών από την παρουσίαση) μπορεί να μειώσει τη διάρκεια νοσηλείας και τις ανάγκες μετάγγισης σε ασθενείς με κλινικά χαρακτηριστικά υψηλού κινδύνου, δεν έχει καμία επίδραση στον κίνδυνο επαναιμορραγίας και στη θνητότητα. Η τοποθέτηση ρινογαστρικού σωλήνα θα πρέπει να αποφεύγεται για τους λόγους που αναφέρονται στην επιλογή δ.

2. Στην προηγούμενη περίπτωση, διενεργήθηκε ανώτερη ενδοσκόπηση, η οποία κατέδειξε μεγάλο γαστρικό έλκος με προσκολλημένο θρόμβο. Ποια από τις ακόλουθες δηλώσεις είναι περισσότερο σωστή;

- α. Σε αντίθεση με ένα έλκος με ορατό αγγείο, ένα έλκος με προσκολλημένο θρόμβο έχει χαμηλό κίνδυνο επαναιμορραγίας
- β. Η καταστολή του οξέος με ενδοφλέβιο αναστολέα αντλίας πρωτονίων θα πρέπει να χορηγηθεί αμέσως μετά την ενδοσκόπηση, καθώς αυτό θα μειώσει τον κίνδυνο επαναιμορραγίας
- γ. Η ενδοσκοπική θεραπεία με τοπικό αιμοστατικό σπρέι είναι ο απλούστερος και αποτελεσματικότερος τρόπος αντιμετώπισης του περιγραφόμενου έλκους

δ. Ενδείκνυται επαναληπτική ενδοσκόπηση σε 72 ώρες για την αξιολόγηση της ανταπόκρισης στη θεραπεία και της ανάγκης για περαιτέρω ενδοσκοπική παρέμβαση

Απάντηση: β. Ένα έλκος με προσκολλημένο θρόμβο έχει υψηλό κίνδυνο επαναιμορραγίας (βλ. Πίνακα 72.5). Παρόλο που τα τοπικά αιμοστατικά σπρέι έχουν δείξει κάποια ελπιδοφόρα αποτελέσματα, ο ρόλος αυτής της νέας μεθόδου παραμένει ασαφής ελλείψει μελετών που να τη συγκρίνουν με άλλες παραδοσιακές μεθόδους αιμόστασης. Η επαναληπτική ενδοσκόπηση δεν ενδείκνυται, εκτός εάν υπάρχουν σημεία ή συμπτώματα υποτροπιάζουσας αιμορραγίας. Σε ασθενείς που διαπιστώθηκε ότι έχουν βλάβες υψηλού κινδύνου που αντιμετωπίστηκαν ενδοσκοπικά, οι κατευθυντήριες γραμμές συνιστούν ενδοφλέβια bolus χορήγηση αναστολέα πρωτονίων, ακολουθούμενη από θεραπεία συνεχούς έγχυσης.

3. Άνδρας 76 ετών παρουσιάζει πέντε επεισόδια μέτριας έως μεγάλης ποσότητας αιματοχεσίας και αναφέρει ζάλη. Ο σφυγμός του είναι αρχικά 130 παλμοί/λεπτό με υπόταση. Μετά από bolus χορήγηση υγρών η αρτηριακή του πίεση ομαλοποιείται και ο σφυγμός του μειώνεται στους 112 παλμούς/λεπτό. Παρουσιάζει άλλο ένα επεισόδιο αιματοχεσίας στο τμήμα επειγόντων περιστατικών.

Μετά την τοποθέτηση καθετήρα Foley και την περαιτέρω αναζωογόνηση με υγρά με στόχο την αρτηριακή πίεση, τον καρδιακό ρυθμό και την παραγωγή ούρων, ποια από τις ακόλουθες δηλώσεις σχετικά με τη διαχείριση αυτού του ασθενούς είναι η πιο σωστή;

- α. Θα πρέπει να γίνει στη συνέχεια σπινθηρογράφημα ραδιονουκλιδίου με σκοπό την επιβεβαίωση ότι η περιοχή της αιμορραγίας βρίσκεται στο παχύ έντερο ενόψει χειρουργικής επέμβασης
- β. Η κολονοσκόπηση θα πρέπει να διενεργείται εντός 24 ωρών από την προσέλευση για διαγνωστικούς και θεραπευτικούς σκοπούς
- γ. Η άμεση μετάβαση σε χειρουργική επέμβαση είναι η πλέον ενδεδειγμένη πορεία δράσης, καθώς ο ασθενής αυτός διατρέχει υψηλό κίνδυνο καταστροφικής επαναιμορραγίας
- δ. Η ραδιονουκλιδική απεικόνιση προτιμάται έναντι της αξονικής αγγειογραφίας ως μέθοδος για τον εντοπισμό της θέσης της αιμορραγίας πριν από την αγγειογραφία

Απάντηση: β. Η κολονοσκόπηση πρέπει να διενεργείται εντός 24 ωρών από την προσέλευση για διαγνωστικούς και δυνητικά θεραπευτικούς σκοπούς. Ο ρόλος της απεικόνισης με ραδιονουκλίδια είναι αμφιλεγόμενος λόγω της ασυνεπούς και ευρέως μεταβαλλόμενης ακρίβειας στον εντοπισμό της αιμορραγίας και του υψηλού ποσοστού ψευδώς θετικών αποτελεσμάτων. Η αξονική αγγειογραφία μπορεί να εντοπίσει καλύτερα την πηγή της αιμορραγίας σε σύγκριση με τη σάρωση με ραδιονουκλίδια. Η χειρουργική επέμβαση ενδείκνυται σε περιπτώσεις συνεχιζόμενης αιμορραγίας (ιδίως εκκολπωματικής) και μαζικής συνεχιζόμενης αιμορραγίας με υψηλές απαιτήσεις μετάγγισης (γενικά >6 μονάδες συμπυκνωμένων ερυθρών αιμοσφαιρίων σε διάστημα 24 ωρών).

ΚΕΦΑΛΑΙΟ 73

Οξεία Παγκρεατίτιδα

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Ερωτήσεις Ανασκόπησης

1. Ποια από τις παρακάτω δηλώσεις σχετικά με την παροχή τροφής σε ασθενείς με επιπλεγμένη οξεία παγκρεατίτιδα είναι η πιο σωστή;

- α. Στην οξεία φάση, η παρεντερική διατροφή προτιμάται από την εντερική διατροφή για την πρόληψη της διέγερσης του παγκρέατος
- β. Η πρόωμη έναρξη της εντερικής διατροφής μειώνει τη συχνότητα των λοιμωδών επιπλοκών
- γ. Η ρινονηστιδική (μεταπυλωρική) χορήγηση εντερικής διατροφής υπερτερεί της ρινογαστρικής σίτισης
- δ. Ο παραλυτικός ειλεός είναι σπάνια επιπλοκή της επιπλεγμένης παγκρεατίτιδας

Απάντηση: β. Η πρόωμη (3^η-5^η ημέρα) έναρξη της εντερικής διατροφής σε ασθενείς με σοβαρή παγκρεατίτιδα έχει αποδειχθεί ότι είναι ασφαλής και οδηγεί σε βελτιωμένες εκβάσεις επιβίωσης και λοιμώξεων σε σχέση με την παρεντερική διατροφή. Η παρεντερική διατροφή, είτε μερική είτε ολική, μπορεί να εξακολουθεί να απαιτείται στη ρύθμιση του παραλυτικού γαστρεντερικού ειλεού, ο οποίος παραμένει συχνός στο πλαίσιο της επιπλεγμένης, ιδίως της λοιμώδους, παγκρεατίτιδας. Λόγω της γειννίας του στομάχου με το πάγκρεας, ο απομονωμένος γαστρικός ειλεός μπορεί να αποτελεί πρόβλημα σε ορισμένες περιπτώσεις, και σε αυτή την περίπτωση, οι ασθενείς μπορεί να επωφεληθούν από την τοποθέτηση ενός ρινονηστιδικού σωλήνα σίτισης που παρακάμπτει τον στόμαχο, ώστε να παρέχεται συνεχής εντερική διατροφή. Μια ευρέως διαδεδομένη πεποίθηση ήταν ότι η συνήθης ρινονηστιδική σίτιση μπορεί να είναι επωφελής λόγω της ελαχιστοποίησης της παγκρεατικής διέγερσης· ωστόσο, τα αποτελέσματα έχουν αποδειχθεί ισοδύναμα μεταξύ της ρινογαστρικής και της ρινονηστιδικής προσέγγισης της σίτισης.

