



Practice File

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Trauma:

MCQs:

Q1: A 27-year-old man presents to the ER after a high-speed motor vehicle collision with chest pain and marked respiratory distress. On physical examination, he is hypotensive with distended neck veins and absence of breath sounds in the left chest. Which of the following is the proper initial treatment?

- A) Emergent thoracotomy
- B) Pericardiocentesis
- C) Chest decompression with a needle
- D) Chest X-Ray
- E) Intubation

Explanation: The patient has a tension pneumothorax caused by blunt trauma from the motor vehicle collision, which should be treated with emergent needle decompression. A tension pneumothorax develops when air continuously enters the pleural space from the lung or through the chest wall, cannot escape, and causes the lung to collapse. This air is under pressure and causes a shift of the mediastinum toward the opposite side with compression of the vena cava, leading to decreased venous return to the heart and hypotension. The diagnosis of a tension pneumothorax is a clinical one and should never wait for chest x-ray confirmation. This will delay lifesaving intervention with emergent needle decompression of the chest. Hypotension and distended neck veins are also seen in cardiac tamponade, but breath sounds are usually symmetric. An emergent thoracotomy is not indicated for a tension pneumothorax.

Q2: Which patients may not mount a tachycardic response to hypovolemic shock?

- A) Those with concomitant spinal cord injuries
- B) Those on β -blockers
- C) Well-conditioned athletes
- D) All of the above

Q3: GCS indication for intubation?

- A) 10
- B) 9
- C) ≤ 8

SAQs:

Q4: Can you rely on a negative FAST in the unstable patient with a pelvic fracture?

Answer: No, perform DPL.

Q5: What's the "lethal triad" ?

Answer: Acidosis, Coagulopathy and Hypothermia.

Q6: What's the major cause of respiratory compromise with flail chest?

Answer: Underlying pulmonary contusion.

Answers

Q1	C
Q2	D
Q3	C

Trauma:

MCQs:

Q1: A patient is admitted following an assault. On assessment, he has a stab wound to his chest. Clinically, he has a massive haemothorax and his Glasgow Coma Scale score is 4/15. Without further management this patient will succumb to which cause of death first?

- A) Respiratory failure
- B) Airway compromise
- C) Intracranial haemorrhage

Explanation: This patient has a GCS of 4, rendering him unable to maintain his own airway, which will therefore be the first factor to lead to his death. Consequently, his airway must be managed before addressing his other injuries.

Q2: A patient is admitted into the emergency department following a head injury at work. He is resuscitated and stabilized, but a computed tomography scan shows significant brain contusion. He is intubated and cared for on the intensive care unit. You attempt to evaluate his Glasgow Coma Scale score; there is no response to voice, but pressing a pen into his fingernail causes the patient to open his eyes and attempt to withdraw his hand from you. His Glasgow Coma Scale score is therefore:

- A) 5/10
- B) 6/10
- C) 5/15
- D) 6/15
- E) 7/15

Explanation: Rarely examiners will attempt to confuse candidates by asking how assessment of GCS in intubated patients differs. Put simply, assessment of motor and eyes is exactly the same. Assessment of vocalization is impossible and therefore discounted entirely. Therefore a fully conscious intubated patient scores 10/10, and an unresponsive intubated patient scores 2/10. The level of sedation obviously is a compounding factor and mention should be made of this in a viva.

Q3: Which of the following techniques does not provide a definitive airway?

- A) Laryngeal mask airway
- B) Cricothyroidotomy
- C) Nasotracheal tube

Explanation: The definition of a definitive airway is a tube in the trachea with an inflatable cuff. Definitive airways are of three types: nasotracheal, orotracheal and surgical.

Answers

Q1	B
Q2	B
Q3	A

Trauma:

Q4: A patient is admitted to the emergency department following an assault. You note a penetrating wound on the anterior chest wall. On examination, his blood pressure is 80/65 mmHg, pulse is thready and respiratory rate is 38 breaths/min. His jugular venous pulse is unrecognizable as the neck veins are grossly distended. Breath sounds are equal bilaterally. During your evaluation the patient's output becomes undetectable. The next course of action should be:

- A) Thoracocentesis
- B) Resuscitative thoracotomy
- C) Pericardiocentesis

Explanation: Beck's triad consists of venous pressure elevation, reduced arterial blood pressure and muffled heart sounds. These three features are the classic identifying features of cardiac tamponade.

Q5: A patient is admitted to the emergency department with a reduced level of consciousness, smelling of alcohol. A boggy haematoma is noted on the posterior aspect of his skull. The patient's eyes open to voice, but he makes no attempt to vocalize. A sternal rub causes the patient to open his eyes, moan and extend his arms and legs. His Glasgow Coma Scale score is:

- A) 4/15
- B) 5/15
- C) 6/15
- D) 7/15
- E) 8/15

Q6: A 42-year-old construction worker is admitted following a crush injury. The patient is in great distress and complaining of chest pain. The patient is working hard to breathe, however there is some paradoxical movement of her chest wall. Arterial blood gases show hypoxia with pO₂ 7.5 and pCO₂ 8.2. A chest radiograph shows multiple rib fractures. The life-saving intervention is:

- A) Endotracheal tube insertion
- B) Cricothyroidotomy
- C) High-flow oxygen

Explanation: Flail chest is a term used to describe an injury to the chest wall which results in a section losing continuity with the remainder. This loose segment is therefore sucked in by the negative pressures implicit in inspiration, preventing effective respiration and causing significant damage to the underlying lung parenchyma. These two factors combined result in significant impairment of gas exchange and respiratory failure. High-flow oxygen will partially reverse the hypoxia, but is only a holding measure and will not affect the carbon dioxide retention. This patient requires mechanical ventilation and therefore the placement of a definitive airway. Both endotracheal intubation and cricothyroidotomy will provide this, but surgical airways are reserved for cases in which intubation fails or is impossible due to severe facial injury. Therefore, endotracheal intubation is the best option in this case.

Answers

Q4	C
Q5	D
Q6	A

Trauma:

Q7: A 23-year-old woman is brought to the emergency department 20 minutes after being involved in a high-speed motor vehicle collision where she was the unrestrained driver. She was found thrown across the dashboard of the car. On arrival, she appears lethargic. She is unable to provide a history. Her pulse is 133/min, respirations are 23/min, and blood pressure is 90/60 mm Hg. Examination shows a 2-cm laceration over the right upper extremity. The pupils are equal and reactive to light. There are multiple bruises over the chest and abdomen. The lungs are clear to auscultation. Cardiac examination shows no abnormalities. The abdomen is soft and not distended. Neurologic examination shows no focal findings. 0.9% saline infusion is begun. Which of the following is the most appropriate next step in management?

- A) CT scan of the abdomen
- B) Ultrasonography
- C) Diagnostic peritoneal lavage

Explanation: Focused Assessment with Sonography for Trauma (FAST) is an essential component of management for blunt abdominal trauma. This patient presents after a motor vehicle collision and is hemodynamically unstable, which is concerning for intraperitoneal bleeding. The FAST exam screens for free fluid, especially blood.

Q8: A 27-year-old man is brought to the emergency department after being injured in a motor vehicle collision. He is noted to speak using inappropriate words. He withdraws and opens his eyes to pain only. This patient's Glasgow Coma Scale score is:

- A) 10
- B) 9
- C) 8
- D) 7
- E) 6

Q9: A 43-year-old man is brought to the emergency department 25 minutes after being involved in a high-speed motor vehicle collision in which he was a restrained passenger. On arrival, he has shortness of breath and is in severe pain. His pulse is 130/min, respirations are 35/min, and blood pressure is 90/40 mm Hg. Examination shows superficial abrasions and diffuse crepitus at the left shoulder level. Cardiac examination shows tachycardia with no murmurs, rubs, or gallops. The upper part of the left chest wall moves inward during inspiration. Breath sounds are absent on the left. He is intubated and mechanically ventilated. Two large bore intravenous catheters are placed and infusion of 0.9% saline is begun. Which of the following is the most likely cause of his symptoms?

- A) Flail chest
- B) Cardiac Tamponade
- C) Hemothorax
- D) Pneumothorax

Answers

Q7	B
Q8	B
Q9	A

Trauma:

Q10: A 19-year-old man is brought to the emergency department 35 minutes after being involved in a high-speed motor vehicle collision. On arrival, he is alert, has mild chest pain, and minimal shortness of breath. He has one episode of vomiting in the hospital. His temperature is 37.3°C (99.1°F), pulse is 108/min, respirations are 23/min, and blood pressure is 90/70 mm Hg. Pulse oximetry on room air shows an oxygen saturation of 92%. Examination shows multiple abrasions over his trunk and right upper extremity. There are coarse breath sounds over the right lung base. Cardiac examination shows no murmurs, rubs, or gallop. Infusion of 0.9% saline is begun. He subsequently develops increasing shortness of breath. Arterial blood gas analysis on 60% oxygen shows:

pH 7.36

pCO₂ 39 mm Hg

pO₂ 68 mm Hg

HCO₃⁻ 18 mEq/L

O₂ saturation 81%

- A) Pneumothorax
- B) Hemothorax
- C) Pulmonary contusion
- D) Tracheobronchial injury

Q10

C

Shock:

MCQs:

The different types of shock with the scenarios given below:

- A) Septic shock.
- B) Cardiogenic shock
- C) Hypovolemic shock – hemorrhagic
- D) Neurogenic shock
- E) Anaphylactic shock
- F) Endocrinal shock
- G) Hypovolemic shock – non-hemorrhagic

1- A 7-year-old boy with nut allergy develops stridor and collapses after eating a snack. He requires airway and breathing support. His BP is 60/38 mmHg.

2- A 78-year-old man with known ischaemic heart disease (IHD) complains of chest pain and collapses. His pulse is irregular and BP is 74/48 mmHg. ECG shows features of an anterolateral myocardial infarction (MI).

3- A 76-year-old male is brought to the hospital with persistent diarrhoea and vomiting for the past 4 days. He has been unable to keep his food down and feels very tired. On examination he is very dehydrated. His pulse is 128/min and his BP is 88/52 mmHg.

4- A 55-year-old woman with poorly controlled hypothyroidism is found comatose. She is hypothermic. Her pulse is irregular and her BP is 96/70 mmHg.

5- An 86-year-old male has been complaining of increasing lower abdominal pain for the past week. On examination he looks very unwell with warm peripheries. He has signs of generalised peritonitis. His pulse is 130/min and his BP 84/50 mmHg.

6- A 28-year-old motorist is brought to the A&E after a road traffic accident (RTA). He has sustained an isolated injury to his back and has motor and sensory deficits in both lower limbs. His pulse is 122/min and his BP 100/62 mmHg.

7- A 19-year-old male is brought to the hospital after sustaining an abdominal injury while playing rugby. He is complaining of left upper abdominal pain and has some bruising over the same area. His pulse is 140/min and his BP is 100/82 mmHg.

Answers

1	E	4	F	7	C
2	B	5	A		
3	G	6	D		

Shock:

MCQs:

Q1. Which of the following statements about compensated shock are false?

