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SPECIAL ARTICLE

Innovations in Perioperative Quality and Patient Safety

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Multiple Choice Questions

The multiple choice questions which appear below relate to the series of special review articles in the February 2013 issue of the *Journal.* We acknowledge with special thanks, the many contributing authors of the review articles appearing in this issue, who formulated these valuable questions. For each question, select the one best response. The correct responses appear online as Electronic Supplemental Material.

Practical current issues in perioperative patient safety

1. The most common source of reported anesthesia accidents in the U.S. since 1990 is:
   1) Disconnected monitors
   2) Operating room fires
   3) Airway management
   4) Unrecognized hemorrhage

2. A suggested way to help prevent hypoventilation accidents during intravenous sedation is:
   1) Keep the patient moving and talking
   2) Monitor exhaled CO_2 with a cannula and capnograph
   3) Prohibit use of midazolam, fentanyl, and propofol
   4) Keep the SpO_2 at 100% with high-flow O_2

3. The "get away with it" phenomenon in anesthesia (e.g., responsible for increasing texting while driving) prior to an accident *applies mostly* to:
   1) Leaving a patient completely unattended during general anesthesia
   2) Making multiple personnel handoffs during one anesthetic
   3) Mixing propofol, midazolam, fentanyl, and ketamine all in one syringe
   4) Inducing general anesthesia without any preoperative evaluation

The evolving role of information technology in perioperative patient safety

4. Core functionalities considered integral to electronic health records (EHR) include:
   1) The ability to collect and store patient data
   2) The ability to supply information to providers
   3) The ability to permit physicians to enter orders on a computer (CPOE)
   4) The ability to provide clinicians with data that facilitate decision-making for individual patients (CDSS)
   5) All of the above

5. Anesthesia information management systems (AIMS) have shown benefits in which of the following key areas?
   1) Improvements in cost containment
   2) Improvements in operations management
   3) Improved reimbursements
   4) Improved quality of care, safety, and documentation
   5) All of the above

6. Barriers to adoption of health information technology (IT) systems and AIMS include:

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1) Lack of clinician "buy in"
2) Lack of physician input into design, planning, and implementation of AIMS
3) Costs of acquisition and implementation
4) Lack of truly interoperable AIMS with health-system IT solutions
5) All of the above

Improving drug safety for patients undergoing anesthesia and surgery

7. Bar code systems for use in the operating room can:

   1) Provide a double-check of the contents of a drug ampoule or vial
   2) Check the label of pre-prepared syringes
   3) Couple information to the electronic patient record and document
   4) All of the above

8. Bar code readers increase the vigilance of anesthesiologists, as indicated by the number of lapses in response to a detection task

   True or False?

9. The leading cause of medico-legal concerns for Canadian anesthesiologists, as evidenced by a review of closed claims by the Canadian Medical Protective Association (CMPA), was:

   1) Ulnar nerve injury
   2) Hypoxic injury
   3) Medication-related adverse events
   4) Communication issues

10. The CAN/CAS-ISO standard for labelling products used within operating room procedures provides guidelines on:

    1) Physical properties for labels used within an operating room
    2) Appearance, content, and application of labels on drug containers
    3) Use of standard colours and patterns for identifying therapeutic drug groups
    4) All of the above

11. Medication reconciliation of a patient's discharge medications with their admitting medication profile has no effect on hospital re-admission rates

    True or False?

Perioperative checklist methodologies

12. All of the following statements regarding checklists are correct EXCEPT:

    1. Items on a checklist should address modifiable safety processes
    2. Checklists are used at distinct points in the care process to allow corrective action to be taken before critical errors occur
    3. Team checklists should be read aloud and involve as many clinical disciplines as possible
    4. Checklists should be memorized by clinical teams to allow efficient use of time
    5. When possible, scripted responses to checklist items minimize confusion between team members

13. Checklists are most useful when:

    1) They are used by the circulating nurse as an audit tool
    2) They prompt a dialogue between clinical disciplines that instruct the entire team to potential critical issues and events
    3) All items on the checklist are ticked whether or not corrective action was needed or taken
    4) They streamline the perioperative process by discouraging participation of the operative team members
    5) They contain a comprehensive enumeration of all potential problems that might occur during the perioperative period