2. Ένας 57χρονος άνδρας εισήχθη στη μονάδα εντατικής θεραπείας (ΜΕΘ) με νεκρωτική παγκρεατίτιδα δευτεροπαθούς αιτιολογίας λόγω αλκοόλ. Έλαβε μαζική αναζωογόνηση με υγρά, παροδική υποστήριξη με αγγειοσυσπαστικά και επεμβατικό αερισμό με θετική πίεση. Η κατάστασή του είχε βελτιωθεί, αλλά καθώς εισέρχεται στη δεύτερη εβδομάδα της εισαγωγής του, εμφανίζει εκ νέου πυρετό και γίνεται επανέναρξη της υποστήριξης με αγγειοσυσπαστικά. Υπάρχει υποψία λοιμώδους νέκρωσης του παγκρέατος. Όσον αφορά τη λοιμώδη παγκρεατική νέκρωση, ποια από τις ακόλουθες δηλώσεις είναι η πιο σωστή;

- α. Τα αναερόβια βακτήρια είναι οι πιο συχνά απομονούμενοι μικροοργανισμοί από καλλιέργειες λοιμώδους παγκρεατικής νέκρωσης
- β. Η έγκαιρη παροχέτευση των παγκρεατικών ψευδοκύστεων κατά την ανίχνευση προλαμβάνει τη λοίμωξη
- γ. Τα προφυλακτικά αντιβιοτικά μειώνουν τον κίνδυνο παγκρεατικής λοίμωξης
- δ. Περίπου το ένα τρίτο των ασθενών με νεκρωτική παγκρεατίτιδα θα αναπτύξει λοιμώδη νέκρωση

Απάντηση: δ. Περίπου το ένα τρίτο των ασθενών με νεκρωτική παγκρεατίτιδα αναπτύσσουν λοιμώδη νέκρωση του παγκρέατος. Η χρήση προφυλακτικών αντιβιοτικών δεν έχει αποδειχθεί σαφώς ότι προλαμβάνει την παγκρεατική λοίμωξη. Η πιο πιθανή πηγή των αιτιολογικών μικροβίων είναι η μετατόπιση της αερόβιας γαστρεντερικής χλωρίδας, ιδίως από τον ανώτερο γαστρεντερικό σωλήνα. Η αναερόβια βακτηριακή λοίμωξη στην παγκρεατική νέκρωση είναι λιγότερο συχνή και είναι πιθανότατα αποτέλεσμα διακριτής εντερικής ρήξης (π.χ. διάτρηση του παχέος εντέρου δευτερογενώς λόγω ισχαιμίας).

Οι παγκρεατικές ψευδοκύστες προκύπτουν από τη διαρροή παγκρεατικών ενζύμων από τους πόρους του κατεστραμμένου αδένου στο οπισθογαστρικό έλασσον επίπλουν της περιτοναϊκής κοιλότητας. Οι ψευδοκύστες μπορεί να γίνουν συμπτωματικές λόγω επίδρασης μάζας (π.χ. πόνος, απόφραξη γαστρικής εξόδου) ή λόγω δευτερογενούς λοίμωξης. Στις περιπτώσεις αυτές, η παροχέτευση με χειρουργικά, ενδοσκοπικά ή ακτινολογικά μέσα είναι ευεργετική. Ωστόσο, οι ψευδοκύστες είναι αρχικά στείρες και η παροχέτευση ρουτίνας μπορεί να οδηγήσει σε ιατρογενή λοίμωξη· συνεπώς δεν ενθαρρύνεται. Επιπλέον, η διαδερμική παροχέτευση μπορεί να οδηγήσει στο σχηματισμό επίμονου παγκρεατοδερματικού συριγγίου.

3. Όσον αφορά τη χολολιθιασική παγκρεατίτιδα, ποια από τις ακόλουθες δηλώσεις είναι πιο σωστή;

- α. Η οριστική αντιμετώπιση της χολολιθιασικής παγκρεατίτιδας είναι η ενδοσκοπική παλίνδρομη χολαγγειοπαγκρεατογραφία (ERCP) με σφιγκτηροτομή
- β. Η επίπτωση της χολολιθιασικής παγκρεατίτιδας μειώνεται
- γ. Η χολοκυστεκτομή είναι η πιο αποτελεσματική θεραπεία για την πρόληψη της υποτροπής
- δ. Η χολολιθιασική παγκρεατίτιδα είναι αποτέλεσμα επίμονης απόφραξης του χοληδόχου πόρου από χολόλιθο

Απάντηση: δ. Η χολολιθιασική παγκρεατίτιδα είναι η πιο συχνή αιτία οξείας παγκρεατίτιδας. Η επίπτωσή της αυξάνεται, αντανakλώντας την αυξανόμενη παγκόσμια επιβάρυνση από την παχυσαρκία. Η υποκείμενη παθοφυσιολογία προκύπτει από μια παροδική αύξηση της ενδοπορικής πίεσης εντός του χοληφόρου δέντρου κατά τη διέλευση του λίθου από τη χοληδόχο κύστη στο δωδεκαδάκτυλο και όχι από επίμονη απόφραξη του κοινού χοληδόχου πόρου από έναν χολόλιθο.

Ασθενείς με αποδεδειγμένους ή πιθανούς επίμονα παραμένοντες χολόλιθους θα πρέπει να υποβάλλονται σε ERCP για την απομάκρυνση των λίθων· σε ασθενείς με απαγορευτικό χειρουργικό κίνδυνο, η ERCP με σφιγκτηροτομή μπορεί να χρησιμοποιηθεί για να μειωθεί ο κίνδυνος επακόλουθων περιπτώσεων παγκρεατίτιδας από χολόλιθους. Ωστόσο, το πιο αποτελεσματικό μέσο για την πρόληψη μεταγενέστερων κρίσεων χολολιθιασικής παγκρεατίτιδας είναι η αφαίρεση της πηγής των χολόλιθων με αφαίρεση της χοληδόχου κύστης (χολοκυστεκτομή).