- A. Tachycardia and cool peripheries may be the only clinical signs.
- B. The perfusion to the skin, muscle and GI tract is increased.
- C. Systemic Metabolic acidosis is seen.
- D. All of the above

Q2. What is the appropriate intervention to hypovolemic shock due to splenic injury?

- A. Noradrenaline
- B. Phenylephrine
- C. Vasopressin
- D. Dobutamine

Q3. In which of the following cases might tachycardia accompany shock?

- A. Hypovolemia due to gastrointestinal (GI) bleeds
- B. Patients on Beta-blockers
- C. Cardiogenic shock
- D. Fit young adults with normal pulse rate of 50/min
- E. Patients with implanted pacemaker

Q4. Which of the following statements are true?

- A. Cells change from aerobic to anaerobic metabolism when perfusion to tissue is reduced.
- B. The product of anaerobic respiration is carbon dioxide.
- C. The accumulation of lactic acid in the blood produces systemic respiratory acidosis.
- D. Lack of oxygen and glucose in the cell will eventually lead to failure of sodium/potassium pumps in the cell membrane and intracellular organelles.
- E. A and D

Explanation: Cells switch from aerobic to anaerobic metabolism when deprived of oxygen. The product of aerobic respiration is carbon dioxide. This is eliminated efficiently through the lungs. The product of anaerobic respiration is lactic acid. When enough tissue is underperfused, the accumulation of lactic acid in the blood produces systemic metabolic acidosis. As tissue ischaemia progresses, the immune and complement systems are activated. This also results in the complement and neutrophil priming with the generation of oxygen-free radicals and cytokines. This leads to injury of the epithelial and endothelial cells, which leads to loss of integrity and leaky walls. The resultant oedema further increases tissue hypoxia. As glucose within the cells is exhausted, anaerobic respiration ceases and there is a failure of the sodium/potassium pump. Intracellular lysosomes release autodigestive enzymes and cell lysis ensues. Intracellular contents, including the potassium, are released into the bloodstream.

Q1	B
Q2	B
Q3	A
Q4	A & D

Answers

Shock:

Q5. A 24-year-old man presents in septic shock from an empyema. He is febrile to 103°F, tachycardic in the 120s, and hypotensive to the 90s. His oxygen saturation is 98% on 2-L oxygen. His white blood cell count is 25,000/mL and creatinine is 0.8 mg/dL. His blood pressure does not respond to fluid administration despite a CVP of 15. Which of the following therapies is indicated in managing this patient?

- A. Intubation
- B. Recombinant human activated protein C
- C. Epinephrine
- D. Norepinephrine
- E. None of the above

Q6. 72-year-old man with diabetes, renal insufficiency, and coronary artery disease presents in septic shock from emphysematous cholecystitis. His oxygen saturation is 100% on 6-L nasal cannula and his hemoglobin is 7.2 mg/dL. His mixed venous oxygen saturation is 58%. Which of the following treatment options will improve his oxygen delivery the most?

- A. Increase his inspired oxygen concentration
- B. Transfer him to a hyperbaric chamber
- C. Transfuse two units of packed red blood cells
- D. Administer an erythropoietic agent
- E. None of the above

Q7: A 22-year-old man sustains severe blunt trauma to the back. He notes that he cannot move his lower extremities. He is hypotensive and bradycardic. Which of the following is the best initial management of the patient?

- A. Intravenous fluid bolus
- B. Administration of phenylephrine
- C. Administration of dopamine
- D. Administration of epinephrine
- E. None of the above

Answers

Q5	D
Q6	C
Q7	A

Shock:

Q8: The response to shock includes which of the following metabolic effects?

- A. Increase in sodium and water excretion
- B. Increase in renal perfusion
- C. Decrease in cortisol levels
- D. Hyperkalemia
- E. All of the above

Q9: Shock is best described as

- A. A state of cellular and tissue hypoxia
- B. A state of hypotension.
- C. A state of low CO.
- D. A state of low vascular resistance.
- E. All of the above

Q10: The most common cause of shock in surgical patients is decreased venous return. What clinical conditions cause decreased venous return?

- A. Peritonitis
- B. Tension PTX
- C. Pericardial tamponade
- D. Massive bleeding
- E. All the above

Q11: Which one of these parameters will appear first and can be diagnostic for shock?

- A. Hypotension
- B. Bradycardia
- C. Decreased tissue perfusion
- D. Tachycardia
- E. All of the above

Answers

Q8	D
Q9	A
Q10	E
Q11	D

Shock:

Q12: A 25 y/o driver sustained a car accident presented to the ER with flaccid paralysis, bradycardia, and hypotension. The most likely diagnosis is:

- A. Neurogenic shock
- B. Cardiogenic shock
- C. Hypovolemic shock
- D. Anaphylactic shock
- E. None of the Above

Q13: The commonest cause of the previous case is:

- A. Massive external bleeding
- B. Ischemic heart disease
- C. Injury to the high thoracic spine
- D. Internal bleeding
- E. None of the above

Q14: . The most sensitive tissue to ischemia is:

- A. Muscle
- B. Nerve
- C. Skin
- D. Adipose tissue
- E. Bone

Q15: Which one of these parameters will appear first and can be diagnostic for shock?

- A. Hypotension
- B. Bradycardia
- C. Decreased tissue perfusion
- D. Tachycardia
- E. All of the above

Q12	A
Q13	C
Q14	B
Q15	D

Shock:

Q16: Which of the following statements about compensated shock are false?

- A) **The preload is preserved by the cardiovascular and endocrinal compensatory responses.**
- B) **Tachycardia and cool peripheries may be the only clinical signs.**
- C) **The perfusion to the skin, muscle and GI tract is increased.**
- D) **Systemic respiratory acidosis is seen.**
- E) **Patients with occult hypoperfusion for more than 12 hours have a significantly higher mortality rate.**

Explanation: The supply shunted to the vital organs. Systemic metabolic acidosis is seen in shock.

Q17: Which of the following statements are false?

- A) **Administration of inotropic agents to an empty heart will help to increase diastolic filling and coronary perfusion.**
- B) **In all cases, regardless of classification, hypovolemia and preload must be addressed first.**
- C) **Long, wide-bore catheters allow rapid infusion of fluids.**
- D) **The oxygen-carrying capacity of both colloids and crystalloids is zero.**
- E) **Hypotonic solutions are poor volume expanders and should not be used in shock except in conditions of free water loss or sodium overload.**

Explanation: Resuscitation should not be delayed in order to definitively diagnose the cause of the shocked state. The first-line therapy is intravenous (IV) access administration of IV fluids using short, wide-bore catheters that allow rapid infusion of fluids. Hypotonic fluids are poor volume expanders and should not be used in the treatment of shock (an exception is free water loss, as in diabetes insipidus and sodium overload, e.g. cirrhosis). If there is an initial doubt about the cause of shock, it is safer to assume that it is hypovolaemia and begin with fluid resuscitation, followed by an assessment of the response. In patients who are actively bleeding (major trauma, ruptured abdominal aortic aneurysm, GI bleed), it is counterproductive to institute high-volume fluid therapy without controlling the site of bleeding. Resuscitation should proceed in parallel with surgery. Conversely, a patient with bowel obstruction and hypovolemic shock should be adequately resuscitated before undergoing surgery. Administration of inotropic agents to an empty heart will rapidly and permanently deplete the myocardium of oxygen stores and dramatically K AN reduce diastolic filling and therefore coronary perfusion.

Q18: Which of the following are true regarding inotropic support in shock?

- A) **This is the first-line therapy in hypovolemic shock.**
- B) **Phenylephrine and noradrenaline are indicated in distributive shock states.**
- C) **Dobutamine is the agent of choice in cardiogenic shock or septic shock complicated by low cardiac output.**
- D) **Vasopressin may be used when the vasodilatation is resistant to catecholamines.**
- E) **Use in the absence of adequate preload may be harmful.**

Explanation: The first-line therapy in hypovolemic shock is IV access and administration of fluids. Phenylephrine and noradrenaline are helpful in distributive shock states, such as those due to sepsis and neurogenic causes. These states are characterised by peripheral vasodilatation, a low systemic vascular resistance and a high cardiac output. If the vasodilatation is resistant to these agents (e.g. absolute or relative steroid deficiency), vasopressin may be used.

Q16	C, D
Q17	A, C
Q18	B, C D, E

Shock:

Q19: Which of these statements about mixed venous saturation are false?

- A) The percentage saturation of oxygen returning to the heart from the body is a measure of the oxygen delivery and extraction by the tissues.
- B) The normal mixed oxygen saturation levels are 30–40 per cent.
- C) Accurate measurements are via analysis of blood drawn from a line placed in the superior vena cava (SVC).
- D) Levels below 50 percent indicate inadequate oxygen delivery consistent with hypovolemic shock.
- E) High mixed venous saturation levels are seen in sepsis.

Explanation: The percentage saturation of oxygen returning to the heart from the body is a measure of the oxygen delivery and extraction by the tissues. Accurate measurement is by a long line placed in the right atrium. Samples from the SVC give slightly higher values. Normal mixed venous oxygen saturation levels are 50–70 per cent. Levels below 50 per cent indicate inadequate oxygen delivery and increased oxygen extraction by the cells. This is consistent with hypovolemic or cardiogenic shock. High mixed venous saturation levels (>70%) are seen in sepsis and some forms of distributive shock.

Q20: 17 y/o male, training for track team On examination:

VS: BP 70/50 (low), P 140 (high), RR 35 (high), O2 sat 88%, Absent breath sounds in left lung field, distended neck veins Dx: tension pneumothorax

Hemodynamics:

Central venous pressure	Increased
Cardiac output	Decreased
Systemic vascular resistance	Normal

What type of shock is he suffering from?

- A. Hypovolemic shock
- B. Septic shock
- C. Anaphylactic shock
- D. Cardiogenic shock
- E. Neurogenic shock

Answers

Q19	B, C
Q20	D

Shock:

Cases:

Q1: A 43-year-old woman is brought to the emergency department 30 minutes after she sustained a gunshot wound to the abdomen. On arrival, she is alert and oriented. Her temperature is 36.5°C (97.7°F), pulse is 115/min and regular, respirations are 30/min, and blood pressure is 90/70 mm Hg. Examination shows cool and damp extremities. Abdominal examination shows a 3-cm entrance wound in the left upper quadrant at the midclavicular line below the left costal margin. Focused ultrasound shows free fluid in the left upper quadrant. Intravenous fluid resuscitation is begun. Which of the following are the most likely hemodynamic findings in this patient?

	Cardiac output (CO)	Pulmonary capillary wedge pressure (PCWP)	Systemic vascular resistance (SVR)	Central venous pressure (CVP)
A	↓	↑	↑	↑
B	↓	↓	↑	↓
C	↓	↓	↓	↓
D	↓	↓	↑	↑
E	↑	↓	↓	↓

Explanation: The combination of ↓ CO, ↓ PCWP, ↑ SVR, and ↓ CVP is characteristic of hypovolemic shock (hemorrhagic shock). Hemorrhage (e.g., after a gunshot wound) leads to intravascular volume depletion, which decreases venous return to the right atrium (as evidenced by ↓ CVP). Reduced venous return to the right heart results in decreased blood delivery to the left atrium (evident in ↓ PCWP) and consequently low left ventricular end diastolic volume (i.e., decreased preload). Low preload causes decreased CO (because the heart cannot pump blood that is not there). Because low CO leads to hypotension, the peripheral vasculature constricts (↑ SVR) in an attempt to maintain blood pressure that is adequate for organ perfusion.

