Multiple Choice Questions

Chronic obstructive pulmonary disease and anaesthesia

1. Chronic obstructive pulmonary disease (COPD) is associated with:
   (a) Skeletal muscle dysfunction.
   (b) Mean pulmonary arterial pressure of ≥25 mm Hg.
   (c) Significant reversibility in airflow limitation with bronchodilator therapy.
   (d) FEV₁/FVC ratio > 0.7.
   (e) Depression.

2. In the treatment of COPD:
   (a) Inhaled long-acting β₂ agonists are a first-line treatment for breathlessness.
   (b) Most patients require maintenance use of oral corticosteroids.
   (c) The dosage of oral theophylline needs to be reduced in patients commenced on erythromycin.
   (d) Long-term oxygen therapy is indicated in a stable patient with a PₐO₂ of 8.5 kPa.
   (e) Non-invasive ventilation should be part of the first-line treatment of exacerbations.

3. In a patient with COPD, the risk of postoperative pulmonary complications increases with:
   (a) Wheezing on preoperative examination.
   (b) A history of preoperative cough.
   (c) Low body mass index (BMI).
   (d) A serum albumin concentration less than 35 mg litre⁻¹.
   (e) Use of regional rather than general anaesthesia.

4. During artificial ventilation in a patient with chronic obstructive pulmonary disease, air trapping:
   (a) Leads to hypotension when venous return is reduced significantly.
   (b) Is likely to be present when the capnogram fails to reach a plateau in expiration.
   (c) May be reduced by using a low respiratory rate.
   (d) Is reduced by decreasing the ratio of inspiratory time to expiratory time.
   (e) Occurs more commonly when any level of positive end-expiratory pressure (PEEP) is used.

Anaesthesia for awake craniotomy

5. A scalp block aims to stop conduction in the following nerves:
   (a) Zygomaticotemporal.
   (b) Infraorbital.
   (c) Greater occipital.
   (d) Trochlear.
   (e) Auriculotemporal.

6. Dexmedetomidine:
   (a) Is recognized as an α₁ receptor agonist.
   (b) Increases the minimum alveolar concentration of volatile agents.
   (c) Causes bradycardia.
   (d) Has a loading dose of 0.5–1.0 μg kg⁻¹.
   (e) Is likely to lead to respiratory depression at high infusion rates.

7. In patients who are awake during craniotomy, appropriate statements include:
   (a) For a temporal lesion, neurosurgeons are likely to require the sitting position.
   (b) A tracheal tube is likely to be used.
   (c) A urinary catheter is likely to be inserted.
   (d) Patient anxiety is likely to be an absolute contraindication.
   (e) Intraoperative seizures are likely to occur during cortical mapping.

8. Cortical stimulation:
   (a) Occurs before resection of a tumour.
   (b) Localizes areas involved with hearing.
   (c) Occurs by indirect application of electrodes.
   (d) Allows identification of Wernicke’s area, which is involved in the comprehension of language.
   (e) Is associated with seizures that are treated by irrigation of brain tissue with warm saline.

Assessment of the high-risk perioperative patient

9. Regarding oxygen consumption by the adult human body:
   (a) It is approximately 3 ml O₂ kg⁻¹ min⁻¹ at rest in the awake adult patient.
(b) It rises to approximately 11 ml O$_2$ kg$^{-1}$ min$^{-1}$ at peak exercise in healthy young adults.
(c) Increases by approximately 5-fold after major surgery.
(d) Peak oxygen consumption is likely to be quantified accurately by cardiopulmonary exercise testing.
(e) Peak oxygen consumption is likely to be quantified accurately by the Duke Activity Status Index.

10. A 75-year-old lady is listed for an anterior resection to treat a cancer in the descending hemicolon. She has never previously been in hospital. She gives no history of shortness of breath or angina, but admits that she does not take part in strenuous activity. Apart from painkillers, she takes no medications. Appropriate statements regarding preoperative testing include:

(a) Resting echocardiography is a useful test of her functional capacity.
(b) Coronary angiography is indicated.
(c) Cardiopulmonary exercise testing is a useful test of functional capacity.
(d) Brain natriuretic peptide level is a useful test that indicates heart failure.
(e) Dobutamine stress echocardiography is a useful test for abnormalities of myocardial wall motion caused by ischaemia.

11. The Lee Revised Cardiac Risk Index:

(a) Has been validated to predict the risk of mortality after major non-cardiac surgery.
(b) Is a complex algorithm.
(c) Provides a simple additive score incorporating six risk factors.
(d) Discriminates well between patients at moderate and severe risk of adverse cardiac outcome.
(e) Automatically adds 1 point for patients aged >70.

12. Appropriate statements regarding markers of outcome after major surgery in England in 2014 include:

(a) Data about each hospital’s complication rates after surgery are readily available.
(b) Data about each hospital’s 30-day mortality after surgery are readily available.
(c) For most procedures, 90-day mortality rate are similar to 30-day mortality rates.
(d) National Hospital Episode Statistics (HES) data are useful for monitoring the performance of units.
(e) Thirty-day mortality after surgery is worse for patients admitted at weekends rather than during the week.