ΚΕΦΑΛΑΙΟ 74

Αιμορραγικές και Θρομβωτικές Διαταραχές

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Ερωτήσεις Ανασκόπησης

1. Ένας άνδρας 70 ετών έχει νεφρική νόσο τελικού σταδίου και υποβάλλεται σε αιμοκάθαρση. Αναπτύσσει πνευμονική εμβολή που απαιτεί αντιπηκτική αγωγή. Ποια από τις παρακάτω επιλογές θα ήταν η καλύτερη επιλογή για την αρχική αντιπηκτική αγωγή;

- α. Μη κλασματοποιημένη ηπαρίνη με βάση το βάρος
- β. Αργατρομπάνη 2 mg/kg/min σε σταθερή έγχυση
- γ. Fondaparinux με μείωση της δόσης κατά 50%
- δ. Ριβαροξαμπάνη σε πλήρη δόση
- ε. Απιξαμπάνη σε πλήρη δόση

Απάντηση: α. Η δοσολογία της μη κλασματοποιημένης ηπαρίνης με βάση το βάρος δεν επηρεάζεται από τη νεφρική λειτουργία. Αν και η αργατρομπάνη μεταβολίζεται από το ήπαρ και δεν χρειάζεται μείωση της δόσης για τη νεφρική νόσο, το κόστος της περιορίζει τη χρήση της σε άτομα με θρομβοπενία που προκαλείται από ηπαρίνη ή πραγματική αλλεργία στην ηπαρίνη. Το fondaparinux έχει χρόνο ημιζωής 18 ωρών σε φυσιολογικά άτομα και απεκκρίνεται μέσω των νεφρών. Αντενδείκνυται σε κάθαρση κρεατινίνης (CrCl) μικρότερη από 30 ml/min. Καμία από τις κλινικές δοκιμές με τη ριβαροξαμπάνη ή την απιξαμπάνη δεν συμπεριέλαβε άτομα με CrCl μικρότερη από 25 έως 30 ml/min. Η ριβαροξαμπάνη δεν πρέπει να χρησιμοποιείται σε CrCl μικρότερη από 15 έως 25 ml/min. Η απιξαμπάνη αποτελεί μια ενδιαφέρουσα επιλογή επειδή έχει τη μικρότερη νεφρική κάθαρση από τα άμεσα από του στόματος αντιπηκτικά (DOACs). Παρόλο που δεν υπήρξε διαφορά στα επίπεδα της απιξαμπάνης σε άτομα υπό αιμοκάθαρση στα οποία χορηγήθηκε εφάπαξ δόση απιξαμπάνης σε σύγκριση με φυσιολογικά άτομα, δεν υπάρχουν δεδομένα αποτελεσματικότητας και ασφάλειας σχετικά με τη χρήση της απιξαμπάνης όταν χορηγείται χρονίως σε άτομα που κάνουν αιμοκάθαρση.

2. Ένας άνδρας 68 ετών με ιστορικό υπέρτασης, διαβήτη και κολπικής μαρμαρυγής παρουσιάζεται με αλλοιωμένη διανοητική κατάσταση. Ο ασθενής αρχικά «βρέθηκε πεσμένος στο έδαφος», χωρίς τις αισθήσεις του. Σύμφωνα με την κόρη του, ο ασθενής λαμβάνει μεθορφίνη, ασπιρίνη, λισινοπρίλη και δαμπίγκατράνη. Έλαβε αυτά τα φάρμακα πριν από 1 ώρα. Τα ζωτικά σημεία είναι φυσιολογικά. Ο πλήρης βιοχημικός έλεγχος και η γενική αίματος είναι εντός των φυσιολογικών ορίων. Το διεθνές κανονικοποιημένο πηλίκιο (INR) είναι 1,1 (φυσιολογικό <1,2) και ο χρόνος ενεργοποιημένης μερικής θρομβοπλαστίνης (aPTT) είναι 27 δευτερόλεπτα (φυσιολογικός 22-29 δευτερόλεπτα). Η αξονική τομογραφία (CT) κεφαλής δείχνει υποσκληρίδιο αιμορραγία που δεν προκαλεί πίεση στους γύρω ιστούς. Ποιος είναι ο καλύτερος τρόπος θεραπείας;

- α. Βιταμίνη Κ
- β. Συμπύκνωμα συμπλόκου προθρομβίνης
- γ. Idarucizumab
- δ. Πρωταμίνη
- ε. Δεν χρειάζεται παρέμβαση επειδή ο χρόνος προθρομβίνης (PT) και ο aPTT είναι φυσιολογικοί

Απάντηση: γ. Το idarucizumab είναι ένα εξανθρωπισμένο μονοκλωνικό αντίσωμα ποντικού που συνδέεται με τη δαμπίγκατράνη με υψηλή συγγένεια, αντιστρέφοντας τις αντιπηκτικές επιδράσεις και τις συγκεντρώσεις της στον ορό. Αυτό φάνηκε στη μελέτη Reversal Effects of Idarucizumab on Active Dabigatran (RE-VERSE-AD). Η βιταμίνη Κ αποτελεί παράγοντα αντιστροφής της βαρφαρίνης. Το συμπύκνωμα συμπλόκου προθρομβίνης (PCC) έχει χρησιμοποιηθεί κυρίως σε μελέτες in vitro και σε ζωικά μοντέλα, αλλά δεν υπάρχουν ισχυρά κλινικά στοιχεία στον άνθρωπο. Παρόλο που ο ασθενής λαμβάνει δαμπίγκατράνη, το PT και το aPTT μπορεί να είναι φυσιολογικά ανάλογα με την ευαισθησία των αντιδραστηρίων και τον χρόνο που έχει παρέλθει από τη λήψη της δόσης μέχρι τη λήψη του αίματος.

3. Μια γυναίκα 28 ετών χωρίς σημαντικό ιατρικό ιστορικό στο παρελθόν εισάγεται στη μονάδα εντατικής θεραπείας με πνευμονική εμβολή δίκην σέλας. Το INR της είναι 1,0 (φυσιολογικό <1,2) με aPTT 41,4 δευτερόλεπτα (φυσιολογικό 22-29 δευτερόλεπτα). Τα αποτελέσματα της γενικής αίματος και του πλήρους βιοχημικού ελέγχου είναι φυσιολογικά. Δεν υπάρχει ιστορικό αιμορραγίας στην ασθενή ή σε κάποιο μέλος της οικογένειας. Ποια από τις παρακάτω είναι η καλύτερη διαγνωστική εξέταση;
- α. Επίπεδο ADAMTS13 (δισιντεγρίνη και μεταλλοπρωτεϊνάση με πρότυπο θρομβοσπονδίνης τύπου 1, της ομάδας 13)
 - β. Προφίλ von Willebrand
 - γ. Επίπεδο παράγοντα X
 - δ. Μελέτες ανάμιξης
 - ε. Παράγοντας H του συμπληρώματος

Απάντηση: δ. Οι μελέτες ανάμιξης θα καθορίσουν εάν το παρατεταμένο aPTT οφείλεται σε ανεπάρκεια παραγόντων ή στην παρουσία ενός κυκλοφορούντος αναστολέα. Οι μελέτες ανάμιξης είναι εξετάσεις που διενεργούνται στο πλάσμα του αίματος και χρησιμοποιούνται για τη διάκριση της ανεπάρκειας παραγόντων από τους αναστολείς παραγόντων (όπως το αντιπηκτικό του λύκου). Οι μελέτες ανάμιξης εκμεταλλεύονται το γεγονός ότι τα επίπεδα παραγόντων που βρίσκονται στο 50% του φυσιολογικού θα πρέπει να δίνουν φυσιολογικό αποτέλεσμα PT ή μερικού χρόνου θρομβοπλαστίνης (PTT). Οι μελέτες ανάμιξης αποτελούν χρήσιμο εργαλείο για την αξιολόγηση των διαταραχών της πήξης. Η ADAMTS13 είναι ανεπαρκής στη θρομβωτική θρομβοπενική πορφύρα και δεν θα ήταν χρήσιμη με μία φυσιολογική γενική αίματος. Αν και οι περισσότεροι ασθενείς με νόσο von Willebrand έχουν αυξημένη aPTT, η ασθενής δεν έχει ιστορικό αιμορραγίας, καθιστώντας έτσι κάτι τέτοιο απίθανο. Η ανεπάρκεια του παράγοντα X προκαλεί αύξηση του INR και του APTT επειδή βρίσκεται στην κοινή οδό. Ανωμαλίες στην πρωτεΐνη H του συμπληρώματος μπορεί να προδιαθέτουν σε άτυπο συγγενικό-αιμολυτικό σύνδρομο ενηλίκων, το οποίο δεν περιλαμβάνεται στη διαφορική διάγνωση με φυσιολογική γενική αίματος και φυσιολογική νεφρική λειτουργία.