Shock:

Q2: An 87-year-old woman is brought to the emergency department 30 minutes after a fall onto a hardwood floor. She landed on her left side and hit the left side of her head. She did not lose consciousness. She has a mild headache over the left temple and severe left hip pain. She has had nasal congestion, a sore throat, and a productive cough for the last 2 days. She has a history of atrial fibrillation, coronary artery disease, hypertension, and osteoporosis. She underwent two coronary artery bypass grafts 5 years ago. She had smoked one pack of cigarettes daily for 30 years but quit 30 years ago. Her current medications include aspirin, apixaban, diltiazem, omeprazole, and vitamin D supplementation. The patient is oriented to person, place, and time. There is a 2-cm ecchymosis over the left temple. Examination of the left hip shows swelling and tenderness; range of motion is limited. Intravenous morphine 2 mg is started. During further examination, the patient complains of dizziness and palpitations. She is diaphoretic and pale. Her skin is cold and clammy. Her pulse is 110/min and faint, respirations are 20/min, and blood pressure is 70/30 mm Hg. Cranial nerves are intact. Cardiac examinations shows no murmurs, rubs, or gallops. An ECG shows absent P waves and nonspecific changes of the ST segment and the T wave. Which of the following is the most likely underlying mechanism for the patient's sudden decline in her condition?

- A) Pulmonary embolism.
- B) Cardiac tamponade.
- C) Drug reaction.
- D) Brain herniation.
- E) Sepsis.
- F) Myocardial infarction.
- G) Blood loss.

Explanation: Hemodynamically relevant blood loss can lead to hypovolemic shock, resulting in low cardiac output and increased systemic vascular resistance that presents with cold and clammy skin. This patient most likely suffered blood loss due to a hip fracture, which is indicated by swelling, pain, and limited range of motion of her left hip. Dual antithrombotic therapy also puts her at increased risk for bleeding.

Q3: A 57-year-old woman is admitted to the intensive care unit for management of shock. Her pulse is feeble and blood pressure is 86/45 mm Hg. The patient undergoes pulmonary artery catheterization which shows an elevated pulmonary capillary wedge pressure and increased systemic vascular resistance. Which of the following additional findings is most likely in this patient?

- A) Cold skin due to loss of intravascular fluid volume.
- B) Bradycardia due to neurologic dysfunction.
- C) Bronchospasm due to excessive histamine release.
- D) Mottled skin due to release of endotoxins.
- E) Confusion due to decreased stroke volume.

Explanation: Confusion due to decreased stroke volume is consistent with cardiogenic shock, which is the most likely cause of shock in this patient. Poor left ventricular output results in elevated pulmonary capillary wedge pressure (PCWP). In addition, hypotension activates the sympathetic nervous system, resulting in vasoconstriction and increased systemic vascular resistance (SVR). Peripheral vasoconstriction also causes cold, clammy extremities.

Answers

Q2	G
Q3	E

Shock:

Q4: A 33-year-old pilot is transported to the emergency department after she was involved in a cargo plane crash during a military training exercise in South Korea. She is conscious but confused. She has no history of serious illness and takes no medications. Physical examination shows numerous lacerations and ecchymoses over the face, trunk, and upper extremities. The lower extremities are cool to the touch. There is continued bleeding despite the application of firm pressure to the sites of injury. The first physiologic response to develop in this patient was most likely which of the following?

- A) Increased HR.
- B) Increased production of lactic acid.
- C) Decreased urine output.
- D) Increased firing of chemoreceptors.
- E) Increased capillary refill time.
- F) Decreased systolic BP.
- G) Increased respiratory rate.

Explanation: An increase in heart rate is the first compensatory mechanism for hypovolemic shock and may be seen as early as class I hemorrhagic shock. In this patient, blood loss has resulted in hypovolemia and decreased stroke volume. The heart rate increases (as a result of intracardiac and arterial baroreceptor reflexes) to help maintain cardiac output. Initially, this mechanism may be sufficient to compensate for volume loss; patients in class I hemorrhagic shock may be otherwise asymptomatic. As shock progresses, compensatory mechanisms become overwhelmed by volume loss, resulting in further derangements in vital signs (e.g., tachycardia, hypotension, tachypnea, hypoxemia) and damage to multiple organ systems.

Q5: A 28-year-old man is scheduled for skin grafting of the right leg. Four weeks earlier, he underwent open reduction and internal fixation of an open right tibial fracture. The postoperative period at that time was complicated by necrosis of the overlying skin. In the operating room, he is placed on continuous hemodynamic monitoring and anesthetized with intrathecal bupivacaine injected into the L3–L4 interspace. Thirty minutes later, he has severe shortness of breath and lightheadedness and loses consciousness. His temperature is 37.1°C (98.8°F), pulse is 38/min, respirations are 24/min, and palpable systolic blood pressure is 58 mmHg. The skin is diaphoretic and flushed. He withdraws the upper extremities to painful stimuli above the navel. The lungs are clear to auscultation. Heart sounds are not audible. Which of the following is the most likely underlying cause of this patient's symptoms?

- A) Loss of sympathetic vascular tone.
- B) Bacterial toxin-induced vasodilation.
- C) Obstructive thrombus in the pulmonary artery.
- D) Intravascular volume depletion.
- E) Bone marrow embolism to the lungs.
- F) Type I hypersensitivity reaction.

Explanation: Local spinal anesthetics can interrupt the transmission of nerve impulses in spinal sympathetic pathways, causing a loss of sympathetic vascular tone that ultimately results in neurogenic shock. Neurogenic shock is a type of distributive shock characterized by generalized vasodilation (causing diaphoresis and flushed skin). This vasodilation leads to decreased preload and subsequently reduced cardiac output, which results in severe hypotension. Bradycardia results from lack of beta adrenergic activity and is exacerbated by unopposed vagal tone. Consequently, cerebral perfusion is impaired, leading to a loss of consciousness as seen in this patient.

Answers

Q4	A
Q5	A

Shock:

Q6: An 84-year old woman is brought to the emergency department from a nursing facility because of confusion and aggressive behavior. She has had multiple episodes of diarrhea the last 3 days. Her temperature is 37.5°C (99.5°F), blood pressure is 82/51 mm Hg, and pulse is 110/min. She is disoriented to place and time. Her extremities are warm and dry. Her pulses are weak. Placement of a foley catheter yields cloudy urine with a foul odor. This patient is most likely to have which of the following hemodynamic profiles?

	Cardiac output (CO)	Pulmonary capillary wedge pressure (PCWP)	Systemic vascular resistance (SVR)	Central venous pressure (CVP)
A	↓	↓	↑	↓
B	↓	↓	↓	↓
C	↓	↑	↑	↑
D	↑	↓	↓	↓
E	↑	↑	↑	↑

Explanation: This profile is suggestive of distributive shock, which is a collective term for shock that results in pathologic vasodilation, leading to decreased SVR. The most common etiology is septic shock (in this case, a patient with likely urinary tract infection), but it can also be caused by neurogenic shock or anaphylactic shock. Circulating cytokines and bacterial toxins cause pathologic vasodilation and lead to decreased SVR (afterload), as well as decreased CVP and PCWP (preload). Consequently, there is an increase in heart rate and cardiac output. Patients with septic shock will often have warm, flushed skin as a result of this pathophysiology.

Burn:

MCQs:

Q1: A 9-year-old boy is brought to the emergency department because he sustained burns to his torso 40 minutes ago. His mother states that she was cooking and drinking a cup of coffee while the boy was on the kitchen table playing with toys. Sometime later, she went to the bathroom and when she came back the child was screaming and crying with the coffee spilled over the front of his pajamas. His vital signs are within the normal ranges. Examination shows that the patient is crying because of pain. There is a non-blanching erythematous, wet looking wound with a few thick-walled blisters that are painful to the touch on his chest. There are no other burn sites on the patient. Which of the following is the most likely diagnosis?

- A) Deep partial thickness burn
- B) First degree burn
- C) Superficial burn
- D) Superficial partial thickness burn

Explanation: Burns can be categorised as follows: 1st degree/superficial burn: Erythematous, painful and dry; 2nd degree/partial thickness burn: Erythematous, painful, wet appearance, blisters and blanching (variable); 3rd degree/full thickness burn: Black/white/grey and/or brown in colour, not painful (or very minimally), dry, non blanching and leathery texture.

Q2: A 25-year-old man comes to the emergency department after escaping from a burning building 40 minutes ago. He states that he is in severe pain. Physical examination shows burn injuries on the anterior and posterior surfaces of the right arm, the anterior and posterior right leg, the chest, and the abdomen. His temperature is 37.8°C (100°F), pulse is 110/min, respirations are 23/min, and blood pressure is 117/78 mm Hg. Which of the following is the most important to monitor for adjusting fluid administration?

- A) Blood pressure for every 4 hours
- B) Daily creatinine and BUN
- C) Daily electrolytes
- D) Fraction of sodium excretion (FENa)
- E) Hourly urine output

Explanation: Burn resuscitation requires careful administration of IV fluids. Urine output is the most important criteria to monitor for determining replacement fluids during the stabilization treatment in burn victims.

Answers

Q1	A
Q2	E

Burn:

Q3: A 27-year-old female comes to the emergency department because she was involved in a house fire 50 minutes ago. She is conscious, but in significant pain. Examination shows that she has significant burns to her entire head and neck, anterior chest and abdomen, and entire right leg. Her temperature is 36.8°C (98°F), pulse is 135/min, respirations are 26/min, and blood pressure is 98/60 mm Hg. Which of the following most likely represents the total percentage of her total body surface involved in the burn?

- A) 27%
- B) 36%
- C) 45%
- D) 63%
- E) 72%

Explanation: One simple method for estimating total body surface area burn percentage is known as the "Rule of 9s". It attributes 9% of the total body surface area to each of the following areas: head, anterior chest, posterior chest, anterior abdomen, posterior abdomen, right arm, left arm, right anterior leg, left anterior leg, right posterior leg, left posterior leg. The perineum is assigned 1% of the total body surface area. Therefore in the above patient, her entire head= 9%, anterior chest/abdomen= 18% and right leg= 18%. Therefore, $9+18+18= 45\%$. The following chart applies to adults only. This statistic is useful for calculating the total fluid resuscitation a burn patient will need in the first 24 hours following a burn injury.

Q4: A 45-year-old man comes to the emergency department because of partial thickness burns to his anterior upper thighs and medial forearms after his grill exploded 20 minutes ago. There is no singed hair on his face and his airway is intact. Examination shows that the wounds are patchy on the thighs, face, and forearms and that <10% of the patient's body is covered in burn wounds. Which of the following is most likely correct regarding further treatment of the patient?

