

COMPREHENSIVE MOCK EXAM 5

Supplemental to: Surgical Critical Care Board Review 2026-2027

Rasmus Broberg

*American Board of Surgery Surgical Critical Care Certifying Examination (TBSCCB) —
200 questions, computer-based single-best-answer format, domain-weighted per the
official SCC CE blueprint*

Board-Review Questions

1. A hemodynamically stable patient has a grade IV blunt splenic injury with contrast blush on CT. What is the preferred management in a trauma center with interventional capability?
- A. Routine diagnostic laparoscopy because CT cannot guide splenic management
 - B. Mandatory immediate splenectomy for every grade IV splenic injury
 - C. Discharge home because hemodynamic stability excludes delayed hemorrhage
 - D. Observation without serial examination because contrast blush is clinically irrelevant
 - E. Nonoperative management with close monitoring and consideration of splenic artery embolization
2. A 170-cm man with ARDS is intubated. Which initial tidal-volume strategy best limits ventilator-induced lung injury?
- A. Choose tidal volume from current body weight because obesity increases lung size
 - B. Set tidal volume near 6 mL/kg of predicted body weight and adjust to lung-protective targets
 - C. Use the largest tidal volume that keeps respiratory rate below 20/min
 - D. Set tidal volume near 10 mL/kg of actual body weight to prevent atelectasis
 - E. Use 12 mL/kg of predicted body weight whenever PaCO₂ is above normal
3. A ventilated patient with massive fluid resuscitation develops a tense abdomen, peak airway pressures rise, urine output falls, and bladder pressure is 28 mm Hg with new organ dysfunction. What is the diagnosis?
- A. Isolated acute tubular necrosis unrelated to intra-abdominal pressure
 - B. Mechanical small-bowel obstruction without pressure-related organ effects
 - C. Abdominal compartment syndrome requiring urgent decompressive management
 - D. Tension pneumothorax causing falsely elevated bladder pressure
 - E. Simple intra-abdominal hypertension without organ dysfunction

4. A septic patient has MAP 66 mm Hg on norepinephrine but remains mottled and oliguric. Echocardiography shows a markedly reduced left ventricular ejection fraction and low stroke volume. Which additional drug is most appropriate?

- A.** Add dobutamine to improve cardiac output while maintaining vasopressor support
- B.** Replace norepinephrine with phenylephrine to reduce myocardial oxygen demand
- C.** Add esmolol immediately despite evidence of inadequate forward flow
- D.** Start nitroprusside despite ongoing vasopressor-dependent shock
- E.** Give adenosine to reduce sinus tachycardia and improve ventricular filling

5. A patient is recognized to have septic shock from a perforated viscus. Which antimicrobial timing is most appropriate?

- A.** Defer therapy until CT confirms every potential source of infection
- B.** Delay antimicrobials until operative cultures identify the exact organism
- C.** Wait 6 hours to see whether fluids alone reverse the shock
- D.** Administer appropriate empiric antimicrobials immediately, ideally within 1 hour of recognition
- E.** Give antimicrobials only after serum procalcitonin becomes elevated

6. A 28-year-old man arrives after a motorcycle crash with severe dyspnea, hypotension, distended neck veins, absent breath sounds on the right, and tracheal deviation. What is the most appropriate immediate intervention?

- A.** Urgent CT angiography of the chest to define the thoracic injury
- B.** Pericardiocentesis for presumed traumatic cardiac tamponade
- C.** Immediate right-sided finger or needle thoracostomy followed by tube thoracostomy
- D.** Portable chest radiography before any pleural intervention is performed
- E.** Rapid-sequence intubation followed by positive-pressure ventilation alone

7. A patient with severe traumatic brain injury has MAP 82 mm Hg and intracranial pressure 24 mm Hg. What is the cerebral perfusion pressure?

- A.** 82 mm Hg, because CPP is identical to mean arterial pressure
- B.** 106 mm Hg, calculated by adding MAP and intracranial pressure
- C.** 58 mm Hg, calculated by subtracting intracranial pressure from mean arterial pressure
- D.** 34 mm Hg, calculated by subtracting MAP from intracranial pressure
- E.** 24 mm Hg, because CPP is equal to intracranial pressure

8. An arterial catheter tracing suddenly becomes blunted with a slow upstroke, absent dicrotic notch, and falsely low systolic pressure but relatively preserved mean pressure. What is the most likely problem?

- A.** An underdamped system that typically exaggerates systolic pressure and pulse pressure
- B.** True severe aortic regurgitation because all blunted waveforms indicate valve failure
- C.** Normal arterial waveform behavior after every rapid fluid bolus
- D.** An overdamped arterial-line system caused by air, clot, tubing compliance, or catheter obstruction
- E.** Ventricular fibrillation because a dicrotic notch is absent

9. A critically ill surgical patient on insulin infusion has repeated glucose values near 210 mg/dL. Which target range is appropriate for most ICU patients once insulin therapy is started?