ΚΕΦΑΛΑΙΟ 75

Χρήση Συστατικών του Αίματος στη Μονάδα Εντατικής Θεραπείας

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Ερωτήσεις Ανασκόπησης

1. Ένας 48χρονος με ατομικό αναμνηστικό πολλαπλού μυελώματος, οποίος έχει υποβληθεί σε μεταμόσχευση μυελού των οστών, εισάγεται στη ΜΕΘ λόγω ήπιας αιμορραγίας με σοβαρή θρομβοπενία (αριθμός αιμοπεταλίων $4000/\text{mm}^3$). Μεταγγίζεται με πέντε μονάδες αιμοπεταλίων τυχαίου δότη και ο αριθμός αιμοπεταλίων μετά τη μετάγγιση είναι $10.000/\text{mm}^3$. Η ήπια αιμορραγία συνεχίζεται. Ποιο από τα παρακάτω αποτελεί την καλύτερη επόμενη θεραπευτική απόφαση;

- α. Προσδιορισμός ανθρωπίνων λευκοκυτταρικών αντιγόνων (HLA) και μετάγγιση HLA-συμβατών αιμοπεταλίων μοναδικού δότη.
- β. Μετάγγιση συμπυκνωμένων αιμοπεταλίων συμβατών ως προς το σύστημα ABO, από αιμοληψία που διενεργήθηκε εντός των τελευταίων 48 ωρών.
- γ. Δεν απαιτείται άλλη μετάγγιση, αλλά μόνο παρακολούθηση του αριθμού αιμοπεταλίων ανά 8 ώρες.
- δ. Χορήγηση πρεδνιζόνης για 2 εβδομάδες.

Απάντηση: α. Η μετάγγιση συμπυκνωμένων αιμοπεταλίων συμβατών ως προς το σύστημα ABO, από αιμοληψία που διενεργήθηκε εντός των τελευταίων 48 ωρών είναι προαιρετική σε αυτό το περιστατικό. Μπορεί να παρατηρηθεί πτωχή ανταπόκριση στη μετάγγιση αιμοπεταλίων σε ασθενείς με σπληνομεγαλία, πυρετό και διάχυτη ενδαγγειακή πήξη (DIC), μετάγγιση αιμοπεταλίων υποβέλτιστης ποιότητας ή μεταμόσχευση μυελού των οστών. Όταν μετά τη μετάγγιση αιμοπεταλίων δεν επιτυγχάνεται η αναμενόμενη αύξηση του αριθμού τους, η μετάγγιση συμπυκνωμένων αιμοπεταλίων συμβατών ως προς το σύστημα ABO, από αιμοληψία που διενεργήθηκε εντός των τελευταίων 48 ωρών μπορεί να βελτιώσει την ανταπόκριση. Εάν σε έναν ασθενή χωρίς παράγοντες κινδύνου για πτωχή ανταπόκριση στη μετάγγιση αιμοπεταλίων δεν διαπιστωθεί αύξηση του αριθμού τους, συνιστάται προσδιορισμός των HLA και μετάγγιση HLA-συμβατών αιμοπεταλίων μοναδικού δότη. Ο συγκεκριμένος ασθενής παραμένει συμπτωματικός μετά τη μετάγγιση αιμοπεταλίων και θα χρειαστεί πρόσθετα συμπυκνωμένα αιμοπετάλια. Η πρεδνιζόνη δεν θα βελτιώσει την ανταπόκριση στη μετάγγιση αιμοπεταλίων

2. Μια 78χρονη είχε νοσηλευτεί πριν από 10 ημέρες για αιμορραγία πεπτικού. Στη διάρκεια της νοσηλείας της χρειάστηκε να μεταγγιστεί με 4 μονάδες συμπυκνωμένων ερυθρών αιμοσφαιρίων. Τώρα προσέρχεται στο Τμήμα Επειγόντων Περιστατικών με πυρετό, ρίγος, και αιματοκρίτη 18%, αλλά χωρίς ενδείξεις ενεργού αιμορραγίας. Η ολική χολερυθρίνη είναι 5 mg/dL και η γαλακτική αφυδρογονάση (LDH) 1500 U/L . Με ποια από τις παρακάτω αιματολογικές εξετάσεις θα τεθεί η διάγνωση;

- α. Η διάγνωση αυτή είναι κλινική και δεν συνιστώνται αιματολογικές εξετάσεις.
- β. Επίχρισμα περιφερικού αίματος.
- γ. Έμμεση δοκιμασία αντισφαιρίνης (έμμεση Coombs)
- δ. Άμεση δοκιμασία αντισφαιρίνης (άμεση Coombs)

Απάντηση: δ. Η διάγνωση θα τεθεί με την άμεση δοκιμασία Coombs. Η ασθενής παρουσιάζει μια τυπική καθυστερημένη

αντίδραση μετά τη μετάγγιση, καθυστερημένη αιμολυτική αντίδραση και ορολογική αντίδραση. Οι αντιδράσεις αυτές κατά κανόνα εκδηλώνονται εντός 3-14 ημερών μετά τη μετάγγιση αλλά υποδιαγιγνώσκονται λόγω απουσίας χρονικής συσχέτισης. Οι ασθενείς προσέρχονται με πυρετό, ρίγος, και ανεξήγητη πτώση του αιματοκρίτη. Μπορεί να συνυπάρχει παροδική αύξηση της χολερυθρίνης και της LDH. Η διάγνωση τίθεται με την άμεση δοκιμασία Coombs, που θετικοποιείται λόγω επικάλυψης των ερυθρών αιμοσφαιρίων του δότη με τα αντισώματα του λήπτη. Η διάγνωση μπορεί να τεθεί με βάση το κλινικό σενάριο και επιβεβαιώνεται με την άμεση δοκιμασία Coombs. Το επίχρισμα περιφερικού αίματος μπορεί να παρουσιάζει ενδείξεις αιμόλυσης, αλλά δεν αρκεί για τη διαφοροδιάγνωση της καθυστερημένης αιμολυτικής αντίδρασης από άλλες αιμολυτικές αναμιξεις. Επιπλέον, η άμεση δοκιμασία Coombs ανιχνεύει την επικάλυψη των ερυθρών του δότη με τα αντισώματα του λήπτη, ενώ η έμμεση δοκιμασία Coombs δεν την ανιχνεύει.

3. Ποιο από τα παρακάτω αποτελεί τη συχνότερη λοιμώδη αιτία θανάτων μετά από μετάγγιση;

- α. Βακτήρια.
- β. Ιοί.
- γ. Μύκητες.
- δ. Παράσιτα.

Απάντηση: α. Η βακτηριακή επιμόλυνση αποτελεί την κυριότερη λοιμώδη αιτία θανάτων μετά από μετάγγιση στις ΗΠΑ, και το προϊόν αίματος με την υψηλότερη συχνότητα επιμόλυνσης είναι τα αιμοπετάλια αφαίρεσης. Το χρονικό διάστημα 2011-2015 το συχνότερο παθογόνο ήταν ο *Staphylococcus aureus* και ακολουθούσε και η *Babesia microti*.