- A) Aloe vera should be used to moisturize the burned areas
- B) Intact blisters should be left alone
- C) The patient will not heal without a skin graft
- D) The wounds should be cleaned with a skin disinfectant, such as povidone-iodine
- E) This patient's pain is unlikely to respond to acetaminophen and NSAIDs

Explanation: Superficial burns can cause blistering of the skin. In order to decrease the risk of infection, intact skin blisters should not be opened or unroofed. Blisters that have already ruptured may be removed in order to decrease further irritation; the underlying skin should be cleaned.

Answers

Q3	C
Q4	B

Burn:

Q5: A 35-year-old man comes to the emergency department because of severe burns sustained in a house fire an hour ago. The patient is conscious and states that he is in significant pain. His temperature is 36.8°C (98°F), pulse is 123/min, respirations are 23/min, and blood pressure is 117/78 mm Hg. Examination shows that he has sustained partial and full-thickness burns to both arms, his right leg, and his anterior chest. During the first 24 hours following injury, the appropriate strategy for fluid resuscitation begins with which of the following?

- A) 6% hydroxyethyl starch
- B) Human serum albumin
- C) Isotonic sodium chloride
- D) Lactated Ringer's solution
- E) Plasmalyte

Explanation: Almost all burn resuscitation strategies are conducted with crystalloid solutions within the initial 24-hour period following burn injury. Lactated Ringer's solution is the preferred treatment given its relative isotonicity. It is preferable to isotonic sodium chloride because of its lower sodium concentration and higher pH, which are closer to physiologic levels. Lactated Ringer's solution also acts as a buffer for metabolized lactate that is present during the ensuing metabolic acidosis following burn injury.

Q6: A 19-year-old man comes to the emergency department after being rescued from a burning building 20 minutes ago. His right lower leg was trapped under a burning beam, resulting in a severe full-thickness and circumferential burn. He sustained no other injuries and he is currently stable on room air. In the ED, he begins feeling severe pain in his right foot and toes. Examination shows there is increased edema of the lower leg, pain with passive movement of the toes, and subjective "tingling" in the right foot. Dorsalis pedis and posterior tibial pulses are palpable bilaterally. There is no cyanosis. Which of the following is the most appropriate next step in management?

- A) Amputation
- B) Emergency escharotomy
- C) Obtain an X-ray
- D) Prescribe additional analgesic
- E) Reassure the patient

Explanation: Burns of a circumferential nature are at risk for eschar development and therefore limb compartment syndrome. Treatment is with escharotomy, to relieve the inter-compartmental pressure and ensure adequate limb perfusion.

Q5	D
Q6	B

Burn:

Q7: A 14-year-old boy comes to the emergency department because he was caught in a house fire 30 minutes ago. He is currently spontaneously breathing at a rate of 35/min and his oxygen saturations are 88% on room air. Examination shows he has some superficial and partial thickness burns on all four extremities. He also has deep burns on his forehead and occipital region. His estimated total burn area is about 75%. His nares appear inflamed, with singed hair. Which of the following is most likely the most important step in the management of this patient?

- A) CT head
- B) Cricothyrotomy
- C) Endotracheal Intubation
- D) IV fluids
- E) Packed erythrocyte transfusion

Explanation: Given his arrival at the emergency department following a house fire, and his inflamed nare and singed nasal hair, this patient is most likely a victim of smoke inhalation. He is therefore at high risk of respiratory failure from inhalation injury and should be sedated by rapid sequence and intubated.

Q8: A 43-year-old man calls emergency medical services minutes after splashing bleach in his face and eyes. He works with a partner, who is able to drive him to the hospital. Which of the following is the most appropriate recommendation to give the patient for immediate management, prior to coming to the emergency department?

- A) Apply lubricating drops
- B) Neutralize with weak acid
- C) Irrigate the eye
- D) Patch the eye
- E) Come immediately with no additional interventions

Explanation: Chemical burns should generally be managed with immediate and copious irrigation with water, which acts to remove and dilute most chemicals at the site of exposure.

Q7	C
Q8	C

Burn:

Q9: A 17-year-old boy comes to the emergency department because of a burn on his left foot and left hand from a skillet 35 minutes ago. The boy states that he tried to grab the skillet, but the handle burned his hand and he dropped it on his foot. Examination shows that the wounds on his hand and foot go through the epidermis and into the dermis, are red in appearance, and are dry. He states that the wounds don't hurt as much as he expected, just around the edges. Which of the following is the most appropriate treatment?

- A) Both limbs are likely to be amputated, given the severity of the burn.
- B) Cover the wounds in wet gauze and give the patient oral antibiotics prophylactically.
- C) Immediate covering in antibiotic ointment and dry gauze, then isolation until the wound resolves.
- D) Skin graft, with careful attention to potential graft contraction given the site of the wound.
- E) Discharge with oral antibiotics

Explanation: Full thickness burns are characterized by little to no pain due to loss of innervation and are treated with debridement of dead tissue and skin grafting. The skin graft needs to be carefully measured, as contraction is likely to occur on the hands and feet in particular.

Q10: A 27 year old female arrives at the trauma bay after being involved in a house fire. She has significant burns to her entire head/neck, anterior chest/abdomen and right leg. Her vitals are P 135, BP 98/60, RR 26, O2 Sat 95% and GCS 10. She weighs approximately 60 kg. Which of the following choices best represents the resuscitation needs of this patient?

- A) Give her 500 mL boluses until her BP improves, then 120 mL/ hr for the next 24 hours.
- B) Give her 5.4 L of fluid in the first 8 hours, then another 5.4 L over the next 16.
- C) Give her 5.4 L over the first 4 hours and another 5.4 L over the next 20 hours.
- D) This patient needs IV access, but does not require resuscitative fluids.
- E) Give her 8 L over the first 12 hours, then 2 L over the next 12 hours

Explanation: An effective estimation of fluid requirement can be made using the Modified Parkland Formula. This formula estimates the amount of fluid required in the first 24 hours post burn. One must remember that the time frame for resuscitation is taken from the time of the burn, NOT the time of the presentation. It is important to obtain burn history from fire/ems/police personnel or other burn patients that can respond appropriately to questioning.

The Parkland Formula is as follows:

Total estimate= 4 mLs X Burned Surface Area % X Weight (kg)

1/2 the total volume is given in the first 8 hours

1/2 the total volume is given in the next 16 hours.

Answers

Q9	D
Q10	B

Burn:

Q11: A 25-year-old male is brought to the emergency department after escaping from a burning building. Physical examination reveals burn injuries on the anterior and posterior surfaces of the right arm, anterior and posterior right leg, chest, and abdomen. His blood pressure is 120/75 mm Hg, and his only complaint is severe pain. The patient's current weight is 50 kg (110 lbs). Which the most appropriate fluid management in this patient?

- A) 200 X 45 mL lactate ringer plus maintenance in 16-hours
- B) 200 X 36 mL lactate ringer plus maintenance in 16-hours
- C) 2L of 5% dextrose in water for 24-hours
- D) 200 X 45 mL lactate ringer plus maintenance in 24-hours
- E) 200 X 36 mL lactate ringer plus maintenance in 24-hours

Explanation: The Parkland formula for managing the fluids of patients with second and third degree burns is as follows: Parkland Formula = % BSA (body surface area affected) x weight (kg) x 4 (mL/kg) This formula calculates the fluid needed in addition to maintenance fluids over a 24-hour period.

The rule of 9's is used to determine % body surface affected where the head, each arm, chest, and abdomen are 9% each and the back, and each leg is 18% each. The patient has one arms (9%), one leg (18%) and his chest and abdomen (18%) involved giving a total of 45%. Substituting this back into the formula gives the correct answer. The first half of the fluids calculated are given in the first 8 hours, the remainders are given over the next 16 hours.

Wound Healing & Management:

MCQs:

Q1: A 94-year-old man is brought to the emergency department from a rehab facility where he has been for the past 17 days following a hemorrhagic stroke. He has a past medical history of urinary incontinence and dementia. On physical exam there is an area of erythema and ulceration over the lumbosacral region extending through the skin, fat, muscles and bones as shown in the exhibit. There is no eschar around the open wounds. Which of the following would be the most likely finding?



- A) Full-thickness skin and tissue loss with exposed fascia, muscle, and bone
- B) Full-thickness skin loss with visible fat
- C) Eroded skin and soft tissue also found on the feet
- D) Infection and erythema of the superficial lymphatics and upper dermis
- E) Erythema and infection of the subcutaneous fat

Explanation: This is a stage IV decubitus ulcer. Decubitus ulcers are also referred to as bedsores or pressure ulcers. They form from a lack of blood flow and mechanical stress to the skin. Those who are immobile due to illness or injury, usually the elderly, are at greatest risk of developing these ulcers. Prevention lies in making sure a patient is not laying on one area of their body too long. These lesions are particularly prone to difficult wound healing and high morbidity and mortality.

Decubitus ulcers are ranked from stage I to stage IV

- Stage I: intact skin with localized, nonblanchable erythema
- Stage II: partial-thickness loss of skin with exposed dermis
- Stage III: full-thickness skin loss with visible fat
- Stage IV: full-thickness skin and tissue loss with exposed fascia, muscle, bone, etc.

Wound Healing & Management:

Q2: A 25-year-old woman presents with a benign nevus on the right upper arm. She desires removal and undergoes a clean incision and then closure of the incision without complication. With regard to the healing process, which of the following cell types are the first infiltrating cells to enter the wound site, peaking at 24 to 48 hours?

- A) Macrophages
- B) Neutrophils
- C) Fibroblasts
- D) Lymphocytes
- E) Monocytes

Explanation: Wound healing is an overlapping sequence of inflammation, proliferation, and remodeling. The inflammatory phase is characterized by a rapid influx of neutrophils, followed in about 2 days by an influx of mononuclear cells.

Q3: A 22-year-old healthy African-American woman presents with a recurrent growth on her right thigh. She has a childhood history of a third-degree scald burn to the same area that did not require skin grafting. The growth was completely removed 2 years ago. On physical examination there is a 5 cm × 2 cm, raised, irregularly shaped purple lesion with a smooth top. Which of the following is the most likely diagnosis?

- A) Angiosarcoma
- B) Malignant melanoma
- C) Squamous cell carcinoma
- D) Kaposi sarcoma
- E) Keloid

Explanation: Keloids occur in areas of previous trauma to the skin (burns, surgery, piercings, tattoos) and represent an over exuberance of wound healing. Keloids are much more common in darker-pigmented ethnicities.

Answers

Q2	B
Q3	E

Wound Healing & Management:

➤ Match:

Choose and match the correct diagnosis with each of the scenarios below:

- A) Early inflammatory phase
- B) Late inflammatory phase
- C) Proliferative phase
- D) Remodelling phase
- E) Mature scar

1- This phase is characterised by replacement of type 3 collagen by type 1 until a ratio of 4:1 is achieved. Realignment of collagen fibres along the lines of tension, decreased vascularity and wound contraction are also seen in this phase.

2- Platelet-enriched blood clot and dilated vessels are a feature of this phase.

3- The contraction of the scar is now complete. The vascularity has reduced and growth ceases.

4- This phase has increased vascularity with plenty of neutrophils and lymphocytes.

5- This phase consists mainly of fibroblast activity and collagen production. The collagen produced during this phase is type 3.