- A.** Use no glucose target because stress hyperglycemia is always beneficial
- B.** Strict normalization to 70-90 mg/dL in every ICU patient
- C.** A moderate target around 140-180 mg/dL while avoiding hypoglycemia
- D.** Allow persistent glucose above 300 mg/dL to avoid any insulin exposure
- E.** Target 40-60 mg/dL because hypoglycemia improves immune function

10. A postoperative patient has serum sodium 118 mEq/L, generalized seizure, and no evidence of hypoglycemia. What is the most appropriate immediate therapy?

- A.** Give desmopressin alone without raising serum sodium during active seizure
- B.** Start loop diuresis as sole therapy despite severe neurologic symptoms

- C. Infuse large volumes of 0.45% saline until the sodium normalizes
- D. Restrict all fluids and wait for spontaneous correction of the sodium
- E. Give a controlled bolus of 3% hypertonic saline and reassess neurologic status and serum sodium

11. A 70-kg adult has 30% TBSA burns and presents within 1 hour of injury. Using the current ABA-recommended starting estimate of 2 mL/kg/%TBSA for initial crystalloid resuscitation, what total volume is estimated for the first 24 hours?

- A. 8,400 mL as the mandatory fixed volume regardless of urine output or response
- B. 4,200 mL, with subsequent fluid titration to physiologic response
- C. 14,000 mL because all burn formulas use 5 mL/kg/%TBSA
- D. 21,000 mL because body weight is multiplied by TBSA without a coefficient
- E. 2,100 mL, because only half the calculated 24-hour volume is ever administered

12. A hemodynamically stable ICU patient without active bleeding has hemoglobin 6.8 g/dL. What is the most appropriate transfusion strategy?

- A. Withhold transfusion until hemoglobin is below 5 g/dL in every ICU patient
- B. Transfuse to a routine hemoglobin target above 12 g/dL
- C. Give plasma instead of red blood cells because anemia is a coagulation disorder
- D. Transfuse red blood cells using a restrictive threshold and reassess after transfusion
- E. Transfuse platelets because they provide the majority of oxygen-carrying capacity

13. A 6-year-old child with septic shock is tachycardic, hypotensive, and has delayed capillary refill. Which fluid strategy is appropriate where intensive monitoring is available?

- A. Use albumin exclusively because crystalloids are contraindicated in children
- B. Give a mandatory 60 mL/kg bolus without reassessment in every child
- C. Give a 10-20 mL/kg isotonic crystalloid bolus with frequent reassessment and stop if fluid overload develops

- D.** Avoid all fluid because pediatric septic shock is treated only with vasopressors
- E.** Give hypotonic free water as the initial intravascular resuscitation fluid

14. Minutes after reperfusion of a transplanted kidney, the graft becomes cyanotic and produces no urine. Biopsy shows widespread thrombosis. What is the most likely diagnosis?

- A.** Calcineurin inhibitor nephrotoxicity occurring before immunosuppression is administered
- B.** Hyperacute antibody-mediated rejection from preformed recipient antibodies
- C.** BK virus nephropathy developing immediately at the time of reperfusion
- D.** Acute cellular rejection developing from T-cell infiltration over several days
- E.** Chronic allograft rejection causing progressive fibrosis over years

15. A stable patient has a high-grade blunt liver injury without peritonitis. CT shows contained hepatic injury and no active arterial extravasation. What is the best initial strategy?

- A.** Immediate hepatic resection to prevent delayed bile leak
- B.** Angiography is mandatory even without active bleeding or vascular lesion
- C.** Nonoperative management with monitored observation and serial assessment
- D.** Discharge from the emergency department after a single normal blood pressure
- E.** Routine laparotomy solely because the liver injury is high grade

16. A patient with ARDS on low tidal volume ventilation has plateau pressure 34 cm H₂O. What is the most appropriate ventilator adjustment?

- A.** Increase tidal volume to lower respiratory rate even if plateau pressure rises further
- B.** Increase inspiratory flow solely to raise plateau pressure and recruit additional lung units
- C.** Reduce tidal volume further, if necessary toward 4 mL/kg predicted body weight, to keep plateau pressure below 30 cm H₂O
- D.** Use actual body weight to recalculate a larger tidal volume target
- E.** Ignore plateau pressure because only peak inspiratory pressure predicts alveolar injury

17. A patient with severe acute pancreatitis is hemodynamically stable after initial resuscitation but cannot eat. Which nutrition strategy is preferred?

- A.** Begin enteral nutrition rather than routine early total parenteral nutrition
- B.** Provide only dextrose-containing IV fluid because protein worsens pancreatitis
- C.** Keep the patient completely NPO until pancreatic enzymes normalize
- D.** Use total parenteral nutrition first because enteral feeding stimulates lethal autodigestion
- E.** Delay all nutrition for at least one week regardless of clinical course

18. A patient with septic shock requires progressively higher norepinephrine doses to maintain MAP. Which adjunct is commonly added next to reduce catecholamine requirements?