4. Ποιο από τα παρακάτω συντέλεσε περισσότερο στη μείωση της επίπτωσης της οξείας πνευμονικής βλάβης που σχετίζεται με μετάγγιση (transfusion-related acute lung injury-TRALI);

- α. Η λευκαφαίρεση των προϊόντων ερυθρών αιμοσφαιρίων.
- β. Η μετάγγιση αιμοπεταλίων συμβατών ως προς το σύστημα ABO.
- γ. Η χρήση φρέσκου κατεψυγμένου πλάσματος από άντρα δότη.
- δ. Η χρήση προϊόντων ερυθρών αιμοσφαιρίων από αιμοληψία που διενεργήθηκε εντός των τελευταίων 14 ημερών.

Απάντηση: γ. Η επίπτωση της TRALI άρχισε να μειώνεται από τότε που οι τράπεζες αίματος υιοθέτησαν τη στρατηγική της μετάγγισης πλάσματος που προέρχεται κυρίως από άρρενες δότες. Με τον τρόπο αυτόν περιορίζεται η έκθεση του λήπτη στα λευκοκυτταρικά αντισώματα του δότη, μια παράμετρο που θεωρείται σημαντική στην εκδήλωση της TRALI. Η λευκαφαίρεση των προϊόντων ερυθρών αιμοσφαιρίων, η μετάγγιση αιμοπεταλίων συμβατών ως προς το σύστημα ABO και η χρήση προϊόντων ερυθρών αιμοσφαιρίων από αιμοληψία που διενεργήθηκε εντός των τελευταίων 14 ημερών, δεν έχουν συσχετιστεί με μείωση της TRALI.

ΚΕΦΑΛΑΙΟ 76

Εντατική Θεραπεία του Ογκολογικού Ασθενούς

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Ερωτήσεις Ανασκόπησης

1. Ένας 66χρονος εισάγεται στη ΜΕΘ με οξεία αναπνευστική ανεπάρκεια σε συνδυασμό με επίμονο πυρετό και ξηρό βήχα επί 2ημέρου. Πριν από 6 μήνες ο ασθενής είχε διαγνωστεί με οστεοσάρκωμα της θωρακικής μοίρας της σπονδυλικής στήλης για το οποίο υποβλήθηκε σε οπισθοπλάγια εκτομή επισκληρίδιου όγκου στο επίπεδο Θ1 έως Θ3 και υψηλού βαθμού συμπίεση του νωτιαίου μυελού στο επίπεδο Θ2, σε συνδυασμό με οπίσθια τμηματική σπονδυλοδεσία στο επίπεδο Α7 έως Θ4, ακολουθούμενες από συμπληρωματική χημειοθεραπεία με σισπλατίνη και δοξορουβικίνη, η τελευταία δόση των οποίων χορηγήθηκε μέσω καθετήρα με υποδόρια σήραγγα (tunneled) εννέα ημέρες πριν από την εισαγωγή του στη ΜΕΘ. Το ατομικό αναμνηστικό του περιλαμβάνει υπέρταση και στεφανιαία νόσο με εμφύτευση επικαλυμμένων με φαρμακευτικές ουσίες stent στον διαγώνιο κλάδο και στη μεσότητα του πρόσθιου κατιόντα πριν από 10 χρόνια. Κατά την εισαγωγή του στη ΜΕΘ, η ακτινογραφία θώρακος παρουσιάζει κατά τόπους πυκνωτικού τύπου αλλοιώσεις σε όλη την έκταση των πνευμονικών πεδίων άμφω. Ο αιματολογικός έλεγχος αποκαλύπτει τα εξής: αριθμός λευκοκυττάρων 100/μL ($0,1 \times 10^9/L$), αιμοσφαιρίνη 7 g/dL, αριθμός αιμοπεταλίων $9 \times 10^3/\mu L$ ($9 \times 10^9/L$), άζωτο ουρίας αίματος 29 mg/dL, κρεατινίνη 1,8 mg/dL, προκαλσιτονίνη 20,1 ng/mL. Χρειάστηκε να διασωληνωθεί και να τεθεί υπό μηχανικό αερισμό, και αντιμετωπίστηκε με ενδοφλέβια χορήγηση μεροπενέμης και μεταγίσεις αίματος. Ποιος από τους παρακάτω μικροοργανισμούς έχει τις περισσότερες πιθανότητες να εντοπιστεί στις αιμοκαλλιέργειες αυτού του ασθενούς;

α. *Corynebacterium jeikeium*

β. *Staphylococcus aureus*

γ. *Propionibacterium acnes*

δ. *Aspergillus fumigatus*

Απάντηση: β. Ως πυρετός στους ουδετεροπενικούς ασθενείς ορίζεται ως μια τιμή θερμοκρασίας $\geq 38,3^\circ C$ μετρημένη από το στόμα, ή θερμοκρασία $\geq 38^\circ C$ που επιμένει > 1 ώρα. Ως ουδετεροπενία συνήθως ορίζεται η μείωση του απόλυτου αριθμού ουδετεροφίλων σε επίπεδα < 1500 κύτταρα/μL, και ως σοβαρή ουδετεροπενία συνήθως ορίζεται η μείωση σε επίπεδα < 500 κύτταρα/μL, η ο απόλυτος αριθμός ουδετεροφίλων που αναμένεται να μειωθεί σε επίπεδα < 500 κύτταρα/μL εντός των επόμενων 48 ωρών. Χαμηλού κινδύνου θεωρούνται οι ασθενείς που αναμένεται να παραμείνουν ουδετεροπενικοί (απόλυτος αριθμός ουδετεροφίλων < 500 κύτταρα/μL) για ≤ 7 ημέρες και οι οποίοι δεν παρουσιάζουν συννοσηρότητες ή ηπατική/νεφρική ανεπάρκεια. Υψηλού κινδύνου θεωρούνται οι ασθενείς που αναμένεται να παραμείνουν ουδετεροπενικοί (απόλυτος αριθμός ουδετεροφίλων < 500 κύτταρα/μL) για > 7 ημέρες. Οι ασθενείς με ουδετεροπενικό πυρετό και συννοσηρότητες ή ενδείξεις ηπατικής/νεφρικής ανεπάρκειας θεωρούνται επίσης υψηλού κινδύνου, ανεξάρτητα από τη διάρκεια της ουδετεροπενίας. Τα παθογόνα που απομονώνονται συχνότερα στις αιμοκαλλιέργειες ασθενών με εμπύρετη ουδετεροπενική σήψη συγκαταλέγονται στους gram-θετικούς κόκκους και είναι ο *Staphylococcus epidermidis* (το συχνότερο), ο *Staphylococcus aureus* και *Streptococcus spp.* Λιγότερο συχνοί gram-θετικοί κόκκοι είναι οι εξής: *Corynebacterium jeikeium*, *Bacillus spp.*, *Leuconostoc spp.*, *Lactobacillus spp.*, *Propionibacterium acnes* και *Rhodococcus spp.* Ο ασπέργιλλος (*Aspergillus spp.*) θετικοποιεί σπάνια τις αιμοκαλλιέργειες. Στους ουδετεροπενικούς ασθενείς με σήψη και στους ασθενείς με ενδοκαρδίτιδα, σηπτική θρόμβωση και επανειλημμένα θετικές αιμοκαλλιέργειες, εκτός από την ενδοφλέβια χορήγηση αντιβιοτικών συστήνεται η πρόωμη αφαίρεση του κεντρικού φλεβικού καθετήρα.