Q1	D	Q4	B
Q2	A	Q5	C
Q3	E		

Answers

Metabolic response to injury:

MCQs:

Q1: In stress response, which of the following statements are false?

- A) It is graded.
- B) Metabolism and nitrogen excretion are related to the degree of stress.
- C) In such a situation there are physiological, metabolic and immunological changes.
- D) The changes cannot be modified.
- E) The mediators to the integrated response are initiated by the pituitary.

Explanation: The stress response is graded according to the injury inflicted. In major surgery there is an increase in metabolism and nitrogen excretion in direct proportion to the injury. There are immunological and metabolic changes which are reflected in the physiology – pyrexia, tachycardia and tachypnoea. The body's innate defence mechanisms can combat mild stress, and return to normal physiology occurs very soon. **In severe injury, the stress response can be modified** by anticipating complications and preventing them by judicious management in an ICU, i.e. attention to nutrition and anticipation and prevention of secondary insults such as ischaemia, infection, hypoxia and compartment syndrome. The pituitary gland, rightly referred to as 'the leader in the endocrine orchestra' (Sir Walter Langdon-Brown, 1931), sets in motion the entire synchronous response.

Q2: With regard to the recovery process, identify the statements that are true.

- A) All tissues are catabolic, resulting in repair at an equal pace.
- B) Catabolism results in muscle wasting.
- C) There is alteration in muscle protein breakdown.
- D) Hyperalimentation helps in recovery.
- E) There is insulin resistance.

Explanation: Catabolism is an important aspect of recovery. However, the body's stress response has a capacity to triage the catabolic effect. The catabolic effect concentrates away from the peripheries, such as muscle fat and skin, to the more important parts – the liver, the immune system and the wound. During catabolism, muscle wasting occurs from muscle protein breakdown and a decrease in muscle protein synthesis. The major site for such a change is peripheral skeletal muscle. Hyperalimentation is not advisable as it enhances the metabolic stress. Nutritional support should therefore be at a modest level. Hyperglycemia is a normal response to stress. This is due to increased glucose production and decreased uptake in peripheral tissues as a result of insulin resistance, a temporary effect of stress. The severity of the stress determines the duration of the hyperglycaemic state – stress-induced diabetes. Intravenous insulin infusion in the ICU setting using a sliding scale has been shown to reduce morbidity and mortality.

Answers

Q1	D
Q2	B,C, E

Metabolic response to injury:

Q1: Which of the following statements are true for optimal perioperative care?

- A) Volume loss should be promptly treated by large intravenous (IV) infusions of fluid.
- B) Hypothermia and pain are to be avoided.
- C) Starvation needs to be combated.
- D) Avoid immobility.
- E) Helpful measures can be taken.

Explanation: As a result of hypovolaemia, receptors in the carotid artery, aortic arch and left atrium act to release aldosterone and antidiuretic hormone (ADH). Aldosterone is also released by the renin-angiotensin system activated by the juxtaglomerular apparatus (see Fig. 1.3). Aldosterone and ADH help in sodium and water retention. **Therefore large volumes of fluid infusion should not be used**, as it will result in oedema, peripheral and visceral, the latter causing delayed gastric emptying. Hypothermia, due to increased production of adrenal steroids and catecholamines, causes greater risk of cardiac arrhythmias. Therefore all efforts must be made to conserve heat in the stressed patient.

Q2: Which of the following statements about homeostasis are false?

- A) It is defined as a stable state of the normal body.
- B) The central nervous system, heart, lungs, kidneys and spleen are the essential organs that maintain homeostasis at a normal level.
- C) Elective surgery should cause little disturbance to homeostasis.
- D) Emergency surgery should cause little disturbance to homeostasis.
- E) Return to normal homeostasis after an operation would depend upon the presence of co-morbid conditions.

Explanation: The normal physiological state of the human body is referred to as homeostasis – a normal internal environment (the milieu intérieur of Claude Bernard). All the vital organs – the brain, heart, lungs, kidneys and, to a lesser extent, the spleen – play an important role in its maintenance. These organs are interdependent and thus help to maintain a normal fluid and acid-base balance.

In the elective situation, the patient is always optimised prior to any operation, thereby minimising the homeostatic disturbance. The extent of surgery also plays a part. Disturbance in the homeostasis to some degree occurs in emergency surgery; this depends upon the extent of injury, presence of sepsis and any ongoing insults. If the patient has co-morbid conditions, postoperatively the return to normal homeostasis would take longer than in those with no co-morbidity. In such cases, care in a high-dependency or intensive care unit (ICU) is essential.

Answers

Q1	B, C, D, E
Q2	D

Metabolic response to injury:

Q1: Which of the following statements about mediators are true?

- A) They are neural, endocrine and inflammatory.
- B) Every endocrine gland plays an equal part.
- C) They produce a model of several phases.
- D) The phases occur over several days.
- E) They help in the process of repair.

Explanation: Stress from injury travels along afferent pathways of the spinal cord to the hypothalamus which secretes the corticotrophin-releasing factor (CRF) that acts on the pituitary to secrete adrenocorticotrophic hormone (ACTH) and growth hormone (GH). This creates the 'flight or fight' response. The pancreas increases glucagon secretion. Other endocrines, thyroid and gonads play a minor role. This concerted neuroendocrine response results in lipolysis, hepatic gluconeogenesis, protein breakdown, pyrexia and hypermetabolism. Cytokines, interleukins (IL-1, IL-6) and tumour necrosis factor-alpha (TNF) are simultaneously released (see Fig. 1.2).

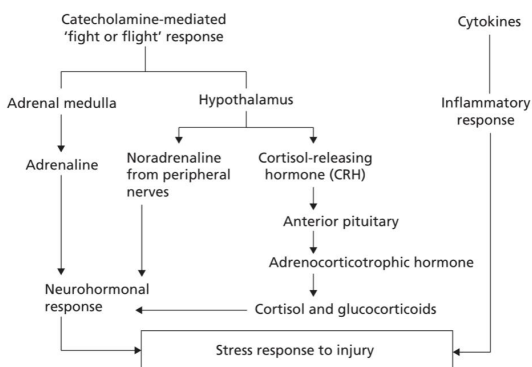


Figure 1.2 Neuroendocrine response to trauma.

A model of two phases, 'ebb and flow', is created. The term was coined by Sir David Cuthbertson in 1930. The ebb, or early, phase helps initiate a 'holding pattern' within the first 12 hours (clinically manifesting as shock). The flow phase lasts much longer depending upon the extent of damage. It can be divided into a catabolic phase lasting several days, followed by a recovery and repair phase lasting several weeks. The time factor depends upon the extent of initial injury and any ongoing insults. The mediators do help in the repair process by endogenous cytokine antagonists, which controls the proinflammatory response, commonly called the systemic inflammatory response syndrome (SIRS). If the response to SIRS is inadequate, multiple organ dysfunction syndrome occurs (MODS), which is just a step away from death.

Transfusion Medicine and therapy:

> MCQs:

Q1: A 74-year-old Caucasian woman presents to her family doctor with a 1-day history of tarry, black stools. She is somewhat confused, but says she has passed multiple bowel movements with this appearance in the last 24 hours. Her past medical history is significant for atrial fibrillation, for which she takes warfarin. Her laboratory results demonstrate an INR of 10.1 and a hemoglobin value within the normal range. Her family doctor, suspecting an upper gastrointestinal bleed, sends the patient to hospital. In the hospital, she is administered vitamin K, coagulation factors, and fresh frozen plasma. Four hours later, the patient develops chest pain and dyspnea. Her chest X-ray is pictured below.

Which of the following is the most likely cause for her shortness of breath?



- A) Acute myocardial infarction
- B) Anaphylaxis
- C) Allergic reaction
- D) Transfusion-related acute lung injury
- E) Transfusion-related bacteremia

Explanation: Transfusion-Related Acute Lung Injury (TRALI) occurs within 6 hours of a blood transfusion and is usually associated with plasma products. It causes flash pulmonary edema, which results in shortness of breath. Treatment for this condition is mainly supportive. Supplemental oxygen is given in mild cases, while aggressive ventilatory support, and vasopressors are reserved for severe cases. TRALI should be suspected in all cases of shortness of breath following transfusion.

Transfusion Medicine and therapy:

Q2: A 27-year-old woman is reviewed in the postoperative care unit because of acute onset of fever and chills for 10 minutes. She underwent total colectomy for Crohn's disease an hour ago. She was given a dose of perioperative antibiotics and received one unit of packed red blood cells during the surgery for excessive blood loss. Her temperature is 39°C (102.2°F), blood pressure is 120/80 mmHg, pulse is 95/min, respirations are 14/min, and SaO₂ is 99% on room air. She has an indwelling urinary catheter, arterial line, and peripheral IV; all of which were placed at the time of surgery. Which of the following is the most likely cause of her fever?

- A) Catheter-Associated Infection from Peripheral IV
- B) Pneumonia
- C) Transfusion Reaction
- D) Urinary Tract Infection
- E) Surgical site infection

Explanation: The timing of postoperative fever can be very helpful in narrowing the differential diagnosis, and can generally be broken down into three categories: immediate fever, acute fevers, and delayed fevers:

- Immediate fever (0-2 hours post-op) is often caused by prior trauma/infection, blood products administered during surgery, medications administered peri-operatively, and inflammation.
- Acute fever (24 hours - 1 week post-op) is generally caused by hospital acquired infections or surgical site infection.
- Delayed fever (1 week - >1 month post-op) include surgical site infection, pulmonary embolism, deep vein thrombosis, viral infections from blood products, and infective endocarditis.

Q3: A 28-year-old male was brought in by ambulance after being struck by a truck while crossing the street. He has lost a large volume of blood and a massive transfusion protocol is initiated. The patient's blood type is found to be AB+. He is to be given two units of packed red blood cells (RBCs). Which type(s) of packed RBCs would be safe to transfuse into this patient?

- A) AB+, O+
- B) A+, B+
- C) A+, B+, AB+, O+
- D) A-, B-, O-
- E) All of the above
- F) None of the above

Answers

Q2	C
Q3	E

Transfusion Medicine and therapy:

Q4: A 43-year-old female was brought in by ambulance after being struck by a truck while crossing the street. She has lost a large volume of blood and a massive transfusion protocol is initiated. The patient is found to have type O- blood. She is to be given two units of packed red blood cells (RBCs). Which type(s) of RBCs would be safe to transfuse into this patient?

- A) A-, B-, O-
- B) A+, B+, O+
- C) O+
- D) O-
- E) A-, B-, AB-, O-
- F) All of the above
- G) None of the above

Q5: A 27-year-old woman is brought by ambulance to the resuscitation room of the emergency department after a high-speed road traffic crash. She has major injuries including a lacerated left arm and has suffered massive intra-abdominal haemorrhage. She has hemorrhagic shock and blood transfusion is required immediately. What blood group of red cells should she receive?

- A) AB Rh(D) positive
- B) AB Rh(D) negative
- C) A Rh(D) negative
- D) O Rh(D) negative
- E) O Rh(D) positive

Q6: A 45-year-old man is evaluated in the surgical intensive care unit for a seizure. This is his first seizure episode. He was admitted to the hospital earlier in the day after being in a motor vehicle collision and losing a large amount of blood. Three units of packed red blood cells were transfused on arrival to the emergency department. Laboratory investigations show serum phosphate level within normal limits. Which of the following is the most likely cause of his seizure?