- A.** Add milrinone because phosphodiesterase inhibition raises systemic vascular resistance
- B.** Add labetalol to improve vascular tone by slowing the heart rate
- C.** Add nitroglycerin as a routine second-line vasopressor
- D.** Add low-dose vasopressin as a second vasopressor
- E.** Add dopamine because it has a lower arrhythmia risk than norepinephrine

19. An ICU has recurrent medication errors during shift change. Which intervention is most likely to reduce information loss?

- A.** Eliminate verbal handoff and rely only on memory of the electronic record
- B.** Shorten handoff by omitting contingency plans and pending tests
- C.** Implement a standardized structured handoff with required critical elements and opportunity for questions
- D.** Prohibit read-back or questions because they slow the transfer process
- E.** Allow each clinician to invent a different handoff format at every shift

20. A patient with septic shock has CT-proven perforated diverticulitis with a drainable abscess and free contamination. Which principle is most important?

- A.** Achieve definitive source control early, ideally within hours once the diagnosis is established
- B.** Continue antibiotics alone for several days before considering any source-control procedure
- C.** Delay intervention until all vasopressors have been discontinued
- D.** Wait for blood cultures to become negative before draining the infected focus
- E.** Use procalcitonin normalization as a prerequisite for operative or percutaneous control

21. A 42-year-old woman with penetrating abdominal trauma is hypotensive with ongoing hemorrhage and no evidence of traumatic brain injury. While blood products are being prepared, which resuscitation target is most appropriate before surgical hemorrhage control?

- A.** Begin a vasodilator infusion to reduce afterload while maintaining a normal mean arterial pressure
- B.** Use limited resuscitation to maintain adequate perfusion while avoiding normalization of blood pressure before hemostasis
- C.** Normalize systolic pressure to at least 140 mm Hg with crystalloid before transport to the operating room
- D.** Give repeated 2-L saline boluses until lactate is normal before definitive hemorrhage control
- E.** Delay operative control until urine output exceeds 1 mL/kg/hour for two consecutive hours

22. A patient with septic shock has rapidly changing renal function and is receiving a renally cleared antibiotic with a narrow therapeutic window. What dosing principle is most appropriate?

- A.** Dose only from total body weight because organ function does not affect clearance
- B.** Assume augmented renal clearance never occurs in critically ill surgical patients
- C.** Use the same fixed maintenance dose regardless of renal function or renal replacement therapy
- D.** Withhold every renally cleared antibiotic until creatinine stops changing
- E.** Use individualized dosing with drug-level monitoring when available and frequent reassessment of renal clearance

23. An incapacitated patient has no written directive. The legally appropriate surrogate knows the patient previously stated that permanent dependence on life support would be unacceptable. Which decision standard should guide the surrogate?

- A.** Require continued life support because only written directives can guide treatment
- B.** Use substituted judgment based on the patient's known values and prior expressed preferences
- C.** Ask clinicians to choose according to their own values rather than the patient's values
- D.** Use financial cost alone as the decisive factor in treatment withdrawal
- E.** Use the surrogate's personal preference even if it conflicts with the patient's stated values

24. A patient with severe TBI and intracranial hypertension is hypotensive. Which hyperosmolar agent has an important practical advantage over mannitol?

- A.** Hypertonic saline can lower intracranial pressure while supporting intravascular volume and blood pressure
- B.** Mannitol reliably raises blood pressure because it expands plasma volume for many hours
- C.** Hypertonic saline is contraindicated whenever serum sodium is below 160 mEq/L
- D.** Mannitol is preferred in shock because its osmotic diuresis increases preload
- E.** Neither agent affects intracranial pressure, so only corticosteroids should be used

25. A patient with penetrating neck trauma has expanding hematoma, severe active bleeding, and an air leak from the wound. What is the next step?

- A.** Close the skin in the emergency department and reassess after antibiotics
- B.** Obtain CT angiography before intervention because hard signs never mandate surgery
- C.** Proceed to immediate operative exploration after securing the airway as needed
- D.** Observe for 24 hours because penetrating neck wounds rarely injure major structures
- E.** Perform barium swallow as the first test despite uncontrolled hemorrhage

26. A patient with severe ARDS has PaO₂/FiO₂ of 85 despite lung-protective ventilation and appropriate PEEP. Which adjunct has a demonstrated mortality benefit when applied for prolonged daily sessions?

- A.** Supine positioning with higher tidal volume to improve dependent aeration
- B.** Inhaled nitric oxide as routine long-term therapy for all severe ARDS
- C.** Prone positioning for more than 12 hours per day, typically about 16 hours
- D.** Routine high-frequency oscillatory ventilation as the next universal step
- E.** Repeated prolonged recruitment maneuvers with very high airway pressures

27. A patient with acute upper GI bleeding is tachycardic but stabilized after resuscitation. Hemoglobin is 6.7 g/dL and there is no active myocardial ischemia. What transfusion approach is appropriate?

