Exam A: Questions

Question A1

The 2012 Berlin definition of acute respiratory distress syndrome (ARDS):

A. Requires PEEP/CPAP of 10 cmH_2O to calculate the P/F ratio
B. Does not require a plain chest radiograph (CXR) for diagnosis
C. Specifies that a diagnosis of ARDS can only be made in intubated patients
D. Includes a factor that corrects for altitude
E. Defines severe ARDS as a P/F ratio of $\leq$ 100 kPa

Question A2

Regarding the timing of defibrillation during cardiopulmonary resuscitation:

A. It should be delayed until after 2 minutes of good-quality CPR
B. Epinephrine should be given after the second shock for refractory VF/VT
C. Three shocks can be given before CPR for a witnessed, monitored arrest
D. A 10-second pulse check should be performed after each shock
E. Defibrillation should be delayed until the patient's core temperature is $>$ 30 °C

Question A3

With regards to the management of patients who have tricyclic antidepressant (TCA) toxicity, which of the following are correct?

A. Cardiac function is affected late or at high plasma levels compared to other tissues in the body
B. TCAs competitively inhibit sodium channels in the heart, leading to slowed conduction
C. Life-threatening effects are most likely to be seen after at least 12 hours following ingestion of high doses
D. Seizures are usually preceded by significant change in mental status or other neurological changes
E. Increasing the plasma pH to achieve alkalosis reduces the free fraction of TCA by up to 20%

Question A4

Regarding synchronised intermittent mandatory ventilation (SIMV):

A. Set tidal volume should be 6 ml/kg actual body weight
B. It may be useful for patients with raised intracranial pressure
C. It is a form of volume-controlled ventilation
D. Inspiratory flow decreases exponentially
E. It may lead to an increase in intrinsic positive end-expiratory pressure (iPEEP)

Question A5

The APACHE II severity of illness score includes the following variables:

A. Age
B. Serum lactate
C. PaO_2/FiO_2 ratio
D. Glasgow Coma Scale
E. $PaCO_2$

Question A6

Regarding treatment for acute coronary syndromes (ACS):

A. Aspirin and clopidogrel should be offered to all ACS patients
B. β-Blockers are contraindicated in asthma, pulmonary oedema and atrioventricular block
C. Unfractionated heparin should be used in preference to low-molecular-weight heparin (LMWH) in renal impairment
D. STEMI patients should be transferred for primary PCI if available within 90 minutes
E. Thrombolysis is contraindicated in patients taking warfarin

Question A7

With regards to the assessment and management of patients with acute upper gastrointestinal bleeding, which of the following are correct?

A. The Blatchford scoring system should be used in all patients at first assessment
B. The full Rockall scoring system should be used following endoscopy
C. Proton-pump inhibitors should be commenced in all patients at presentation
D. Terlipressin should be commenced only once variceal bleeding is confirmed
E. Aspirin should not be recommenced once haemostasis is achieved

Question A8

According to the Surviving Sepsis guidelines (2012), the following supportive therapies are recommended for all patients with severe sepsis:

A. Selenium
B. Sodium bicarbonate to improve haemodynamics in lactic acidaemia ($pH \geq 7.15$)
C. Glucose control between 4.5 and 6.0 mmol/l (80–110 mg/dl)
D. Unfractionated heparin (UFH) if creatinine clearance is < 30 ml/min
E. Stress ulcer prophylaxis

Question A9

Which of the following statements concerning cardiac output (CO) monitors using pulse contour analysis (PCA) are true?

A. They calculate SV and CO using the arterial pressure waveform, compliance and SVR
B. They may be calibrated using indicator dilution CO measurements
C. Demographic and physical data may be used to estimate arterial compliance
D. Accuracy is largely unaffected by damping of the arterial trace
E. Choice of arterial site may affect data quality

Question A10

Regarding the investigation and management of primary and secondary spontaneous pneumothorax (PSP and SSP):

A. Expiratory chest radiographs are preferred to inspiratory chest radiographs
B. A large pneumothorax is defined as a visible rim of air > 3 cm at the level of the hilum
C. Patients with large pneumothoraces should be admitted to hospital
D. Patients with secondary spontaneous pneumothorax should always be admitted to hospital
E. A large pneumothorax should be treated with an intercostal drain

Question A11

With regards to thermoregulation, which of the following are correct?