- A) Epilepsy
- B) Hyperparathyroidism
- C) Hypermagnesemia
- D) Hypocalcemia
- E) Hypothyroidism

Explanation: Blood transfusions can cause hypocalcemia due to the citrate in the transfusion products binding to calcium in the patient's blood. This causes a lack of free calcium and the symptoms of hypocalcemia.

Q4	D
Q5	D
Q6	D

Thoracic Diseases:

MCQs:

Q1: An initial primary survey of the chest is intended to quickly identify the following causes of cardiorespiratory compromise, except?

- A) Flail chest
- B) Cardiac tamponade
- C) Tension pneumothorax
- D) Haemothorax
- E) Pulmonary contusion

Explanation: Thoracic injuries which are an immediate threat to life include flail chest, tension pneumothorax, open pneumothorax, massive haemothorax and cardiac tamponade. Pulmonary contusion is not an immediate threat to life, and therefore is not of initial concern during the primary survey. However, it can complicate recovery as the injured lung can impair gas exchange and may be more susceptible to fluid overload.

Q2: A 42-year-old construction worker is admitted following a crush injury. The patient is in great distress and complaining of chest pain. The patient is working hard to breathe, however there is some paradoxical movement of her chest wall. Arterial blood gases show hypoxia with pO₂ 7.5 and pCO₂ 8.2. A chest radiograph shows multiple rib fractures. The life-saving intervention is?

- A) High-flow oxygen
- B) Cricothyroidotomy
- C) Endotracheal tube insertion
- D) Aggressive fluid resuscitation
- E) Adequate analgesia to allow effective respiration

Explanation: Flail chest is a term used to describe an injury to the chest wall which results in a section losing continuity with the remainder. This loose segment is therefore sucked in by the negative pressures implicit in inspiration, preventing effective respiration and causing significant damage to the underlying lung parenchyma. These two factors combined result in significant impairment of gas exchange and respiratory failure. Analgesia will improve the patient's pain but since the respiratory failure is not due to pain restricting breathing it will not save this patient's life. Fluid resuscitation is a complicated issue in these patients; a careful balance must be struck as the injured lung is vulnerable to fluid overload, which only exacerbates the poor gas exchange. High-flow oxygen will partially reverse the hypoxia, but is only a holding measure and will not affect the carbon dioxide retention. This patient requires mechanical ventilation and therefore the placement of a definitive airway. Both endotracheal intubation and cricothyroidotomy will provide this, but surgical airways are reserved for cases in which intubation fails or is impossible due to severe facial injury.

Answers

Q1	E
Q2	C

Thoracic Diseases:

Q3: A 65-year-old woman has had pain in her right shoulder and has been treated with analgesics without relief. The CXR reveals a mass in the apex of the right chest. A transthoracic needle biopsy documents carcinoma. Superior pulmonary sulcus carcinomas (Pancoast tumors) are bronchogenic carcinomas that typically produce which of the following clinical features?

- A) Atelectasis of the involved apical segment
- B) Horner syndrome
- C) Pain in the T4 and T5 dermatomes
- D) Nonproductive cough
- E) Hemoptysis

Explanation: Pancoast tumors are peripheral bronchogenic carcinomas that produce symptoms by involvement of extrapulmonary structures adjacent to the cupula. These structures include the nerve roots of C8 and T1, as well as the sympathetic trunk. Interruption of the cervical sympathetic trunk leads to miosis, ptosis, and anhidrosis, the triad of signs that constitutes Horner syndrome. Involvement of the nerve roots causes pain along the corresponding dermatomes. The peripheral location of the neoplasm makes pulmonary signs, such as atelectasis, cough, and hemoptysis, unlikely.

Match:

Choose and match the appropriate answer for the following questions:

- A) Thoracotomy
- B) Chest drain insertion
- C) Bronchoscopy
- D) CT scan of the chest

1- A middle-aged male patient presents with spontaneous recurrent haemoptysis, and clinical examination reveals no abnormal findings. Her chest radiograph is normal. What is the procedure of choice?

2- After reading the information booklet about his proposed procedure, an anxious 45-year-old female patient being consented for a procedure is worried about the post-procedural complications of pain and possible rib fractures. What procedure is this patient planned to have?

3- Following a right pneumonectomy, the postoperative recovery of a 52-year-old male patient is complicated by bronchopleural fistula, which presents with pyrexia, expectoration of large amounts of purulent sputum and a high fluid level on chest radiograph. In addition to positioning the patient to lie on the operated side, what procedure is urgently required?

4- A mediastinal mass is found incidentally on the chest radiograph of a 65-year-old female non-smoker who is otherwise healthy, with no significant past medical history. Which option would you recommend to this patient at this time?

Answers

Q3	B	3	B
1	C	4	D
2	A		

Esophageal Diseases:

MCQs:

Q1: A 58-year-old patient presents with a 6-week history of increasing difficulty swallowing. He first noticed problems when eating meat which became stuck 'behind his heart', but this gradually began to include other foods. The patient is currently worried because he is now struggling with thick fluids and has noticed some involuntary weight loss. What is the most appropriate investigation?

- A) Staging computed tomography
- B) Barium meal
- C) Upper gastrointestinal endoscopy
- D) Barium swallow
- E) Electrocardiography

Explanation: The gold standard investigation being endoscopy as it allows histological examination as well as direct visualization of pathology.

Q2: A 27-year-old patient presents with a 3-month history of increasing difficulty in swallowing. He first noticed the problem when drinking fluids, but is now commonly experiencing it when eating food as well. He has presented as regurgitation of food is becoming a problem and he has noticed unintentional weight loss. A chest radiograph shows a widened mediastinum. What is the most likely diagnosis?

- A) Thoracic aortic aneurysm
- B) Oesophageal malignancy
- C) Plummer-Vinson syndrome
- D) Achalasia
- E) Esophageal spasm

Explanation: Achalasia is a neuromuscular disorder caused by degeneration of Auerbach's plexus, which results in a failure of the lower esophageal sphincter to relax. The characteristic presentation is with problems swallowing fluids initially, followed by food. Chest pain and weight loss are also common. This conflicts with mechanical causes such as malignancy and compression, as these will initially cause problems with large food boluses, progressing to fluids. The spectre of malignancy is raised by the history of weight loss and mediastinal mass; however, the pattern of symptoms and the patient's age count against this as an answer. The mass seen on the chest radiograph is a dilated oesophagus loaded with food.

Answers

Q1	C
Q2	D

Esophageal Diseases:

Q3: A 58-year-old builder is referred to outpatients with a long history of retrosternal chest pain associated with food. esophagogastroduodenoscopy was performed which showed grade 2 oesophagitis with a hiatus hernia. The stomach and duodenum were normal. What is the most appropriate management?

- A) Triple eradication therapy
- B) Proton pump inhibitor
- C) Nissen's fundoplication
- D) Yearly endoscopic surveillance and biopsy
- E) Supportive gusset

Q4: A 65-year-old patient presents with symptoms of oesophagitis. Endoscopy is performed and biopsies taken from the patients lower oesophagus which demonstrates Barrett's oesophagus with low grade dysplasia. What is the next best course of action?

- A) Referral for esophagectomy
- B) Staging CT chest abdomen and pelvis
- C) Esophageal ablation
- D) High dose PPI and repeat endoscopy
- E) Triple eradication therapy

Explanation: This patient has Barrett's oesophagus with low grade dysplasia. As such, he is at high risk of developing oesophageal malignancy. Such patients require high dose acid suppression and surveillance endoscopy until the dysplasia resolves.

Q5: A 41-year-old man complains of regurgitation of saliva and of undigested food. An esophagram reveals a dilated esophagus and a bird's-beak deformity. Manometry shows a hypertensive lower esophageal sphincter with failure to relax with deglutition. Which of the following is the safest and most effective treatment of this condition?

- A) Medical treatment with sublingual nitroglycerin, nitrates, or calcium-channel blockers
- B) Repeated bougie dilations
- C) Injections of botulinum toxin directly into the lower esophageal sphincter
- D) Dilation with a Gruntzig-type (volume-limited, pressure-control) balloon
- E) Surgical esophagomyotomy

Explanation: This patient has achalasia, which is a functional disorder caused by failure of relaxation of the lower esophageal sphincter, typically present with dysphagia, chest pain, and regurgitation of saliva and undigested food. The safest and most effective treatment for this condition is surgical treatment with an esophagomyotomy. The operation of choice is a modified laparoscopic Heller myotomy. Initial management of achalasia may include medications (calcium-channel blockers or long-acting nitrates), and other management options such as endoscopic dilation or injection of botulinum toxin (Botox) into the LES. However, symptoms always recur and patients need to undergo repeated procedures with the associated risk of perforation. Surgery results in improvement in more than 90% of patients, compared with only 70% of patients treated by forceful dilatation.

Answers

Q3	A
Q4	D
Q5	E

Esophageal Diseases:

Q6: A 45-year-old executive experiences increasingly painful retrosternal heartburn, especially at night. He has been chewing antacid tablets. An esophagogram shows a hiatal hernia. In determining the proper treatment for a sliding hiatal hernia, which of the following is the most useful modality?

- A) Barium swallow with cinefluoroscopy during Valsalva maneuver
- B) Flexible endoscopy
- C) Twenty-four-hour monitoring of esophageal pH
- D) Measurement of the size of the hernia on upper GI
- E) Assessment of the patient's smoking and drinking history

Explanation: Endoscopy is an important step prior to undergoing operative intervention for GERD. It has the ability to exclude other diseases, such as tumors, and document the degree of peptic esophageal injury. Surgical treatment for sliding esophageal hernias (type I paraesophageal hernias) should be considered only in symptomatic patients with objectively documented esophagitis or stenosis. The overwhelming majority of sliding hiatal hernias are totally asymptomatic, even many of those with demonstrable reflux. Even in the presence of reflux, esophageal inflammation rarely develops because the esophagus is so efficient at clearing the refluxed acid. Symptomatic hernias should be treated vigorously by the variety of medical measures that have been found helpful. Patients who do have symptoms of episodic reflux and who remain untreated can expect their disease to progress to intolerable esophagitis or fibrosis and stenosis. Neither the presence of the hernia nor its size is important in deciding on surgical therapy. Once esophagitis has been documented to persist under adequate medical therapy, manometric or pH studies may help determine the optimum surgical treatment.

Q7: A 62-year-old man has been noticing progressive difficulty swallowing, first solid food and now liquids as well. A barium study shows a ragged narrowing just below the carinal level. Endoscopic biopsy confirms squamous cell carcinoma. Which of the following provides the most accurate information regarding the T stage of an esophageal carcinoma?