The role of practice guidelines and evidence-based medicine in perioperative patient safety

14. Differences in care offered to different communities within a population are most commonly associated with:

    1) The local health of the population
    2) The resources available in the community
    3) The practices of the physicians in the community
    4) The demands made by the community

15. All of the following statements about the medical literature are true except one. State the exception:

    1) It is expanding at a rapid rate
    2) There are important methodological deficiencies within it
    3) Retraction is common
    4) More commonly cited literature is reliable

16. Which of the following statements about clinical practice guidelines is true?

    1) They are typically evidence-based
    2) Well-constructed guidelines are very durable
    3) They have been shown to improve outcomes
    4) Uptake by physicians is associated with guideline quality

Safety aspects of anesthesia in under-resourced locations

17. Anesthesia care in under-resourced locations is provided by:

    1) Anesthesiologists
    2) Clinical officers
    3) Unqualified personnel
    4) Surgeons
    5) All of the above

18. Anesthesia mortality rates in under-resourced areas are:

    1) Greater than in Canada
    2) Less than in Canada
    3) The same as in Canada

19. In Uganda, one survey showed that hospitals could administer an anesthetic for a Cesarean delivery:

    1) 100% of the time
    2) 50% of the time
    3) 23% of the time
    4) 6% of the time

20. The most commonly available drug for use in anesthesia in low-resource areas is:

    1) Thiopentone
    2) Morphine
    3) Halothane
    4) Ketamine

21. Lifebox:

    1) Is a charitable foundation
    2) Provides oximeters to under-resourced areas
    3) Provides education on oximetry
    4) Provides education on the Surgical Safety Checklist
    5) All of the above

The role of hypotension in perioperative stroke

22. Intraoperative stroke, i.e., apparent on awakening from anesthesia, accounts for what percent of perioperative strokes?

    1. $< 10\%$
    2. 15-45%
    3. 50-70%
    4. $> 80\%$

23. The most common cause of perioperative stroke is:

    1. Hypotension
    2. Air microbubbles
    3. Embolism
    4. Hemorrhage

24. Which of the following contributes to the high mortality from perioperative stroke?

    1. Inflammatory changes
    2. Hypercoagulability
    3. Delayed diagnosis
    4. All of the above

25. Early management of a stroke in the postoperative period includes all except:

    1. Immediate neurology consultation
    2. Non-contrast computed tomography
    3. Transfer to an intensive care unit or stroke unit
    4. Intravenous thrombolysis

Risks of anemia and related management strategies: can perioperative blood management improve patient safety?

26. Which of the following statements is false?

    1) Anemia is an independent predictor for mortality.
    2) Mild anemia, as defined by hemoglobin concentration $< 120\ g{\cdot}L^{-1}$, is not a predictor of adverse patient outcomes.
    3) Transfusion of red blood cells in non-bleeding patients is a predictor for increased infection rates in surgical patients.
    4) Iron deficiency accounts for a significant proportion ($> 20\%$) of perioperative anemia.
    5) Treatment of anemia has not been clearly shown to improve perioperative survival.

27. Which of the following is most likely to be true?

    1) There are likely no differences in transfusion requirements for different patient populations.
    2) Transfusion of red blood cells clearly increases mortality as shown by randomized clinical trials.
    3) Properly powered transfusion trials are required to determine if different transfusion thresholds can improve patient outcomes.
    4) The incidence of transfusion of surgical patients is increasing in Ontario.
    5) Patient blood management programs likely will not impact care in perioperative patients.

28. In a perfect world, the following achievable goals would help to improve patient safety:

    1) Identification of a patient-specific marker of anemia-induced tissue hypoxia.
    2) Establishment of anemia treatment programs to assess, diagnose, and treat patients with anemia prior to surgery.

3) Completion of properly powered randomized controlled trials to assess the optimal transfusion thresholds to minimize adverse outcomes in specific surgical populations.
4) Development of patient blood management programs in hospitals with high levels of transfusion.
5) All of the above.

