Multiple Choice Questions

Anaesthetic management of patients with a congenital diaphragmatic hernia

1. Congenital diaphragmatic hernias:
   a) Occur in 1:3600 registered births
   b) Are more common on the left side
   c) On left side are associated with a better survival rate than those on the right side
   d) Are associated with many chromosomal and genetic conditions
   e) Are associated most commonly with cardiac defects.

2. Appropriate statements regarding medical therapy prior to repair include:
   a) Peak inspiratory pressure should be less than 25 cmH₂O and permissive hypercapnia should be allowed
   b) High Frequency Oscillatory Ventilation (HFOV) is the optimal mode of ventilation
   c) Neuromuscular blockade is not advised unless absolutely necessary
   d) Nitric oxide is associated with reduced mortality
   e) Echocardiography should be performed as soon as possible after birth.

3. Appropriate statements regarding surgical repair of congenital diaphragmatic hernia include:
   a) Surgery is likely to occur within 48 hours of birth
   b) Compared with open repair, recurrence rates are often higher with the thoracoscopic approach
   c) Compared with open repair, the thoracoscopic approach is associated with improved survival rates
   d) Surgery during ECMO (extracorporeal membrane oxygenation) is contraindicated
   e) Control of arterial carbon dioxide is likely to be a significant challenge.

4. Positive predictors of survival for congenital diaphragmatic hernia (CDH) include:
   a) Liver down position
   b) Cardiac anomaly
   c) Patch repair
   d) Term delivery
   e) Early gestational age at diagnosis.

Physics for anaesthesia: Magnetic resonance imaging; depth of anaesthesia monitoring; LASER and light spectroscopy

1. In magnetic resonance imaging (MRI):
   a) The hydrogen atom is used because it is the only one with adequate magnetic precession properties to form an image.
   b) Atoms precess synchronously when a single large magnetic field is applied.
   c) The Larmor frequency is the precession frequency, characteristic of the atom and proportional to the magnitude of the resonating applied magnetic field.
   d) The MRI image signal is detectable following precession relaxation due to resonance and the perpendicularity of the signal to the main magnetic field.
   e) MRI is considered to be good at imaging all tissues.

2. Appropriate statements regarding the term ‘LASER’ include:
   a) Light emitted as a result of phosphorescence is neither monochromatic nor coherent
   b) Resonance of the stimulated emission process occurs by use of mirrors at either end of the laser tube
   c) A ruby laser emits light of wavelength 10600 nm
   d) High power class 4 lasers are hazardous because they have a power output of more than 1000 mW
e) Laser light in the visible spectrum causes photochemical changes to tissues.

3. Appropriate statements concerning depth of anaesthesia monitors include:
   a) The bispectral index (BIS) monitor utilises only bispectral analysis to estimate depth of anaesthesia
   b) The spectral edge frequency of the EEG power spectrum is independent of drug dose or drug type
   c) The BIS monitor analyses phase relationships between different neuronal electrical generators
   d) The BIS monitor analyses the bispectral index in the 0.5 - 47 Hz bandwidth
   e) In a monitor using an auditory stimulus, the most useful evoked potential is from the brainstem.

4. Appropriate statements concerning the use of light spectroscopy in anaesthesia include:
   a) In pulse oximetry two spectroscopy wavelengths are used to differentiate four different haemoglobin species.
   b) In pulse oximetry two spectroscopy wavelengths are used to differentiate the absorption spectra of pulsatile and non-pulsatile tissues.
   c) In spectroscopy for gas analysis, infra-red light is absorbed by the inter-atomic bonds of dissimilar atoms.
   d) Oxygen, nitrogen and water vapour do not absorb infrared (IR) light.

Prognostication of patients following cardiopulmonary resuscitation

1. Elements of the chain of survival include:
   a) Early recognition and call for help
   b) Early cardiopulmonary resuscitation (CPR)
   c) Early defibrillation
   d) Early prognostication
   e) Post resuscitation care.

2. Neurological factors associated with a poor prognosis post cardiac arrest include:
   a) Fixed and dilated pupils immediately following return of spontaneous circulation (ROSC)
   b) Absence of corneal and pupillary reflexes at 72 hours following ROSC
   c) Intermittent limiting myoclonus of duration less than 30 seconds in the first 48 hours following ROSC
   d) A Glasgow Coma Score (GCS) of 3 immediately following ROSC
   e) Bilateral absence of N20, somatosensory evoked potentials (SSEP) wave at 72 hours following ROSC.

3. During assessment of neurological function, appropriate statements regarding Somatosensory Evoked Potentials (SSEP’s) include:
   a) The ulnar nerve is the ideal site for stimulatory electrode placement.
   b) It is important that neuromuscular blocking agents have been fully reversed.
   c) ’N20’ refers to the time taken in milliseconds (20 milliseconds) from signal transduction to reception in the Post-central gyrus.
   d) Factors such as electrical and noise interference from equipment are particular issues when interpreting SSEP studies in the Intensive Care Unit (ICU) setting.
   e) SSEP’s are reliable on their own as a single modality of assessment when making definitive decisions on neurological prognosis.