- A) Computed tomography
- B) Positron emission tomography
- C) Magnetic resonance imaging
- D) Endoscopic ultrasound
- E) Bronchoscopy

Explanation: Endoscopic ultrasound (EUS) provides the most accurate T staging of an esophageal carcinoma. An experienced endoscopic ultrasonographer can identify the depth and length of the tumor, the degree of luminal compromise, the status of regional lymph nodes, and involvement of adjacent structures. In addition, biopsy samples can be obtained of the mass and the regional lymph nodes. The accuracy of EUS for T staging increases with the depth of invasion. For T1 lesions, EUS is 84% accurate, and increases to 95% accuracy for T4 lesions. Computed tomography is helpful, but its accuracy is only 57% for T staging. An MRI can accurately detect T4 lesions and metastatic lesions but overstages T and N status with only 74% accuracy. A PET scan is reliable for detecting metastatic disease but is equal to a CT scan for T staging. Bronchoscopy is useful in patients who present with a cough or cervical esophageal carcinoma to rule out a tracheoesophageal fistula or growth of tumor into the trachea.

Answers

Q6

B

Q7

D

Esophageal Diseases:



Match:

Choose and match the appropriate answer for the following questions:

- A) Peptic stricture
- B) Carcinoma
- C) Achalasia
- D) Diffuse esophageal spasm
- E) Pharyngeal (Zenker's) diverticulum

1- A 50-year-old patient complains of chest pain on swallowing. This is usually episodic. He has had these symptoms for many years but recently they have become more frequent and severe.

2- A 45-year-old male patient complains of dysphagia of 2 years' duration. He seems to have greater difficulty swallowing liquids than solids. Recently he has noticed that at night he is woken up by coughing. He has lost about 7–8 kg in weight in 6 months.

3- A 65-year-old male, a heavy smoker, complains of dysphagia to solid food of 2 months' duration. At present he can only take fluids. He has quite severe cough when he tries to swallow any food or fluids. He feels this is different to his 'smoker's cough' which he has suffered for many years. He has lost about 10 kg in weight since the onset of these symptoms.

4- A 65-year-old male patient complains of dysphagia, with food sticking in the lower retrosternal region. He has suffered from heartburn all his life and occasionally has a sour and bitter taste in his mouth with water brash. He also has cough on occasions. He has not lost any weight.

5- A 60-year-old male complains of quite a severe cough which occurs when he lies in bed. At times he is woken up because of incessant cough when food material seems to project out. He is embarrassed by bad breath. He also has some dysphagia. His doctor has been treating him for chest infections.

Answers

1	D	4	A
2	C	5	E
3	B		

Urology:

MCQs:

Q1: A 40-year-old office executive presents with a 4-hour history of excruciating left loin pain radiating to the groin. The pain has been constant with short spells of more severe pain every 30–40 minutes. He informs you that his father has gout and has had similar pains in the past. A KUB and IVU confirm the presence of a radio-opaque stone in the left ureter, measuring approximately 4 mm in diameter. What type of stone is more likely to be present in this patient?

- A) Xanthine
- B) Uric acid
- C) (Triple) phosphate
- D) Calcium oxalate
- E) Cysteine

Explanation: Most stones (approximately 90%) are formed of calcium oxalate and magnesium/calcium/ammonium phosphate (so-called triple phosphate stones). These substances are radio-opaque and as a result mostly seen on a plain KUB scan. Xanthine, uric acid and cystine stones are rarer and usually the result of an acquired or genetic biochemical abnormality. These types of stones are generally radiolucent and therefore not seen on a KUB scan.

Q2: A 69-year-old diabetic man presents to the acute surgery unit with a 5-day history of mild dysuria, frequency and feeling generally unwell. On examination, he is found to be pyrexia and tachycardic. A genital examination reveals both the penis and the scrotum to be swollen, red and tender to touch, with erythema also extending into the groin bilaterally. Of note, the examining surgeon believes that there is palpable crepitus in the perineum. Routine bloods and cultures are taken (which later grow both aerobic and anaerobic organisms), and fluid resuscitation and broad-spectrum antibiotics are commenced. Following further discussion with a urologist, he is taken promptly into the operating theatre for definitive. The most likely diagnosis in this patient is?

- A) Fournier's gangrene
- B) Epididymo-orchitis
- C) Testicular tumour
- D) Testicular torsion
- E) Prostatitis

Explanation: Fournier's gangrene is a relatively rare necrotizing fasciitis of the perineal, perianal and genital areas (secondary to infection by aerobic and anaerobic bacteria), affecting predominantly middle-aged and elderly men with pre-existing comorbidities (it is seen more frequently in diabetic patients). It is a urological emergency that often presents with swelling, pain and erythema of the genital region accompanied by systemic features such as fever and rigour.

Answers

Q1	D
Q2	A

Urology:

Q3: A 30-year-old PhD student presents with acute-onset colicky left loin pain and describes a history suggestive of urinary calculi. Which one of the following would be the initial investigation of choice to determine the presence of a calculus in the renal tract?

- A) Dimercaptosuccinic acid (DMSA) scan
- B) Kidney ureter bladder (KUB) radiograph
- C) Intravenous urogram/pyelogram
- D) Flexible cystoscopy
- E) Diethylene triamine pentaacetic acid (DTPA) scan

Q4: A 6-week-old boy presents with his parents to the specialist paediatric urology outpatients department. The family is Jewish and at the time of the boy's circumcision were told by their rabbi that the urethral meatus was not in the normal position. On examination, the meatus is on the ventral surface just below the glans penis. What is the most likely diagnosis?

- A) Hypospadias
- B) Epispadias
- C) Phimosis
- D) Chordee
- E) Perineal urethra

Explanation: Hypospadias is the name for the abnormal ventral opening of the urethral meatus along the urethral groove between the glans penis and the scrotum or perineum. Epispadias is a condition in which the urethral meatus opens on the dorsum of the penis.

Q5: An 80-year-old man presents to his GP with a 6-month history of increasing urinary frequency. He passes urine approximately eight times during the day and six times each night, but feels that he has not completely voided. In addition, he reports that his stream is very slow and finds it hard to stop, with micturition prolonged due to terminal dribbling. He is otherwise fit and healthy with no other symptoms reported. On rectal examination, the prostate is found to be smoothly enlarged with no other significant findings on systemic examination. Which of the following layers of the prostate gland is likely to be enlarged in this man?

- A) Central zone
- B) Peripheral zone
- C) Anterior fibromuscular stroma
- D) Transition zone
- E) All of the above

Answers

Q3	B
Q4	A
Q5	D

Urology:

Q6: 23 A 69-year-old retired canal engineer who has previously worked in North Africa presents to the urology outpatients department with a 2-month history of intermittent painless haematuria. A cystoscopy is performed showing a sessile mass on the posterior bladder wall. A biopsy is taken of this mass, which confirms transitional cell carcinoma invading the bladder muscle, but no local nodes are involved. A further staging computed tomography scan shows no distant metastases. According to the TNM classification, the tumour stage in this individual is?

- A) Tis Nx Mx
- B) T2 N0 M0
- C) T2 N1 M0
- D) T3 N1 M1
- E) T3 N0 M1

Q7: A 36-year-old carpenter is diagnosed with a seminoma. To which lymph nodes do a seminoma most commonly spread first?

- A) Para-aortic lymph nodes
- B) Superficial inguinal lymph nodes
- C) Anterior cervical chain
- D) Posterior cervical chain
- E) Deep inguinal lymph nodes

Explanation: Vascular supply to the testicles is from the testicular artery, a branch of the abdominal aorta that travels through the inguinal canal to reach the testicles. Lymphatic drainage of the testicles follows the arterial supply back to the aorta and as a result initial dissemination of testicular malignancies is in the para-aortic lymph nodes.

Q8: A 75-year-old man presents to the surgical unit with a 24-hour history of acute-onset left loin pain, which seems to worsen intermittently and has not settled with regular simple analgesia. He suffers from mild dementia and is unable to recall the details of his past medical history. The foundation year 2 doctor on call suspects that a urinary calculus is the cause of this man's pain and spots an old pathology report in the patient's notes showing the presence of negatively birefringent crystals in a synovial fluid aspirate. Which one of the following substances is likely to make up the majority of this man's calculus?

- A) Xanthine
- B) Uric acid
- C) (Triple) phosphate
- D) Calcium oxalate
- E) Cysteine

Explanation: Gout is a disorder of purine metabolism exacerbated by dehydration, resulting in hyperuricemia and acute recurrent attacks of synovitis due to urate crystal deposition in the (predominantly) large joints of the body. Hyperuricemia also predisposes individuals to urate and calcium oxalate stones.

Q6	B
Q7	A
Q8	B

Urology:

Match:

Choose and match the appropriate answer for the following questions:

- A) Renal stone
- B) Pyonephrosis
- C) Ureteric calculus
- D) Bladder carcinoma
- E) Schistosomiasis of bladder
- F) Acute retention of urine
- G) Chronic urinary retention with overflow

1- A 40-year-old man has come to the A&E department complaining of a sudden onset of very severe pain in his left loin of 4 h duration, radiating to the front of the lumbar area and groin and the left testis. He has vomited a couple of times and has urinary frequency. On examination he is writhing around in pain and cannot find a comfortable position.

2- A 45-year-old female patient complains of nagging pain in her right loin and urinary frequency for several months. On examination she has tenderness in her loin over the kidney. Urine examination shows red blood cells and a growth of *Proteus* and staphylococci.

3- A 60-year-old female patient was seen as an emergency with high temperature, rigors and pain in her right loin. She had a blood pressure of 160/70 mmHg, bounding pulse of 90/min and extreme tenderness in her right loin.

4- A 35-year-old male, a recent visitor from Egypt, attended the A&E department with painless haematuria at the end of micturition. He had a few similar episodes while at home in Egypt. Clinical examination revealed no abnormality. He was referred to the one-stop haematuria clinic. On flexible cystoscopy he was found to have scattered tubercles and islands of pale patches resembling sand.

5- 70-year-old male, a heavy smoker for over 50 years, complains of painless, profuse and periodic haematuria for 6 weeks or so. The blood is uniformly mixed with the urine. He has frequency of micturition and some retropubic discomfort. Clinical examination reveals no abnormality.

6- A 75-year-old male complains of general malaise, lethargy, abdominal distension and urinary incontinence. On examination he has a large painless mass in his subumbilical region arising from the pelvis and has continuous urinary dribbling. The mass is dull on percussion. He is a type 2 diabetic and is on medication.

7- A 72-year-old man has come to the A&E department with severe acute pain in his lower abdomen not having passed urine for almost 10 h. He has been on some medicines which he bought across the counter for cold and flu. This has also made him constipated. On examination he is in severe pain from a large mass in his subumbilical region arising from his pelvis. The mass is dull to percussion.

1	C	4	E	7	F
2	A	5	D		
3	B	6	G		

Answers

Urology:

> Match:

Choose and match the appropriate answer for the following questions:

- A) Benign prostatic hypertrophy causing Bladder outflow obstruction
- B) Carcinoma of prostate
- C) Acute epididymo-orchitis
- D) Testicular tumour
- E) Torsion of the testis
- F) Varicocele

1- A 70-year-old male complains of poor stream, frequency of micturition both in the day and at night, hesitancy, intermittent stream, a feeling of incomplete emptying and terminal haematuria. These symptoms of BOO have been there for about 4 months. More recently he has had backache localised to the small of his back. On clinical examination, no abnormality is found. On rectal examination he has a generalised hard, nodular prostate with overlying fixed rectal mucosa.