A. Rectal temperature is an accurate way to assess core temperature
B. Heat stroke can be life-threatening
C. Genetic factors predispose to heat stroke
D. Heat stroke is rare in elderly patients, as they are more susceptible to hypothermia
E. The hypothalamus is not involved in temperature regulation in patients with heat stroke

Question A12

In the treatment of shock:

A. Colloids are better than crystalloids for treating hypovolaemia
B. Intra-aortic balloon pumps reduce afterload and improve coronary perfusion
C. Treatment should start with fluid boluses, then vasoconstrictors, followed by inotropes
D. Treatment should focus on restoring pre-morbid blood pressure
E. Fluid resuscitation should be guided by measures such as CVP, stroke volume variation or central venous oxygen saturation

Question A13

Hypernatraemia:

A. Is a recognised cause of subarachnoid haemorrhage

B. Should be treated with 0.9% sodium chloride if the plasma sodium is > 160 mmol/l
C. Should be reduced by no more than 10 mmol/l/day
D. If caused by diabetes mellitus should be treated with desmopressin
E. Is caused by treatment with intravenous ciprofloxacin

Question A14

Inotropic drugs:

A. Cause increased force of contraction of the heart
B. Usually increase intracellular calcium levels by increasing cAMP levels
C. Act on cell-surface receptors
D. Increase myocardial work and oxygen demand
E. Need to be given with a vasoconstrictor to offset vasodilatation

Question A15

With regards to parenteral nutrition, which of the following are correct?

A. Soybean oil is commonly used as a source of essential fatty acids and lipid
B. Carbohydrate is usually supplied as fructose
C. Glutamine supplementation improves patient outcome
D. Protein is given as amino acid mixes and acts as an energy substrate
E. Trace elements such as selenium are added separately, for stability reasons

Question A16

Regarding the management of acute asthma, which of the following are correct?

A. Mortality is higher in patients with adverse psychosocial factors
B. A single dose of intravenous magnesium sulphate should be administered to patients with life-threatening asthma
C. Intravenous aminophylline is no longer recommended for any patients
D. Heliox is recommended as a treatment for near-fatal asthma in patients who are admitted to intensive care
E. Non-invasive ventilation has no place in the treatment of acute asthma in adults

Question A17

Regarding the causes of hypotension, which of the following are correct?

A. Anaphylaxis is accompanied by tachycardia
B. Bradycardia and hypotension are seen in neurogenic shock
C. Hypotension is commonly a late sign in hypovolaemic shock due to haemorrhage
D. Sepsis causes tachycardia, hypotension and reduced cardiac output
E. Cardiogenic shock is accompanied by hypotension

Question A18

The following are sources of inaccuracy in pulse oximetry monitoring of oxygen saturations:

A. Arterial oxygen saturations below 70%
B. Movement
C. Cyanide poisoning
D. Methaemoglobinaemia
E. Carbon monoxide poisoning

Question A19

Concerning the causes of acute seizures:

A. Multiple sclerosis causes acute seizures in 2% of patients with the disease
B. Hypernatraemia can cause seizures
C. Patients must have two or more seizures to be diagnosed with epilepsy
D. Non-epileptic seizures usually involve incontinence
E. Febrile convulsions lead to epilepsy in most patients

Question A20

With respect to the cleaning of medical equipment:

A. Hydrogen peroxide treatment will sterilise an object
B. Pasteurisation is the removal of all viable microorganisms and infectious agents from an object
C. Sterilisation will effectively remove prions
D. Autoclaving an object will sterilise it
E. 2% glutaraldehyde will disinfect an object

Question A21

Regarding the anterior triangle of the neck:

A. The common carotid artery divides at the level of the cricoid cartilage
B. The internal jugular vein travels in the carotid sheath lateral to the carotid artery
C. The vagus nerve travels posterior to the carotid sheath
D. The internal jugular vein is valveless
E. The carotid body contains baroreceptors and is found above the carotid bifurcation

Question A22

The following are absolute indications for tracheal intubation and ventilatory support:

A. $PaO_2 < 8$ kPa (60 mmHg)
B. $PaCO_2 > 8$ kPa (60 mmHg)
C. GCS < 8
D. Septic shock with a severe metabolic acidosis
E. Ventilatory insufficiency from fractured ribs

Question A23

With respect to the measurement of venous blood gases:

A. Mixed venous oxygen saturation is normally 70%
B. Central venous saturations are generally 5% lower than mixed venous oxygen saturations
C. Mixed venous oxygen saturation is decreased by shunt in septic shock
D. Venous bicarbonate is usually 3–4 mmol/l higher in venous blood than in arterial
E. Venous pH is usually 0.03–0.05 pH units lower than arterial pH

Question A24

Chest compressions during cardiopulmonary resuscitation:

A. Should be at a rate of 100–120/minute
B. Increase the likelihood of VF being successfully defibrillated
C. Provide a circulation to the brain and heart that is at best 25% of normal
D. Should be continuous if a supraglottic airway has been inserted
E. Should be continued while the defibrillator is charging

Question A25

Regarding the intraosseous (IO) route of drug administration, which of the following are correct?

A. It is a good alternative to central venous access for children requiring long-term antibiotic therapy
B. It should always be considered in the paediatric resuscitation scenario, where obtaining intravenous access is likely to be challenging
C. The iliac crest is the preferred location for access, because of its proximity to the skin
D. The incidence of serious complications such as skin necrosis or osteomyelitis is around 5%
E. The speed of drug onset following administration is likely to be slower than following intravenous administration

Question A26

Transfusion-related acute lung injury (TRALI):

A. Is more common if blood is donated by a multiparous woman
B. Is most common after red cell transfusion
C. Is a complication of intravenous immunoglobulin therapy
D. Is usually seen between 12 and 24 hours after transfusion
E. Is associated with high pulmonary artery wedge pressures

Question A27

Ventilatory modes useful in weaning a patient from mechanical ventilation include:

A. Synchronised intermittent mandatory ventilation (SIMV) with pressure support
B. Bilevel ventilation (BIPAP) with pressure support
C. Non-invasive ventilation (NIV)

D. Airway pressure-release ventilation (APRV)
E. Pressure-support ventilation without automatic tube compensation

Question A28

Regarding the Glasgow Coma Scale (GCS):

A. It is a three-part scoring system giving a score of 0–15
B. The motor score is the most useful discriminator
C. It should only be applied to patients with head injuries
D. A score of ≤ 8 defines severe head injury and mandates intubation
E. It can be modified for use in children

Question A29

In the treatment of drowning victims:

A. Chest compressions should be started immediately in the presence of cardiac arrest
B. Cervical spine injury is common in drowning victims
C. Salt-water drowning causes more severe acute respiratory distress syndrome (ARDS) than fresh-water drowning
D. Antibiotics should be started after open-water drowning
E. Non-fatal fresh-water drowning is characterised by a dilutional hyponatraemia

Question A30

Regarding skin disinfection:

A. 0.5% chlorhexidine has a concentration below the minimal inhibitory concentration (MIC) for most nosocomial bacteria
B. 2% chlorhexidine in 70% alcohol is recommended for skin disinfection prior to insertion of a central venous catheter
C. Aqueous 0.5% chlorhexidine is recommended for skin disinfection prior to insertion of an epidural catheter
D. 10% povidone–iodine has a similar efficacy to 2% chlorhexidine in preventing catheter-related bloodstream infections (CRBSI)
E. The use of acetone to remove skin lipids prior to insertion of a central venous catheter reduces CRBSI

Question A31

Concerning ventilator-associated pneumonia (VAP):

A. VAP is associated with increased mortality and length of stay
B. VAP is defined as a pneumonia occurring after 48 hours of ventilation
C. Lung-protective ventilation (6 ml/kg IBW) reduces rates of VAP
D. Gastric ulcer prophylaxis with proton-pump inhibitors increases VAP rates
E. Selective decontamination of the digestive tract (SDD) reduces VAP rates

Question A32

Which of the following drug assays are routinely available to measure plasma levels?

A. Phenytoin
B. Tacrolimus

C. Flecainide
D. Digoxin
E. Sodium valproate

Question A33

Which of these statements about pulmonary function tests are correct?

A. FEV_1 is normal or increased in restrictive lung disease
B. Gas transfer of CO measures V/Q matching
C. PEFR monitoring can be used to predict exacerbations of asthma
D. Spirometry gives values for FEV_1, FVC, FRC and tidal volume
E. FEV_1/FVC ratio of $< 70\%$ is consistent with an obstructive lung disease

Question A34

With regards to smoke inhalation, which of the following are correct?