ΚΕΦΑΛΑΙΟ 77

Εντατική Θεραπεία στην Κύηση

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Ερωτήσεις Ανασκόπησης

1. Ποιο από τα παρακάτω αποτελεί αναμενόμενη μεταβολή της μητρικής αναπνευστικής φυσιολογίας;
 - α. Μείωση της αναπνευστικής συχνότητας κατά 40%.
 - β. Αντιρροπούμενη αναπνευστική αλκάλωση.
 - γ. Μείωση της ροής αέρα (βίαια εκπνεόμενος όγκος στο 1^ο sec [FEV₁]) με την πρόοδο της κύησης
 - δ. Αύξηση της διαφοράς ανάμεσα στη μερική πίεση οξυγόνου στις κυψελίδες και στο αρτηριακό αίμα (PAO₂-PaO₂).
 - ε. Έκπτωση της διαφραγματικής λειτουργίας.

Απάντηση: β. Παρατηρείται αύξηση του αερισμού ως απάντηση της κεντρικής διέγερσης από την προγεστερόνη. Η αύξηση αυτή δεν οφείλεται στην υψηλότερη αναπνευστική συχνότητα αλλά στον αυξημένο αναπνεόμενο όγκο. Αυτό έχει ως αποτέλεσμα να εμφανίζεται αντιρροπούμενη αναπνευστική αλκάλωση. Ο FEV₁ και η PAO₂-PaO₂ δεν επηρεάζονται στη διάρκεια της κύησης, ενώ η διαφραγματική λειτουργία παραμένει αμετάβλητη.

2. Ποιο από τα παρακάτω ισχύει αναφορικά με τη διερεύνηση και την αντιμετώπιση της πνευμονικής θρομβοεμβολικής νόσου στην κύηση;
 - α. Το σπινθηρογράφημα αερισμού-αιμάτωσης αντενδείκνυται.
 - β. Η υπερηχητική φλεβογραφία κάτω άκρων αντενδείκνυται λόγω υψηλού ποσοστού ψευδώς θετικών αποτελεσμάτων.
 - γ. Η εμπειρική αντιμετώπιση είναι προτιμότερη από τις διαγνωστικές εξετάσεις για να ελαχιστοποιηθεί η επιβάρυνση του εμβρύου.
 - δ. Η ηπαρίνη χαμηλού βάρους (LMWH) αποτελεί τη θεραπεία εκλογής.
 - ε. Η αξονική πνευμονική αγγειογραφία εκθέτει το έμβρυο σε απαράδεκτα υψηλά επίπεδα ακτινοβολίας.

Απάντηση: δ. Η διερεύνηση της πνευμονικής θρομβοεμβολικής νόσου στην κύηση γίνεται με σπινθηρογράφημα αερισμού-αιμάτωσης ή αξονική πνευμονική αγγειογραφία. Και στα δύο τα επίπεδα ακτινοβολίας στα οποία εκτίθεται το έμβρυο είναι αποδεκτά χαμηλά. Αν και στην υπερηχητική φλεβογραφία κάτω άκρων το ποσοστό των ψευδώς θετικών αποτελεσμάτων είναι αυξημένο, η μέθοδος αυτή εξακολουθεί να είναι χρήσιμη και ασφαλής. Η εμπειρική αντιπηξία μάλλον ενέχει περισσότερους κινδύνους από τις διαγνωστικές εξετάσεις, και η θεραπεία εκλογής είναι η LMWH.

3. Ποιο από τα παρακάτω δεν ισχύει αναφορικά με τις λοιμώξεις του αναπνευστικού στη διάρκεια της κύησης;
 - α. Η βακτηριακή πνευμονία στις έγκυες οφείλεται στους ίδιους μικροοργανισμούς που προσβάλλουν τις μη έγκυες.
 - β. Η επηρεασμένη κυτταρική ανοσία αυξάνει την ευπάθεια των εγκύων σε συγκεκριμένες λοιμώξεις αναπνευστικού με αυξημένη σοβαρότητα.
 - γ. Οι έγκυες θα πρέπει να εμβολιάζονται κατά της γρίπης.
 - δ. Η αντιφυματική αγωγή στη διάρκεια της κύησης μπορεί να περιλαμβάνει ισονιαζίδη, ριφαμπικίνη και αιθαμβουτόλη.
 - ε. Στη διάρκεια της κύησης, η χορήγηση ακυκλοβίρης για την αντιμετώπιση της ανεμευλογιάς που επιπλέκεται από πνευμονία αντενδείκνυται.

Απάντηση: ε. Η βακτηριακή πνευμονία στις έγκυες οφείλεται στους ίδιους μικροοργανισμούς που προσβάλλουν τις μη έγκυες. Η επηρεασμένη κυτταρική ανοσία αυξάνει την ευπάθεια των εγκύων στη γρίπη και στην ανεμευλογιά, καθιστώντας αναγκαίο το αντιγριπικό εμβολιασμό των εγκύων. Η τριπλή αντιφυματική αγωγή (ισονιαζίδη, ριφαμπικίνη και αιθαμβουτόλη) είναι αποδεκτή στη διάρκεια της κύησης. Η ακυκλοβίρη συνιστάται για την αντιμετώπιση της σοβαρής ανεμευλογιάς και μπορεί να μειώνει τη θνητότητα – δεν αντενδείκνυται.

4. Ποιο από τα παρακάτω ισχύει αναφορικά με την καρδιακή ανακοπή στην κύηση;
 - α. Η καρδιοπνευμονική αναζωογόνηση (CPR) θα πρέπει να εκτελείται με την γυναίκα σε αριστερή πλάγια κατακεκλιμένη θέση και πρόσθια κάμψη του κορμού στις 30°.
 - β. Η περιθανάτια καισαρική τομή θα πρέπει να ξεκινά μετά την παρέλευση 4 min, εάν το έμβρυο είναι τελειόμηνο.
 - γ. Απινίδωση θα πρέπει να χορηγείται μόνο με προσθιοπίσθια ηλεκτρόδια για να μην προκληθεί βλάβη στο έμβρυο.
 - δ. Το ποσοστό επιβίωσης είναι χαμηλότερο από εκείνο των μη εγκύων εξαιτίας των καρδιοαναπνευστικών μεταβολών που συντελούνται στη διάρκεια της κύησης.
 - ε. Η υποξαιμία αποτελεί μια σημαντική αιτία καρδιακής ανακοπής και επί υποξαιμίας συνιστάται άμεση διασωλήνωση.

Απάντηση: ε. Η CPR είναι λιγότερο αποτελεσματική όταν ο κορμός βρίσκεται σε πρόσθια κάμψη 30° και είναι προτιμότερο η μήτρα να μετατοπίζεται με χέρια προς τα αριστερά ενώ η γυναίκα παραμένει σε ύπτια θέση στη διάρκεια της CPR. Περιθανάτια καισαρική τομή θα πρέπει να εκτελείται σε κάθε κύηση μετά την 20^η έως 24^η εβδομάδα (όταν ο πυθμένας της μήτρας βρίσκεται στο επίπεδο του ομφαλού) και όχι μόνο στις τελειόμηνες κύσεις. Η απινίδωση χορηγείται όπως στις μη έγκυες, χωρίς να πραγματοποιηθεί καμία αλλαγή, ενώ το ποσοστό επιβίωσης είναι υψηλότερο από εκείνο των μη εγκύων και ισούται περίπου με 5%. Οι έγκυες εμφανίζουν υποξαιμία ταχύτερα από τις μη έγκυες, οπότε πρέπει να δίνεται ιδιαίτερη προσοχή στην οξυγόνωση.