13. Melatonin is a hormone that is involved in the regulation of the circadian rhythm. Features of melatonin include:

(a) It circulates in the cerebrospinal fluid and blood.
(b) It has a plasma elimination half-life of 4 h.
(c) It is derived from tryptophan.
(d) It activates the pituitary adenylate cyclase mechanism of circadian wakefulness.
(e) It acts via melatonin receptors in the suprachiasmatic nucleus cell membrane.

14. Your junior trainee has been in theatre for 5 h with a patient undergoing a femorodistal bypass procedure. He is yawning and seems withdrawn. The trainee’s fatigue is likely to be improved by:

(a) Imbibing one 60 ml shot of espresso coffee.
(b) Taking a 1-h nap.
(c) Increasing the brightness of the theatre lighting.
(d) Walking around and chatting to other members of staff.
(e) Microsleeps.

15. It is the start of your second successive night shift on the labour ward. You have only managed to sleep for 4 h in the previous day. Your usual sleep requirement is 8 h per night. Appropriate statements regarding this situation include:

(a) Your total cumulative sleep deficit is 8 h.
(b) Your alertness will increase between 3 a.m. and 7 a.m. due to natural fluctuation in your circadian rhythm.
(c) Unintentional dural puncture during epidural insertion is more likely to occur during a night shift than during normal working hours.
(d) Sleeping for an extra 4 h will eliminate the sleep deficit.
(e) Modafinil facilitates daytime sleep.

16. A government initiative to reduce the effects of fatigue in the workforce has recently been rolled out. As anaesthetic lead, you are asked by the chief executive of your institution to develop strategies to reduce fatigue in your department. Appropriate strategies are likely to include:

(a) Changing the frequency of night shifts on the on-call rota from every 3 days to every 2 weeks.
(b) Including a section in the trainee’s handbook on the signs of fatigue, along with prevention and management strategies.
(c) Acquiring a departmental exercise bike.
(d) Reducing the number of night shifts worked by colleagues over 55 years of age.
(e) Providing refreshments to colleagues confined to theatre.

Role of percutaneous cervical cordotomy in cancer pain management

17. In the UK, percutaneous cervical cordotomy is likely to be:

(a) Indicated in patients with unilateral pain due to cancer.
(b) Indicated in patients with non-malignant pain.
(c) Effective for neck pain.
(d) Guided by computed tomography (CT) rather than fluoroscopy.
Deferred until less invasive techniques have been shown to be unsuccessful.

18. Percutaneous cervical cordotomy:
   (a) Is performed under general anaesthesia.
   (b) Occurs by entry of a needle into the intervertebral foramen between cervical vertebrae C4 and C5.
   (c) Involves thermoablation of the anterior spinothalamic tract.
   (d) Is performed on the same side as the pain.
   (e) Is likely to lead to complete numbness.

19. In the year 2012, appropriate statements regarding complications of percutaneous cervical cordotomy in the UK include:
   (a) Estimates of complication rates are based on pooled data in a national registry.
   (b) Complications are similar to those after open surgical cordotomy.
   (c) Rates of major complications such as death and paralysis are between 1 in 10 000 and 1 in 1000.
   (d) Persistent postural hypotension is uncommon.
   (e) Persistent headache is likely to occur.

20. After percutaneous cervical cordotomy:
   (a) Ptosis and miosis occur on same side as the thermal lesion.
   (b) Temporary reduced power in the arm or leg occur on the same side as the thermal lesion.
   (c) Patients are likely to stay in hospital until retitration of opioid medication is complete.
   (d) Neuropathic pain is unlikely to occur because the lateral spinothalamic tract has been destroyed.
   (e) Immediately after successful cervical cordotomy, the pretreatment dose of opioid is likely to be reduced by 10%.

**Intrathecal drug delivery systems**

21. When conventional routes of analgesia have been unsuccessful or are contraindicated for chronic pain syndromes, intrathecal drug delivery systems may be considered. Appropriate indications are likely to include:
   (a) Patients with cancer-related pain in whom life expectancy is estimated to be > 3 months.
   (b) Chronic pancreatitis.
   (c) Haematuria loin pain syndrome.
   (d) Chronic low back pain.
   (e) Chronic refractory angina.

22. Ziconotide is:
   (a) Licensed for administration by the intrathecal route in Europe and North America.
   (b) Associated with intrathecal granuloma formation.
   (c) Contraindicated in schizophrenic patients.
   (d) Likely to lead to hypogonadotropic hypogonadism during long-term infusion.
   (e) Associated with the development of tolerance and increased dose during long-term infusion.

23. In Europe and the USA, drugs licensed for use in intrathecal drug delivery systems include:
   (a) Diamorphine.
   (b) Methadone.
   (c) Morphine.
   (d) Ziconotide.
   (e) Ketamine.