The anesthesiologist's role in the prevention of surgical site infections

29. Which of the following is true regarding oxygen therapy and surgical site infections (SSIs)?

1) A number of prospective studies have identified an association between low wound oxygen tension and SSIs
2) The clinical evidence supports the administration of hyperoxic gas mixtures to all patients undergoing anesthesia
3) A recent meta-analysis suggests there is benefit to the administration of hyperoxic gas mixtures to colorectal patients undergoing general anesthesia
4) Oxygen therapy has been shown to be effective at reducing the risk of surgical site infections only when administered at concentrations of 50% or more

30. The use of heated forced air during general anesthesia:

1) Offers no advantage to preventing hypothermia when compared with electric blankets
2) Has been shown to reduce the risk of surgical site infections in patients undergoing colorectal surgery
3) Has no impact on core temperatures
4) Is only effective when used intraoperatively

31. The legislated mandatory use of the Surgical Safety Checklist in Ontario, Canada:

1) Is supported by an international multicentred cluster randomized controlled trial
2) Has effectively reduced the rates of surgical site infections in Ontario
3) Is enforced by the public reporting of its use
4) Has effectively reduced perioperative mortality in Ontario

Video-laryngoscopy: another tool for difficult intubation or a new paradigm in airway management?

32. Which statement is true about airway management safety in the operating room or during the perioperative period?

1) When an experienced operator has difficulty performing direct laryngoscopy, at least five attempts are recommended before switching to an alternative technique
2) More than 90% of complications during airway management occur during the induction phase of anesthesia
3) Surgical rescue techniques are usually associated with good outcomes when they are used after a "cannot intubate and cannot ventilate" situation has occurred
4) Obesity is a major risk factor for airway complications
5) An obese patient with apnea sleep syndrome easily underwent tracheal intubation with a video-laryngoscope. Hence, the extubation should be considered easy

33. Which of the following is a major risk factor for airway complications?

1) Use of a supraglottic airway device
2) Lack of video-laryngoscopy technologies in the operating room
3) Head and neck anomalies
4) Airway management by supervised trainees
5) Carefully planned extubation

34. Which statement about video-laryngoscopes is true?

1) It is not possible to perform a direct laryngoscopy with a video-laryngoscope
2) When a Cormack-Lehane grade 1 or 2 view is obtained with a video-laryngoscope, the intubation success rate is 100%
3) Tracheal intubation is more often successful with video-laryngoscopy than with direct laryngoscopy in patients with at least one predictor of airway difficulty
4) For novice laryngoscopists, success rates for tracheal intubation are similar with a video-laryngoscope and with a direct laryngoscope
5) The learning curves for the use of video-laryngoscopes and direct laryngoscopes are similar

35. Current evidence in airway management suggests that one of these statements is true:

1) Management of a difficult airway is best accomplished first with direct laryngoscopy and then with video-laryngoscopy as a backup
2) There is no consensus as to which device should be used if video-laryngoscopy is used first and fails
3) The GlideScope has better success rates than other video-laryngoscopes

4) Hemodynamic complications are the most frequent complications of intubation performed in operating room locations
5) Poor outcomes in airway management in the operating room usually occur in the hands of inexperienced physicians working evenings and nights

Simulation: a means to address and improve patient safety

36. Which ONE of the following is an example of a High Reliability Organization (HRO):

    1. Investment banking
    2. Nuclear power
    3. Legal services
    4. Information technology services

37. All of the following are Error Producing Conditions (EPCs) EXCEPT ONE. Indicate the exception:

    1. Fatigue
    2. Poor supervision
    3. Lack of knowledge
    4. Time pressure

38. All of the following are nontechnical skills EXCEPT ONE. Indicate the exception.

    1. Leadership
    2. Vigilance
    3. Situation awareness
    4. Teamwork

39. Which ONE of the following best represents translational research that demonstrates transfer from simulator performance to improved performance with a patient?

    1. T1
    2. T2
    3. T3
    4. T4