- A.** Avoid red-cell transfusion until hemoglobin is below 5 g/dL regardless of symptoms
- B.** Give plasma instead of red cells because oxygen delivery is preserved by coagulation factors
- C.** Delay endoscopy until hemoglobin has normalized completely
- D.** Use a restrictive red-cell strategy and transfuse at this level while arranging endoscopic therapy
- E.** Transfuse every patient to hemoglobin above 12 g/dL before endoscopy

28. An arterial-line fast-flush test shows multiple oscillations after release of the flush. What does this indicate?

- A.** An overdamped system that cannot produce any oscillation after flushing
- B.** Normal damping regardless of how many oscillations are seen
- C.** A venous catheter inadvertently connected to the arterial transducer
- D.** An underdamped monitoring system that may overestimate systolic pressure
- E.** A pressure transducer that is zeroed perfectly and cannot distort the waveform

29. A patient on chronic glucocorticoids presents after emergency surgery with refractory hypotension, abdominal pain, hyponatremia, hyperkalemia, and hypoglycemia. What is the most appropriate treatment?

- A.** Give insulin for hyperkalemia but avoid steroids because they worsen shock
- B.** Give levothyroxine alone because the electrolyte pattern proves hypothyroidism
- C.** Give stress-dose intravenous hydrocortisone and isotonic fluid while treating precipitating illness
- D.** Start fludrocortisone only and defer glucocorticoids until cortisol results return
- E.** Restrict sodium and free water because hyponatremia is the primary problem

30. A malnourished patient with chronic hyponatremia has serum sodium rise from 108 to 121 mEq/L in 8 hours after volume resuscitation. What is the best response?

- A.** Begin bicarbonate infusion because osmotic demyelination is caused by metabolic acidosis
- B.** Stop further rapid correction and consider desmopressin with free water to limit or relower the sodium
- C.** Administer mannitol to prevent brain swelling from the rapid sodium increase
- D.** Continue the same fluids because any sodium rise under 20 mEq/L per day is always safe
- E.** Give additional hypertonic saline to complete normalization within the first 12 hours

31. A patient with an inferior myocardial infarction is hypotensive with clear lungs and elevated jugular venous pressure. Right ventricular infarction is suspected. Which initial maneuver is most appropriate?

- A.** Begin aggressive diuresis because the elevated jugular venous pressure proves volume overload
- B.** Start a pure arterial vasodilator to reduce systemic vascular resistance
- C.** Apply high levels of PEEP to improve venous return and right ventricular filling
- D.** Administer high-dose nitroglycerin to reduce right ventricular preload
- E.** Give a cautious fluid bolus to support right ventricular preload while reassessing perfusion

32. During acute adult burn resuscitation, which urine-output target is commonly used to guide crystalloid titration in a patient without electrical injury?

- A.** Approximately 0.05 mL/kg/hour regardless of perfusion
- B.** At least 3 mL/kg/hour in every adult thermal burn

- C. Approximately 0.5 mL/kg/hour in a typical adult thermal burn
- D. Exactly 5 mL/kg/hour because higher output prevents edema
- E. Urine output is not useful during burn resuscitation

33. A patient with secondary peritonitis after bowel perforation is critically ill and has recent broad-spectrum antibiotic exposure. Which empiric strategy is most appropriate pending cultures?

- A. Withhold therapy until final cultures because broad empiric treatment increases mortality
- B. Use broad gram-negative and anaerobic coverage, adding resistant-organism coverage according to local risk and prior exposures
- C. Use narrow gram-positive coverage only because intra-abdominal sepsis is rarely polymicrobial
- D. Give antifungal monotherapy because bacteria are unlikely after bowel perforation
- E. Avoid anaerobic coverage because colonic perforation primarily causes viral infection

34. A patient after high-speed blunt trauma has respiratory distress. Chest radiograph shows an elevated left hemidiaphragm with bowel loops in the thorax. What is the diagnosis?

- A. Congenital hiatal hernia that explains all acute post-traumatic findings
- B. Isolated flail chest without diaphragmatic injury
- C. Simple left lower-lobe atelectasis causing apparent bowel gas above the diaphragm
- D. Traumatic diaphragmatic rupture with herniation of abdominal viscera
- E. Tension gastrothorax caused by an intact diaphragm

35. A patient with moderate-to-severe ARDS remains hypoxemic on low tidal volume ventilation. Which PEEP strategy is supported by current guideline recommendations?

- A. Combine high PEEP with prolonged recruitment maneuvers using pressures above 35 cm H₂O for several minutes
- B. Use a higher PEEP strategy without prolonged lung recruitment maneuvers, while monitoring hemodynamics and overdistension
- C. Avoid PEEP entirely when the PaO₂/FiO₂ ratio is below 150

- D.** Increase tidal volume rather than PEEP whenever oxygenation remains poor
- E.** Use the lowest possible PEEP in all patients to avoid any effect on venous return

36. A cirrhotic patient presents with hematemesis and shock from suspected esophageal varices. Which early treatment bundle is appropriate before endoscopy?