24. Appropriate statements concerning intrathecal drug delivery systems include:
   (a) In a patient with progressive cancer-related pain, a low-grade pelvic infection is an absolute contraindication for implanting either an intrathecal catheter or a pump, even under antibiotic cover.
   (b) Intrathecally administered opioids circulate to the central neuraxis, including the brainstem, where they are likely to cause drowsiness and respiratory depression.
   (c) In difficult cases, ziconotide can be administered with either an opioid or clonidine, or both.
   (d) As a mixture of opioid and clonidine is expected to distribute throughout the cerebrospinal fluid, the level of the catheter in the intrathecal space is unlikely to be important.
   (e) Magnetic resonance imaging cannot be performed in most patients with an implanted intrathecal drug delivery system.

**Trauma anaesthesia and critical care: the post trauma network era**

25. Appropriate statements concerning radiology and trauma interventional radiology include:
   (a) To rule out injury of the cervical spine in the unconscious patient, application of a protocol involving a computed tomography (CT) scan to the neck is recommended.
   (b) A FAST (Focused Assessment with Sonography for Trauma) scan is a specific investigation for assessment of intraperitoneal bleeding.
   (c) In a patient who is persistently hypotensive in the emergency department despite adequate fluid resuscitation, radiological interventions to treat bleeding caused by a pelvic fracture are not recommended.
   (d) Interventional radiology has a role in the management of injuries to the liver, kidney and spleen.
   (e) Time-critical patients should be taken to the radiology department without the same level of staffing and support as is the case in the operating theatre.
26. In the UK, appropriate statements concerning the trauma network include:

(a) Major trauma centres, but not minor trauma units, need facilities to deal with polytrauma patients.
(b) Hospitals dealing with trauma are expected to contribute data to the Trauma Audit Research Network (TARN) database.
(c) Within their network, trauma units have transfer arrangements for moving seriously injured patients to major trauma centres.
(d) Trauma networks have an ambulance protocol for bypassing the nearest unit for injuries that may be best treated at a distant specialist centre.
(e) Trauma networks have a responsibility for the acute care of injured patients but not for rehabilitation.

27. Damage control resuscitation:

(a) Is not indicated unless it is clear the patient’s physiology has been deranged by severe injury.
(b) Is not indicated unless the patient is in the hospital.
(c) Is likely to involve restriction of fluid administration in a hypotensive, bleeding patient.
(d) Is likely to be assessed for adequacy by palpation of the radial pulse in patients with a head injury.
(e) Uses the ABC (airway, breathing, circulation) principle as its prime focus.

28. After a road traffic accident at 50 miles per hour, a healthy 30-year-old patient is admitted to a major trauma centre with a closed femoral shaft fracture and pulmonary contusion. Routine management in the intensive care unit is likely to include:

(a) A tertiary survey.
(b) A course of broad-spectrum antibiotics.
(c) Non-specific medical treatment of a rising creatinine kinase concentration (CK).
(d) Delay in physiotherapy to minimize bleeding.
(e) Application of the guidelines contained in the Surviving Sepsis Campaign (www.survivingsepsis.org).

29. In the UK, orthognathic surgery is likely to:

(a) Be undertaken in specialist craniofacial surgery units rather than in maxillofacial surgery units.
(b) Be associated with a high incidence of postoperative nausea and vomiting.
(c) Require a nasal rather than an oral tracheal tube when a Le Fort I osteotomy is performed.
(d) Require admission of the patient to a high-dependency unit.
(e) Be required after cleft palate repair.

30. During general anaesthesia for orthognathic surgery:

(a) A head-down supine position is popular to minimize the risk of airway soiling.
(b) Lidocaine with adrenaline 1:80 000 is used for infiltration.
(c) Non-steroidal anti-inflammatory drugs (NSAIDs) are avoided even after haemostasis is achieved.
(d) Blocks of both mandibular and maxillary nerves are possible and useful.
(e) Total i.v. anaesthesia with propofol has been shown to give improved recovery time when compared with anaesthesia using volatile agents.

31. When using induced hypotension during orthognathic surgery:

(a) Mean arterial blood pressure may be reduced to 30% of normal in patients of ASA grade I.
(b) The stress response to surgery is attenuated.
(c) Drugs that cause relative bradycardia are useful adjuncts.
(d) The desired effects of clonidine are mediated by α1-adrenoceptors.
(e) There is no increased risk of skin pressure injuries if invasive monitoring is used to control blood pressure accurately.

32. Postoperative care at the completion of bimaxillary surgery:

(a) Is likely to be complicated by the presence of intermaxillary fixation (IMF).
(b) Involves awake rather than asleep extubation.
(c) Requires gentle removal of the tracheal tube to avoid damage of mandibular plates and screws.
(d) Involves reinsertion of a nasal tracheal tube when complicated by airway bleeding or obstruction requiring emergency reintubation.
(e) Should be in a high-dependency unit on discharge from the recovery unit.

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