A. Early bronchoscopy and washout can be helpful
B. Upper airway swelling occurs rapidly, and intubation should be performed pre-hospital
C. Cut endotracheal tubes are preferred
D. Hoarseness is a common sign and does not signify airway compromise
E. Burns to the face, lips and eyebrows are a worrying sign

Question A35

Regarding the monitoring of cardiac output (CO):

A. Thermodilution with a pulmonary artery (PA) catheter is the gold standard
B. Pulse contour analysis (PCA) requires calibration with indicator studies
C. CO monitors use the Fick principle to calculate CO
D. The ability to accurately measure CO is more important than tracking changes
E. Fluid responsiveness is reflected by an observed increase in stroke volume (SV) after a fluid bolus

Question A36

With respect to mast-cell tryptase sampling after anaphylaxis:

A. A-tryptase is measured to ascertain if a reaction is anaphylaxis
B. The volume of intravenous resuscitation fluid should be taken into account
C. The assay has a high sensitivity
D. Samples taken more than 12 hours post mortem are unreliable
E. Tryptase levels are likely to be raised by myocardial infarction

Question A37

Regarding lumbar puncture (LP):

A. Blood-stained CSF is not diagnostic of subarachnoid haemorrhage (SAH)

B. Post-dural puncture headache (PDPH) is prevented by the use of a 25G pencil-point needle
C. Absolute contraindications include coagulopathy, patient refusal and local infection
D. LP should not be performed in patients with raised intracranial pressure
E. LP can be performed at any lumbar level

Question A38

Regarding antibiotic resistance:

A. Free bacterial DNA is commonly found in the blood of intensive care patients
B. Genetic mutation is the most common mechanism of acquisition of resistance
C. Plasmids move independently of bacteria to spread resistance
D. Intrinsic resistance occurs as a result of genetic mutation
E. Transposons may insert DNA into either the bacterial chromosome or a plasmid to confer resistance

Question A39

The following physiological changes contribute to stress hyperglycaemia:

A. Increased cortisol levels
B. Reduced corticotrophin-releasing hormone (CRH) levels
C. Insulin resistance
D. Increased glycogenesis
E. Increased norepinephrine levels

Question A40

Following return of spontaneous circulation (ROSC) from out-of-hospital cardiac arrest (OHCA), the following are useful indicators of neurological outcome:

A. Fixed dilated pupils on admission
B. Isoelectric EEG
C. Post-arrest myoclonic status epilepticus
D. Absent somatosensory evoked potentials (SSEPs)
E. Loss of grey–white distinction on CT brain

Question A41

Appropriate immediate management of acute cardiogenic pulmonary oedema includes:

A. Intravenous opiates
B. Norepinephrine
C. Haemofiltration
D. ACE inhibitors
E. Intra-aortic balloon pump (IABP)

Question A42

The following ECG changes are characteristic of hypokalaemia:

A. Bradycardia more commonly than tachycardia
B. Delta waves
C. T-wave inversion
D. ST depression
E. U waves

Question A43

With respect to antifungal agents used in critical care:

A. Echinocandins have the best side-effect profile of the antifungal agents
B. Fluconazole should be first line for invasive aspergillosis
C. Amphotericin B is fungistatic
D. Oral fluconazole is 100% bioavailable
E. Amphotericin B exhibits dose-limiting nephrotoxicity

Question A44

The following sites allow accurate measures of core temperature:

A. Tympanic membrane
B. Nasopharynx
C. Bladder
D. Groin
E. Forehead

Question A45

Chronic obstructive pulmonary disease (COPD):

A. Is classified for severity on the basis of forced expiratory volume in 1 second (FEV_1) measurements
B. Requiring ICU admission confers a 50% 1-year mortality
C. Is responsible for approximately 40% of patients admitted in type 2 respiratory failure
D. Treated with long-term oxygen therapy has improved mortality
E. Should be treated with non-invasive ventilation as a first-line therapy for $PaCO_2$ > 6 kPa

Question A46

Regarding the differences between partial- and full-thickness burns, which of the following are correct?

A. Partial-thickness burns are usually painless
B. Full-thickness burns are usually more extensive than partial-thickness burns
C. Full-thickness burns can include loss of hair follicles and nerve endings
D. A white and rubbery appearance indicates a full-thickness burn
E. Partial-thickness burns often require escharotomy