- A.** Give proton-pump inhibitor alone and omit antibiotics because variceal bleeding is sterile
- B.** Begin vasoactive therapy such as octreotide, give prophylactic antibiotics, and arrange urgent endoscopy
- C.** Start anticoagulation to prevent portal vein thrombosis before hemostasis
- D.** Delay vasoactive therapy until endoscopy confirms the bleeding vessel
- E.** Give large-volume crystalloid until the hemoglobin exceeds 10 g/dL

37. A patient with severe blunt trauma has a Glasgow Coma Scale score of 5, a systolic pressure of 78 mm Hg, and suspected intracranial injury. Which resuscitation principle is most important?

- A.** Delay airway control until a detailed neurologic examination can be repeated
- B.** Use permissive hypotension until the head CT is completed and reviewed
- C.** Correct hypotension promptly because even a single hypotensive episode can worsen secondary brain injury
- D.** Avoid blood products until intracranial bleeding has been excluded
- E.** Target a systolic pressure near 80 mm Hg to limit expansion of cerebral hematomas

38. A patient with exsanguinating trauma requires massive transfusion before viscoelastic results are available. Which component strategy best approximates whole-blood resuscitation?

- A.** Give platelets alone until the blood pressure normalizes
- B.** Use plasma only because it provides both oxygen delivery and coagulation factors
- C.** Give ten units of red cells before any plasma or platelets are considered
- D.** Use crystalloid as the main resuscitation and add blood products only after coagulopathy appears

E. Deliver red cells, plasma, and platelets in a balanced ratio such as approximately 1:1:1

39. A postoperative patient suddenly becomes hypotensive. Echocardiography shows a small hyperdynamic left ventricle with systolic anterior motion of the mitral valve and dynamic LV outflow obstruction. Which treatment is most appropriate?

- A. Begin aggressive diuresis to decrease left ventricular end-diastolic volume
- B. Start nitroprusside to reduce afterload and increase the outflow gradient
- C. Apply higher PEEP to reduce venous return and ventricular filling
- D. Reduce catecholamine stimulation, restore preload, and consider short-acting beta blockade
- E. Increase dobutamine to augment contractility and drive flow across the obstruction

40. A sedated patient with severe TBI has refractory intracranial hypertension despite head elevation, analgesia, ventilation optimization, and hyperosmolar therapy. Which sedative is useful because it lowers cerebral metabolic demand but requires monitoring for hypotension?

- A. Propofol infusion titrated to ICP and sedation goals with close blood-pressure monitoring
- B. Ketamine is absolutely contraindicated in every patient with intracranial injury
- C. Nitrous oxide is preferred because it reliably decreases intracranial pressure
- D. Oral diazepam is preferred for rapid titration in unstable ICU patients
- E. Haloperidol is a primary cerebral metabolic suppressant for refractory ICP

41. A pulmonary artery catheter tracing shows a large V wave in the wedge position. Which lesion should be suspected when the clinical context fits?

- A. Severe mitral regurgitation causing prominent systolic left-atrial pressure waves
- B. Tricuspid regurgitation causing giant wedge waves rather than right atrial V waves
- C. Severe pulmonic stenosis causing isolated right ventricular obstruction
- D. Complete heart block causing loss of all left atrial pressure waves
- E. Aortic stenosis causing a specific giant wedge V wave

42. A patient with thyroid storm is febrile, delirious, tachycardic, and in heart failure. Which treatment sequence is correct?

- A.** Use radioactive iodine as the immediate ICU therapy for unstable thyroid storm
- B.** Treat with corticosteroid alone because antithyroid drugs act too slowly to matter
- C.** Give a beta blocker as tolerated, a thionamide, then iodine after thionamide, plus corticosteroid and supportive care
- D.** Give iodine before thionamide so new thyroid hormone synthesis is stimulated
- E.** Give levothyroxine and avoid beta blockade in all patients

43. A patient with serum potassium 7.2 mEq/L has peaked T waves and QRS widening. Which treatment should be given first to reduce immediate arrhythmic risk?

- A.** Sodium polystyrene sulfonate alone because it acts within minutes
- B.** Oral bicarbonate without additional therapy despite ECG changes
- C.** Intravenous calcium to stabilize the cardiac membrane
- D.** Hemodialysis only after waiting for repeat potassium confirmation
- E.** Loop diuretic alone because potassium removal is the only urgent objective

44. A ventilated patient develops a new infiltrate, purulent secretions, fever, and worsening oxygenation after 8 ICU days. The unit has high MRSA prevalence and the patient recently received IV antibiotics. What is the best empiric approach?