4. Measures frequently reported when researching the post-arrest state include:
   a) Mortality
   b) EuroSCORE
   c) Cerebral performance categories scale
   d) Rankin scale
   e) Scoville scale.

Current recommendations for paediatric resuscitation

1. A 7 year old boy of 25 kg presents to the emergency room. His trachea is intubated and his lungs are ventilated in oxygen of 100%. Ongoing intermittent chest compressions are applied. The paramedics have been unable to establish intravenous access. A defibrillator is attached and the following rhythm is seen.
Appropriate statements regarding this patient’s resuscitation include:

a) Intravenous access is likely to be the main priority
b) Defibrillator pads of 8-12 cm diameter are likely to be used
c) If defibrillation is required, then shocks of 25 Joules are likely to be applied
d) If amiodarone is used after the third shock, then a dose of 250 mg is likely to be administered
e) After return of spontaneous circulation and consciousness, therapeutic hypothermia is likely to be required.

2. A 6 month old infant of weight 6 kg has been found on the paediatric ward: he is not breathing. The ward staff have commenced basic life support. Unfortunately, bag-mask ventilation becomes increasingly difficult. You are part of the arrest team that arrives. Appropriate statements concerning airway management and ventilation include:

a) Tracheal intubation is likely to be the first line method for achieving airway control and ventilation
b) For definitive airway management, an uncuffed oral tracheal tube of size 4 is likely to be selected.
c) If mask ventilation is difficult, then a laryngeal mask airway (LMA) of size 3 is likely to be selected
d) Oro or nasogastric tube insertion is likely to be an important part of airway management for this infant
e) Hypercapnia is likely to require a target respiratory rate of 20-30 breaths per minute (bpm) after tracheal intubation.

3. A 5-year-old child weighing approximately 20 kg presents in ventricular fibrillation (VF).

Appropriate statements regarding this situation include:

a) You are likely to come across this rhythm in < 1 in 5 paediatric cardiac arrests
b) To avoid overlapping, the defibrillator pads are likely to be applied anterior and posterior to the chest wall
c) For identification of the rhythm, automated external defibrillators are likely to be inaccurate.
d) After the fourth shock, you likely to administer adenosine 2 mg.
e) After the third shock, lidocaine is likely to be an acceptable alternative drug to amiodarone.

4. A one-year-old infant weighing approximately 10 kg presents with no pulse. Cardiopulmonary resuscitation is commenced, a defibrillator is attached and the following rhythm is seen.

Appropriate statements regarding this scenario include:

a) The most likely primary cause is respiratory decompensation with hypoxaemia
b) Intravascular adrenaline 50 μg should be administered as soon as it is available
c) Defibrillation is the most important intervention
d) Capnography is likely to guide chest compressions during cardiopulmonary resuscitation
e) If intravenous access is not immediately available for administration and fluids, then the intraosseous route is acceptable.

How to start a quality improvement project

1. Examples of the best statements regarding the aim of a quality improvement project include:

a) By January 2017, this orthopaedic department wants to decrease the number of trauma patients having surgical site infections to 2% because it will decrease duration of hospital stay.
b) This anaesthetic department wants to improve patients post-operative pain scores in recovery by 20%.

c) By November 2015, this anaesthetic department wants to improve the number of patients who have post-operative nausea and vomiting.

d) To improve patient survival of patients having elective abdominal aneurysm repair, this hospital wants to decrease the 30 day postoperative mortality to 1% by March 2016.

e) This hospital wants to decrease day-case patient cancellation rates by 20% by March 2016.

2. Accepted types of measures include:

   a) Balancing
   b) Outcome
   c) Complementary
   d) Process
   e) Activity

3. Outcome measures relating to prevention of surgical site infection include:

   a) The percentage of patients appropriately receiving antibiotics in the 60 minutes before skin incision
   b) The increased costs due to increased use of forced air warming devices
   c) The percentage of patients with surgical site infections
   d) The percentage of patients with a post-operative temperature >38°C.

4. Process measures regarding a quality improvement project designed to reduce the percentage of patients who have a pain score of moderate to severe in recovery include:

   a) The number of patients receiving simple analgesia such as paracetamol and nonsteroidal anti-inflammatory drugs (NSAIDs)
   b) The percentage of patients having pain scores recorded within 20 minutes of arrival in recovery.
   c) The percentage of patients in moderate to severe pain in recovery
   d) The high cost owing to an increase in use of intravenous paracetamol and intravenous NSAIDs
   e) Long duration of time that patients spend in recovery owing to increased use of opioids.