5. Ποιο από τα παρακάτω ισχύει αναφορικά με την αντιμετώπιση της αναπνευστικής ανεπάρκειας στην κύηση;
 - α. Ο τοκετός δεν οδηγεί πάντα σε βελτίωση της μητρικής αναπνευστικής λειτουργίας.
 - β. Ο αναπνεόμενος όγκος θα πρέπει να τροποποιείται με βάση το αυξημένο μητρικό βάρος.
 - γ. Ο αερισμός με στόχο τη μείωση της μερικής πίεσης του διοξειδίου του άνθρακα στο αρτηριακό αίμα (PaCO₂) είναι ωφέλιμος για την εμβρυϊκή υγεία.
 - δ. Οι μετρήσεις του κορεσμού της αιμοσφαιρίνης σε οξυγόνο δεν είναι αξιόπιστες στη διάρκεια της κύησης.
 - ε. Ο μη επεμβατικός αερισμός αντενδείκνυται στην κύηση.

Απάντηση: α. Ο τοκετός δεν οδηγεί απαραίτητα σε βελτίωση της αναπνευστικής λειτουργίας των γυναικών με αναπνευστική ανεπάρκεια. Ο ακριβής αναπνεόμενος όγκος και οι στόχοι των τιμών αερίων αίματος στη διάρκεια της κύησης παραμένουν αδιευκρίνιστα. Ο αναπνεόμενος όγκος υπολογίζεται συνήθως με βάση το ιδανικό βάρος σώματος που είναι συνάρτηση του ύψους, και άρα δεν επηρεάζεται από τη μητρική αύξηση βάρους στη διάρκεια της κύησης. Τα χαμηλά επίπεδα PaCO₂ μπορεί να βλάψουν το έμβρυο επειδή προκαλούν αγγειοσύσπαση στη μήτρα. Οι μετρήσεις του κορεσμού της αιμοσφαιρίνης σε οξυγόνο είναι αξιόπιστες στη διάρκεια της κύησης, και ο μη επεμβατικός αερισμός δεν αντενδείκνυται στην έγκυο που βρίσκεται σε εγρήγορση.

6. Ποιο από τα παρακάτω δεν ισχύει αναφορικά με τη μαιευτική αιμορραγία;
 - α. Η μέση απώλεια αίματος λόγω καισαρικής τομής ισούται με 1L.
 - β. Το τρανεξαμικό οξύ αντενδείκνυται στην κύηση λόγω υψηλού κινδύνου θρομβοεμβολής.
 - γ. Συσκευές με μπαλόνι μπορούν να χρησιμοποιηθούν για τον επιπωματισμό της μήτρας.
 - δ. Η έγχυση ωκυτοκίνης μπορεί να προκαλέσει υπονατριαμία.
 - ε. Ο διακαθετηριακός εμβολισμός μπορεί να εξαλείψει την ανάγκη για χειρουργική παρέμβαση.

Απάντηση: β. Η μέση απώλεια αίματος λόγω καισαρικής τομής ισούται περίπου με 1L. Οι συσκευές με μπαλόνι (π.χ. το μπαλόνι Bakri) είναι αποτελεσματικές για τον επιπωματισμό της μήτρας και τον περιορισμό της απώλειας αίματος. Η ωκυτοκίνη (λόγω της συγγένειάς της με την βαζοπρεσσίνη) σε υψηλές δόσεις μπορεί να προκαλέσει υπονατριαιμία. Ο διακαθετηριακός εμβολισμός

χρησιμοποιείται συχνά για τον έλεγχο των αιμορραγιών και την αποφυγή της χειρουργικής παρέμβασης. Στη μελέτη WOMAN (World Maternal Antifibrinolytic Trial), η πρώιμη (εντός 3 ωρών από την έναρξη της αιμορραγίας) χορήγηση τρανεξαμικού οξέος συσχετίστηκε με μείωση των θανάτων λόγω αιμορραγίας.

ΚΕΦΑΛΑΙΟ 78

Διατροφική Υποστήριξη

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Ερωτήσεις Ανασκόπησης

1. Ένας ασθενής με βάρος 75 kg κατά την εισαγωγή αναρρώνει από σήψη και οξεία πνευμονική βλάβη και είναι δύσκολο να απογαλακτιστεί από τον αναπνευστήρα παρά τη βελτίωση της ακτινογραφίας θώρακος. Ο κατά λεπτό αερισμός είναι 15 L/min. Το αναπνευστικό πηλίκο (RQ) με έμμεση θερμιδομετρία είναι 1,15. Λαμβάνει 3000 kcal/ημέρα (80% από υδατάνθρακες και 20% από λιπίδια) με τη μορφή ολικής παρεντερικής διατροφής (total parenteral nutrition-TPN). Ποια από τις παρακάτω είναι η καταλληλότερη διατροφική τροποποίηση;
 - α. Αλλαγή σε εντερική φόρμουλα πνευμονικής ανεπάρκειας
 - β. Αντικατάσταση μέρους των θερμίδων από υδατάνθρακες με πρωτεΐνες
 - γ. Μείωση των συνολικών θερμίδων σε 2250 kcal/ημέρα
 - δ. Αύξηση του ποσοστού των λιπαρών θερμίδων στο 50% των συνολικών θερμίδων (1500 kcal από λιπαρά/ημέρα)
 - ε. Αύξηση των συνολικών θερμίδων σε 4000 kcal/ημέρα

Απάντηση: γ. Συνιστάται στους βαρέως πάσχοντες ασθενείς να λαμβάνουν 25 έως 30 kcal/ημέρα. Η υπερσίτιση, η οποία οδηγεί σε λιπογένεση, αναμένεται να προκαλέσει αύξηση του RQ, ενώ η υποσίτιση, η οποία προάγει τη χρήση των ενδογενών αποθεμάτων λίπους, αναμένεται να προκαλέσει μείωση του RQ. Οι έντονες αυξήσεις στην παραγωγή διοξειδίου του άνθρακα (VCO_2 , με επακόλουθη αύξηση του RQ) ως απόκριση στην υπερσίτιση μπορεί να προκαλέσουν αναπνευστικό κίνδυνο σε ασθενείς με περιορισμένη πνευμονική εφεδρεία. Ένα RQ άνω του 1,0 υποστηρίζει την υπερσίτιση. Το RQ του 1,15 σε αυτή την περίπτωση υποδηλώνει σύνθεση λίπους και συνεπώς υπερσίτιση. Οι εξειδικευμένες φόρμουλες πνευμονικής ανεπάρκειας περιέχουν το 50% των θερμίδων ως λίπος, γεγονός που θα μειώσει το RQ, αλλά η αποφυγή της υπερσίτισης είναι πιο σημαντική.