- A.** Use oral amoxicillin alone because ventilator-associated pneumonia is usually community acquired
- B.** Treat only MRSA and omit gram-negative coverage despite prolonged hospitalization
- C.** Delay antibiotics until quantitative cultures are finalized despite clinical deterioration
- D.** Use antifungal therapy alone because Candida in respiratory cultures usually causes VAP
- E.** Cover MRSA and antipseudomonal gram-negative organisms initially, then de-escalate to culture results

45. A stable patient has blunt thoracic aortic injury at the isthmus without rupture. Which initial medical therapy is important while planning definitive repair?

- A.** Give thrombolysis to dissolve the aortic wall hematoma
- B.** Raise systolic pressure above 180 mm Hg to preserve flow across the injury
- C.** Use high-dose inotropy to increase aortic wall stress and distal perfusion
- D.** Control heart rate and blood pressure with anti-impulse therapy, typically beta blockade
- E.** Avoid analgesia because pain-induced tachycardia helps detect deterioration

46. A patient with severe ARDS has refractory hypoxemia despite optimized low tidal volume ventilation, prone positioning, and appropriate PEEP. Which advanced support is most appropriate to consider at an experienced center?

- A.** High-frequency oscillation as mandatory therapy before any ECMO consultation
- B.** Venovenous extracorporeal membrane oxygenation for selected severe, potentially reversible respiratory failure
- C.** Chronic home noninvasive ventilation as rescue therapy for refractory ICU hypoxemia
- D.** Venoarterial ECMO solely because the primary problem is isolated gas-exchange failure
- E.** Routine intra-aortic balloon counterpulsation to improve pulmonary oxygen transfer

47. A patient with atrial fibrillation has sudden severe abdominal pain out of proportion to examination and metabolic acidosis. What is the best initial diagnostic study if the patient is stable enough for imaging?

- A.** Colonoscopy as the first test for acute superior mesenteric artery embolism
- B.** HIDA scan because acute mesenteric ischemia is usually biliary in origin
- C.** Noncontrast head CT because abdominal pain out of proportion is neurologic
- D.** Plain abdominal radiography because it reliably excludes early mesenteric ischemia
- E.** CT angiography of the abdomen and pelvis to evaluate mesenteric arterial occlusion

48. An intubated infant suddenly becomes bradycardic and cyanotic. What is the most important immediate consideration?

- A.** Primary coronary artery disease because pediatric bradycardia is usually ischemic
- B.** Hyperthyroidism because it commonly causes profound bradycardia in infants
- C.** Essential hypertension because it produces acute cyanosis and bradycardia
- D.** Hypoxemia from airway or ventilation failure, because pediatric bradycardia is often a late sign of respiratory compromise
- E.** Isolated anemia because oxygen saturation always falls before ventilation changes

49. Three weeks after kidney transplantation, creatinine rises and biopsy shows interstitial lymphocytic infiltration with tubulitis. What is the most likely process?

- A.** Acute T-cell-mediated rejection, often treated initially with high-dose corticosteroids
- B.** Pure prerenal azotemia proven by the presence of lymphocytic tubulitis
- C.** Hyperacute rejection from preformed antibody occurring weeks after transplantation
- D.** Chronic rejection causing years of progressive vascular intimal thickening
- E.** Normal post-transplant adaptation that requires no evaluation or treatment

50. A patient with acute aortic dissection has severe hypertension and tachycardia. Which sequence best reduces aortic shear stress?

- A.** Give a large crystalloid bolus before controlling heart rate and blood pressure
- B.** Use dopamine to maintain a high systolic pressure and prevent branch-vessel ischemia
- C.** Start nitroprusside first and add beta blockade only if reflex tachycardia develops
- D.** Start an intravenous beta blocker before adding a vasodilator if additional pressure control is needed
- E.** Use hydralazine alone because reflex sympathetic activation improves distal perfusion

51. A 70-kg patient with exsanguinating torso trauma is receiving massive transfusion. After multiple units, the patient develops hypotension, a prolonged QT interval, and diffuse oozing despite improving temperature. Which abnormality should be treated immediately?

- A.** Ionized hypocalcemia from citrate binding during high-volume transfusion
- B.** Hyperphosphatemia from rapid administration of stored plasma products
- C.** Metabolic alkalosis caused by early conversion of citrate to bicarbonate
- D.** Hypernatremia caused by the sodium content of packed red blood cells
- E.** Mild hypermagnesemia from cellular breakdown during tissue injury

52. A patient with a high-voltage electrical injury has dark urine and severe muscle injury. Which additional resuscitation concern is most important?

- A.** Monitor for rhabdomyolysis, hyperkalemia, and pigment nephropathy while targeting adequate urine output
- B.** Assume external skin appearance accurately reflects the full depth of internal injury
- C.** Restrict fluids because electrical injury rarely damages muscle
- D.** Avoid cardiac monitoring because electrical current does not cause arrhythmia
- E.** Treat only the cutaneous burn because deep tissue injury is uncommon

53. A unit has a rising central-line bloodstream infection rate. Which prevention strategy has the strongest systems basis?