2- A 70-year-old man complains of urgency, frequency and hesitancy of micturition with a feeling of incomplete emptying. He also has poor flow, intermittent stream and post-micturition dribbling. These symptoms have been going on for 2 years and are gradually getting worse. Clinical examination reveals no abnormality. On rectal examination he has an enlarged smooth prostate with overlying mobile rectal mucosa and the median vertical groove is easily felt.

3- A 25-year-old male complains of feeling heavy in his left scrotum where he noticed a lump while in the shower. A few days before he felt a lump in the periumbilical region of his abdomen. At the same time he noticed another lump on the left side of his neck. The abdominal and neck lumps do not give him any symptoms. On questioning he admits to coughing up some blood in his sputum a month ago. On examination he has a 2 cm irregular lump over his left supraclavicular area and a 5 cm irregular firm lump in his umbilical region. Examination of the left testis reveals a large lump which is hard and heavy.

4- A 45-year-old man complains of a painful left testis of 4 days' duration. This is associated with fever and rigors. He has painful micturition and considerable frequency. On examination he looks unwell, has pyrexia of 39°C and has a swollen, red, oedematous and shiny left hemiscrotum; the testis and epididymis feel indurated and tender.

5- An 18-year-old male complains of sudden onset of agonising pain in his right groin and suprapubic area of 6 h duration. He has no urinary symptoms. On examination he is in agony, the right testis is drawn up and the scrotum is red. The testis is impossible to feel because of pain.

6- A 45-year-old male complains of a dragging discomfort in the left side of his scrotum. He noticed an irregular lump in his scrotum separate from the testis. He thinks he has had this for many years but only recently noticed discomfort in the lump. On examination he has a bunch of veins in the scrotum and the testis feels normal. On lying down the veins disappear. Abdominal examination in the left renal area does not show any abnormality.

1	B	4	C
2	A	5	E
3	D	6	F

Answers

Vascular:

MCQs:

Q1: You assess a patient with a plantar ulcer who has poorly controlled diabetes. From the list of options below, select the most likely management plan?

- A) Optimise glycaemic control
- B) Reduce plantar pressure by ensuring good footwear
- C) Ensure podiatry input
- D) Assess vascularity of the limb
- E) All of the above

Q2: As part of the peripheral vascular examination, you are asked to record the ankle-brachial pressure index of the patient. Which one of the following values reflects a normal ankle-brachial pressure index?

- A) Between 0.9 and 0.6
- B) Greater than 1.3
- C) Between 0.6 and 0.3
- D) Greater than or equal to 1.0
- E) Less than or equal to 0.3

Q3: A 55-year-old man, with a positive smoking history, presents to you in the outpatient clinic with pain in the lower leg which is brought on by walking. The pain is cramping in nature, well localized to the left calf only, and is relieved by rest. The patient has noticed that his walking distance has progressively decreased because of the cramps in the left calf. There are no abnormal findings on physical examination. What is the most appropriate way to investigate the patient's symptoms?

- A) Measure the ankle-brachial pressure index
- B) Angiography
- C) Radiograph of the lower limbs
- D) Duplex ultrasound
- E) None of the above

Explanation: The ABPI may be used as a first line diagnostic investigation for PVD in patients presenting with lower limb symptoms. This test is non-invasive, quick and cheap and is usually performed in an outpatient clinic setting.

Answers

Q1	E
Q2	D
Q3	A

Vascular:

Q4: A 60-year-old woman has been diagnosed as having claudication of the lower limbs which does not impair her lifestyle. The patient is a smoker and has hyperlipidaemia for which she is taking a 'statin'. You are asked to discuss with the patient the treatment options available to her. From the list below, choose the recommended treatment option for this patient.

- A) Angioplasty
- B) Amputation
- C) Lower limb bypass
- D) Start an antiplatelet, increase exercise and quit smoking
- E) Continue with the cholesterol-lowering medication and follow up in outpatients in 3 months

Q5: You are asked to see a 67-year-old woman admitted with severe limb ischaemia. Your senior colleague asks you to examine the patient and report your findings. What are the two most likely clinical features that suggest the patient has severe limb ischaemia?

- A) Pulselessness and pain
- B) Paraesthesia and paralysis
- C) Perishingly cold limb and pallor
- D) Pallor and pain
- E) Paraesthesia and pallor

Explanation: The clinical signs and symptoms associated with acute limb ischaemia can be remembered using the list of '6 Ps': Pain, pallor, pulselessness, perishingly cold, paresthesia and paralysis. Paraesthesia and paralysis are late signs of severe limb ischaemia and urgent surgical intervention is required as these features threaten loss of the limb.

Q6: A 65-year-old man presents for the first time to your clinic with a painless wound in his right leg, which has been present for over 2 months. On examination you notice a 3 cm × 4 cm leg ulcer in the gaiter area of the right leg, covering the medial malleolus. The shallow bed of the ulcer is covered with granulation tissue, which is surrounded by sloping edges. There is no history of trauma. From the list below, choose the most likely diagnosis.

- A) Arterial leg ulcer
- B) Neuropathic ulcer
- C) Venous ulcer
- D) Traumatic ulcer
- E) Neoplastic ulcer

Answers

Q4	D
Q5	B
Q6	C

Vascular:

Q7: You are asked to see a 56-year-old homeless man who presented to the emergency department with a severe pain in his right leg, which started over 12 hours ago. On examination, the right leg is pale in colour in comparison with the left leg from below the knee to the toes and has fixed mottling. The right leg is cold and the popliteal, posterior tibial and dorsalis pedis pulses are absent. There is no sensation in the right leg and the patient is unable to flex the knee or move the toes due to fixed flexion deformities. In addition, the patient is afebrile and heart rate is 85 beats per minute and regular. What is the most likely diagnosis?

- A) Critical limb ischaemia
- B) Acute limb ischaemia
- C) Intermittent claudication
- D) Necrotizing fasciitis
- E) Spinal claudication

Explanation: This patient has classic clinical signs of an acute ischaemic limb. The patient has the '6 Ps' (pain, pallor, pulselessness, paraesthesia, paralysis and perishingly cold) which indicate that the limb is unsalvageable.

Q8: A 55-year-old woman, who is obese and has a positive smoking history, is to have varicose vein surgery in the next 12 hours. Your senior colleague asks you to ensure that deep vein thrombosis prophylaxis is commenced. From the list below, choose the most appropriate form of deep vein thrombosis prophylaxis that you would use.

- A) Low-molecular-weight heparin
- B) Warfarin
- C) Aspirin
- D) Clopidogrel
- E) None of the above

Explanation: Low-molecular-weight heparin has been shown to be effective for the use of DVT prophylaxis in those undergoing surgery. It is given subcutaneously and does not require laboratory monitoring. It should be used with caution in patients with renal dysfunction.

Q9: A 54-year-old woman comes to the surgery clinic with varicose veins. She and her primary care physician have already tried a number of conservative management options including leg elevation, exercise, and the use of compression stockings. She also tried a topical agent that was recommended by a friend. However, she has received no cosmetic relief and is also experiencing symptoms of leg ache and one episode of a leg ulcer. Which of the following is the next best step in managing the patient's concerns?

- A) Bypass of affected veins using vessel grafts
- B) Stenting of the affected vessels
- C) Venous reconstruction
- D) Cold ablation
- E) Laser vein ablation

Answers

Q7	B
Q8	A
Q9	E

Vascular:

Q10: Your colleague consults you with regard to a 56-year-old patient who has suffered an episode of amaurosis fugax. From the list below, choose the most likely site of pathology which may give rise to amaurosis fugax.

- A) Vertebrobasilar artery territory
- B) Carotid artery territory
- C) Posterior communicating artery territory
- D) Spinal artery territory
- E) Anterior communicating artery territory

Explanation: It usually occurs as a result of atherogenic emboli arising from the carotid artery territory, which unilaterally obstruct the lumen of the retinal arterial circulation. This leads to decreased blood flow to the retina, resulting in ischaemia. Other less common causes of amaurosis fugax are cardiac emboli and temporary vasospasm of the retinal artery (usually occurs in young people during exercise) and atherosclerosis of the ophthalmic artery.

Q11: You have decided to investigate the symptom experienced by the patient in Question 10. From the list below, select the most appropriate investigation that you would order first to investigate the site of pathology.

- A) Magnetic resonance angiography
- B) Digital subtraction angiography
- C) Computed tomography scan of the head and neck
- D) Duplex ultrasound scanning
- E) None of the above

Q12: A 40-year-old woman comes into her primary care physician's office with a several month history of swollen, painful legs. On physical exam, the patient's jugular venous pulsations are normal, her lungs are clear to auscultation bilaterally, but she has 2+ pitting edema in both lower extremities. Cardiac examination is normal. On further questioning, she says that her swelling is much less in the morning, right after she wakes up. Which of the following is the best initial treatment for this patient?

- A) Laser therapy
- B) Diuretic therapy
- C) St John's Wort
- D) Compression stockings
- E) Venous stripping

Explanation: Initial therapy of varicose veins should include conservative measures such as leg elevation and compression stockings before turning to surgical options.

Answers

Q10	B
Q11	D
Q12	D

Vascular:

Q10: You are asked to see a 56-year-old homeless man who presented to the emergency department with a severe pain in his right leg, which started over 12 hours ago. On examination, the right leg is pale in colour in comparison with the left leg from below the knee to the toes and has fixed mottling. The right leg is cold and the popliteal, posterior tibial and dorsalis pedis pulses are absent. There is no sensation in the right leg and the patient is unable to flex the knee or move the toes due to fixed flexion deformities. In addition, the patient is afebrile and heart rate is 85 beats per minute and regular. What is the most likely diagnosis?

- A) Critical limb ischaemia
- B) Acute limb ischaemia
- C) Intermittent claudication
- D) Spinal claudication

Explanation: This patient has classic clinical signs of an acute ischaemic limb. The patient has the '6 Ps' (pain, pallor, pulselessness, paraesthesia, paralysis and perishingly cold) which indicate that the limb is unsalvageable

Q11: A 58-year-old man presents with pain in the left leg after walking more than one block that is relieved with rest. On physical examination, distal pulses are not palpable in the left foot and there is dry gangrene on the tip of his left fifth toe. An ankle-brachial index on the same side is 0.5. Which of the patient's symptoms or signs of arterial insufficiency qualifies him for reconstructive arterial surgery of the left lower extremity?

- A) ankle-brachial index less than 0.7
- B) Claudication
- C) Absent palpable pulses
- D) Toe gangrene

Explanation: Rest pain and gangrene represent advanced stages of arterial insufficiency and warrant arterial reconstructive surgery whenever clinically feasible

Q12: A 69-year-old man with mild hypertension and chronic obstructive pulmonary disease (COPD) presents with transient ischemic attacks and the angiogram shown here. Which of the following is the most appropriate treatment recommendation?

- A) Medical therapy with aspirin 325 mg/day and medical risk factor management
- B) Medical therapy with warfarin
- C) Angioplasty of the carotid lesion followed by carotid endarterectomy if the angioplasty is unsuccessful
- D) Carotid endarterectomy

Answers

Q10	B
Q11	D
Q12	D