2. Ένας ασθενής με σύνδρομο πολλαπλής οργάνικης δυσλειτουργίας, συμπεριλαμβανομένης της νεφρικής ανεπάρκειας, λαμβάνει συνεχή θεραπεία νεφρικής υποκατάστασης (continuous renal replacement therapy-CRRT). Ποιο από τα παρακάτω αντιπροσωπεύει την καταλληλότερη διατροφική οδηγία;
 - α. Ένα εξειδικευμένο σκεύασμα νεφρικής ανεπάρκειας με χαμηλή περιεκτικότητα σε πρωτεΐνες
 - β. Ένα τυπικό διατροφικό σκεύασμα με αναλογία θερμίδων μη πρωτεϊνικής προέλευσης προς άζωτο ίση με 150:1
 - γ. Ένα εντερικό σκεύασμα με υψηλή περιεκτικότητα σε πρωτεΐνες και ενδεχομένως την προσθήκη ενός συμπληρώματος πρωτεΐνης σε σκόνη ή σε υγρή μορφή
 - δ. Ένα εξειδικευμένο ανοσοτροποποιητικό εντερικό σκεύασμα που περιέχει ιχθυέλαιο και συμπληρωματική αργινίνη
 - ε. «Τυπική TPN» με αναλογία θερμίδων μη πρωτεϊνικής προέλευσης προς άζωτο ίση με 150:1

Απάντηση: γ. Παρόλο που η σίτιση με χαμηλή περιεκτικότητα σε πρωτεΐνες μπορεί να είναι κατάλληλη για ασθενείς με χρόνια νεφρική ανεπάρκεια που δεν είναι οξείως πάσχοντες, κάθε βαρέως πάσχων ασθενής με οξεία νεφρική ανεπάρκεια χρειάζεται διατροφή υψηλής περιεκτικότητας σε πρωτεΐνες κυρίως λόγω της καταβολικής νόσου που προκάλεσε τη νεφρική ανεπάρκεια. Οι ασθενείς που λαμβάνουν CRRT χρειάζονται στην πραγματικότητα αυξημένη πρωτεΐνη, συνήθως 2,0 έως 2,5 g/kg ημερησίως, για να αντισταθμιστούν οι απώλειες μέσω του φίλτρου της αιμοκάθαρσης. Οι εξειδικευμένες φόρμουλες νεφρικής ανεπάρκειας δεν συνιστώνται γενικά για οποιονδήποτε βαρέως πάσχοντα ασθενή με νεφρική ανεπάρκεια. Τα ανοσοτροποποιητικά σκεύασμα δεν συνιστώνται επί του παρόντος για βαρέως πάσχοντες ασθενείς με νεφρική ανεπάρκεια. Η χρήση της TPN δεν συνιστάται για ασθενείς που ανέχονται την εντερική σίτιση.

3. Ένας ασθενής με καλή θρέψη αναπτύσσει αδιαφοροποίητη καταπληξία και σύνδρομο οξείας αναπνευστικής δυσχέρειας μετά από μια δύσκολη επέμβαση στεφανιαίας παράκαμψης. Ο ασθενής σταθεροποιείται αιμοδυναμικά εντός 48 ωρών, αλλά εξακολουθεί να χρειάζεται υποστήριξη με αναπνευστήρα. Ξεκινά εντερική διατροφή μέσω ενός ρινονηστιδικού σωλήνα. Μετά από μία ακόμη ημέρα, ο ασθενής δεν ανέχεται την πλήρη εντερική σίτιση και συνεχίζει τη σίτιση στο 20% του ρυθμού στόχου. Ποια από τις παρακάτω είναι η καταλληλότερη διατροφική παρέμβαση σε αυτό το σημείο;
 - α. Διακόψτε την εντερική σίτιση και ξεκινήστε TPN
 - β. Χρησιμοποιήστε TPN για να συμπληρώσετε την εντερική διατροφή για να καλύψετε τις ανάγκες σε θερμίδες και πρωτεΐνες
 - γ. Επιβάλλετε την εντερική σίτιση, αγνοώντας τον υπολειπόμενο γαστρικό όγκο, για να επιτύχετε πλήρη εντερική σίτιση
 - δ. Συνεχίστε την «τροφική σίτιση» για έως και μία εβδομάδα πριν εξετάσετε την προσθήκη TPN

Απάντηση: δ. Η πρώιμη χορήγηση TPN δεν ενδείκνυται σε ασθενείς χαμηλού κινδύνου. Σε ασθενείς υψηλότερου κινδύνου, όπως ο συγκεκριμένος, οι Casaer και συν.⁹⁵ απέδειξαν σε μια μεγάλη τυχαioποιημένη ελεγχόμενη μελέτη σε ασθενείς ΜΕΘ ότι η καθυστερημένη συμπλήρωση με TPN (στις 8 ημέρες), σε σύγκριση με την πρώιμη συμπλήρωση με TPN, σε περιπτώσεις ανεπαρκούς εντερικής σίτισης, μείωσε τις λοιμώξεις, τη θεραπεία νεφρικής υποκατάστασης και το κόστος και οδήγησε σε βελτίωση της λειτουργικής κατάστασης. Αν και η πλήρης εντερική σίτιση θεωρείται γενικά «καλό πράγμα», σε μια τυχαioποιημένη ελεγχόμενη μελέτη οι Rice και συν.¹⁰² απέδειξαν ότι σε ασθενείς με σύνδρομο οξείας αναπνευστικής δυσχέρειας, η πλήρης εντερική σίτιση δεν ήταν καλύτερη από την τροφική σίτιση (χωρίς πλήρη διατροφική κάλυψη) κατά τις πρώτες 6 ημέρες της υποστήριξης της εντερικής διατροφής και σχετιζόταν με λιγότερες γαστρεντερικές επιπλοκές. Όλοι οι βαρέως πάσχοντες ασθενείς θα πρέπει να λαμβάνουν πλήρη σίτιση, από οποιαδήποτε οδό, μετά από 6 έως 8 ημέρες κρίσιμης νόσου.

4. Ένας ασθενής με νοσογόνο παχυσαρκία εισάγεται για πολλαπλό τραύμα 2 μήνες μετά από γαστρική παράκαμψη με γαστρονηστιδοστομία Roux-en-Y. Ο ασθενής είναι διασωληνωμένος μετά από πολλαπλά κατάγματα πλευρών, πυέλου και κάτω άκρων. Η οικογένειά του σημειώνει ότι παραπονιέται για μούδιασμα στα χέρια και τα πόδια και κατά την εξέταση έχει κάτι που φαίνεται να είναι οριζόντιος νυσταγμός. Έχουν προγραμματιστεί πολλαπλές χειρουργικές επεμβάσεις και θα είναι διασωληνωμένος για παρατεταμένο χρονικό διάστημα. Ποιο από τα παρακάτω αντιπροσωπεύει την καταλληλότερη συνταγή διατροφικής υποστήριξης;
 - α. Ένα τυπικό εντερικό σκεύασμα με συμπληρωματική βιταμίνη D
 - β. Συμπλήρωμα θειαμίνης με πρωτεΐνη 2,0 έως 2,5 g/kg ημερησίως και θερμιδική πρόσληψη 11 έως 14 kcal/kg ημερησίως
 - γ. Συμπλήρωμα θειαμίνης με πρωτεΐνη 1,5 g/kg ημερησίως και θερμιδική πρόσληψη 25 έως 30 kcal/kg ημερησίως
 - δ. Συμπλήρωμα νιασίνης με πρωτεΐνη 2,0 έως 2,5 g/kg ημερησίως και θερμιδική πρόσληψη 25 έως 30 kcal/kg ημερησίως
 - ε. Συμπλήρωμα θειαμίνης με πρωτεΐνη 2,0 έως 2,5 g/kg ημερησίως και θερμιδική πρόσληψη 25 έως 30 kcal/kg ημερησίως

Απάντηση: β. Οι ασθενείς που υποβάλλονται σε γαστρική παράκαμψη για νοσογόνο παχυσαρκία διατρέχουν κίνδυνο για εγκεφαλοπάθεια Wernicke, η οποία παρουσιάζεται με νευροπάθεια «γαντιού-κάλτσας» και οριζόντιο νυσταγμό, και επομένως η χορήγηση συμπληρώματος θειαμίνης είναι κατάλληλη. Η American Society for Parenteral and Enteral Nutrition και η Society of Critical Care Medicine συνιστούν πρωτεΐνη 2,0 έως 2,5 g/kg ημερησίως και ενέργεια 11 έως 14 kcal/kg ημερησίως για την παροχή διατροφικής υποστήριξης στον ασθενή με νοσογόνο παχυσαρκία.