- A.** Avoid auditing maintenance practices because insertion technique is the only determinant
- B.** Give prophylactic systemic antibiotics to every patient with a central line
- C.** Replace every central line over a guidewire on a fixed daily schedule
- D.** Use a standardized central-line insertion and maintenance bundle with daily review of line necessity
- E.** Use femoral access preferentially in every adult regardless of infection risk

54. A patient with pelvic fracture remains hypotensive despite a binder and balanced transfusion. FAST is negative. Which next hemorrhage-control strategy is appropriate?

- A.** Delay pelvic intervention because a negative FAST excludes life-threatening hemorrhage
- B.** Perform thoracotomy because pelvic bleeding cannot cause persistent shock
- C.** Proceed rapidly to pelvic hemorrhage control with packing and/or angioembolization according to physiology
- D.** Remove the binder and repeatedly manipulate the pelvis to localize the bleeding
- E.** Give only crystalloid until a CT scan can identify every bleeding vessel

55. A patient with early severe ARDS has intense ventilator dyssynchrony despite adequate analgesia and sedation, with injurious inspiratory efforts. Which short-term intervention can be considered?

- A.** Stop sedation entirely so the patient can override the ventilator settings
- B.** A short course of neuromuscular blockade while continuing lung-protective ventilation
- C.** Use routine prolonged paralysis for every patient with mild ARDS
- D.** Remove PEEP to reduce the sensation of inspiratory resistance
- E.** Increase tidal volume to match the patient's spontaneous inspiratory demand

56. A patient after a low-flow shock state develops crampy abdominal pain and bloody diarrhea. CT shows segmental left-colon wall thickening without major-vessel occlusion. What is the most likely diagnosis?

- A.** Ischemic colitis from transient hypoperfusion
- B.** Acute appendicitis causing diffuse watershed ischemia of the colon
- C.** Primary small-bowel volvulus causing isolated left-colon injury
- D.** Fulminant ulcerative colitis because recent hypotension is unrelated
- E.** Mesenteric venous thrombosis because it always spares the small intestine

57. A patient with *Staphylococcus aureus* bacteremia has an infected central venous catheter and no other clear source. What is the most appropriate catheter management?

- A.** Use topical antibiotic at the insertion site as definitive treatment
- B.** Remove the infected catheter and evaluate for metastatic infection while treating with appropriate IV antibiotics
- C.** Leave the catheter in place routinely because biofilm does not affect *S aureus* clearance
- D.** Exchange the line over a guidewire and give a single oral antibiotic dose
- E.** Stop antibiotics after line removal even if blood cultures remain positive

58. A patient with severe TBI and cortical contusions has no seizures. What is the usual goal of antiseizure prophylaxis?

- A.** Use prophylaxis only after a first seizure has already occurred
- B.** Prevent early post-traumatic seizures during approximately the first 7 days, not late epilepsy
- C.** Continue prophylaxis for at least 6 months in every patient with severe TBI
- D.** Continue prophylaxis indefinitely because it prevents all late post-traumatic epilepsy
- E.** Avoid prophylaxis because early seizures do not worsen secondary brain injury

59. A patient has mixed venous oxygen saturation of 48% with normal arterial saturation and hemoglobin. Which physiologic change most directly explains this finding?

- A.** Mitochondrial extraction failure, which usually raises venous saturation
- B.** Severe left-to-right intracardiac shunt increasing venous oxygen content
- C.** Hyperoxia from excessive FiO_2 causing low arterial oxygen content
- D.** Markedly increased cardiac output causing reduced tissue extraction
- E.** Low cardiac output causing greater tissue oxygen extraction

60. An elderly patient is hypothermic, bradycardic, hyponatremic, hypoventilating, and obtunded with markedly elevated TSH and low free T4. What is the best treatment?

- A.** Use active external rewarming alone and defer thyroid replacement until normothermia
- B.** Give a beta blocker to reduce myocardial oxygen demand despite profound bradycardia

- C. Give intravenous thyroid hormone with stress-dose glucocorticoid coverage and supportive care
- D. Restrict ventilatory support because hypercapnia is protective in severe hypothyroidism
- E. Treat with thionamide and iodine as for thyroid storm

61. A patient with refractory ventricular ectopy has potassium 3.1 mEq/L and magnesium 1.1 mg/dL despite repeated potassium replacement. What is the most important additional treatment?

- A. Replace magnesium because hypomagnesemia promotes renal potassium wasting and arrhythmia
- B. Use acetazolamide because it reliably restores magnesium without affecting potassium
- C. Stop potassium replacement because magnesium deficiency protects against ventricular arrhythmia
- D. Give calcium alone because calcium corrects intracellular potassium depletion
- E. Begin hypertonic saline because sodium loading rapidly raises serum potassium

62. A patient develops polymorphic ventricular tachycardia with a prolonged QT interval after receiving several QT-prolonging drugs. What is the immediate pharmacologic treatment?

- A. Start digoxin to slow ventricular conduction through the atrioventricular node
- B. Give verapamil because it suppresses all forms of polymorphic ventricular tachycardia
- C. Administer intravenous adenosine as first-line therapy for torsades de pointes
- D. Give intravenous calcium gluconate to shorten the QT interval directly
- E. Administer intravenous magnesium sulfate promptly while correcting QT-prolonging factors

63. A massively bleeding patient has low fibrinogen and weak clot amplitude attributable to fibrinogen deficiency. Which product is most appropriate?

- A. Give vitamin K as the fastest source of circulating fibrinogen
- B. Give fibrinogen replacement with cryoprecipitate or fibrinogen concentrate according to local practice
- C. Use platelet transfusion alone because platelets replace all soluble clotting proteins

- D.** Give protamine because it directly raises fibrinogen concentration
- E.** Give packed red blood cells alone because they contain adequate fibrinogen

64. A 35-year-old man has an unstable pelvic ring injury, hypotension, and no major external bleeding. What should be performed immediately as part of hemorrhage control?

- A.** Apply a pelvic binder centered over the greater trochanters
- B.** Place the binder high across the iliac crests to compress the abdominal aorta
- C.** Perform repeated pelvic compression examinations to confirm mechanical instability
- D.** Delay pelvic stabilization until CT defines the exact fracture pattern
- E.** Apply bilateral femoral traction splints as the primary method of pelvic volume reduction

65. A patient has an open tibial fracture contaminated with soil. Which early intervention reduces infectious complications?

- A.** Wait 24 hours before surgical evaluation to allow demarcation of all tissue injury
- B.** Give prompt intravenous antibiotics and perform timely irrigation/debridement with stabilization
- C.** Delay antibiotics until deep operative cultures are finalized
- D.** Close the contaminated wound primarily in the emergency department before debridement
- E.** Use oral antibiotics only because intravenous therapy increases resistance

66. A mechanically ventilated patient with severe asthma becomes hypotensive with very high peak airway pressures, a relatively lower plateau pressure, and incomplete expiratory flow before the next breath. What is the best immediate ventilator strategy?

- A.** Shorten expiratory time by increasing the inspiratory-to-expiratory ratio
- B.** Add external PEEP above intrinsic PEEP without reassessing dynamic hyperinflation
- C.** Reduce respiratory rate and minute ventilation to prolong expiratory time and allow permissive hypercapnia
- D.** Increase respiratory rate to eliminate carbon dioxide despite worsening air trapping

E. Increase tidal volume to force open small airways during expiration

67. A patient with acetaminophen-associated acute liver failure develops encephalopathy and coagulopathy. Which antidotal therapy should be given promptly?

A. Give intravenous N-acetylcysteine promptly while arranging liver-failure supportive care

B. Vitamin K alone because acetaminophen toxicity is a vitamin K antagonist effect

C. Lactulose alone because reducing ammonia reverses hepatocellular necrosis

D. Flumazenil because acetaminophen depresses hepatic GABA metabolism

E. Activated charcoal alone after established hepatic failure regardless of timing

68. A postoperative patient has fulminant *Clostridioides difficile* colitis with hypotension, ileus, leukocytosis, and diffuse colonic dilation. Which medical regimen is appropriate while surgical evaluation proceeds?

A. Oral metronidazole alone because vancomycin is reserved for mild disease

B. Intravenous vancomycin alone because it reaches the colon in high luminal concentrations

C. High-dose enteral vancomycin plus intravenous metronidazole, adding rectal vancomycin if ileus prevents delivery

D. Loperamide and observation to reduce stool losses before antibiotics

E. Broad antipseudomonal therapy without *C difficile*-directed treatment

69. A house-fire victim has facial burns, carbonaceous sputum, and progressive respiratory symptoms. Which test best evaluates suspected lower-airway inhalation injury?

A. Serum amylase because airway epithelial injury releases pancreatic enzymes

B. Routine sputum culture because bacterial growth confirms thermal airway damage

C. Pulmonary artery catheterization because filling pressures diagnose inhalation injury

D. Early bronchoscopy to inspect the tracheobronchial mucosa

E. Abdominal CT because inhalation injury produces characteristic bowel findings

70. A patient receiving IV vancomycin for serious MRSA infection has stable renal function. Which monitoring approach best balances efficacy and nephrotoxicity?

- A.** Use exposure-guided dosing based on vancomycin AUC rather than relying on a high trough alone
- B.** Dose exclusively by serum creatinine without measuring vancomycin concentrations
- C.** Use peak concentration alone because total exposure does not predict efficacy
- D.** Target the highest possible trough because nephrotoxicity is unrelated to exposure
- E.** Avoid drug monitoring because vancomycin clearance is constant in critical illness

71. A patient has a valid do-not-resuscitate order but develops septic shock from a treatable intra-abdominal infection. What does the DNR order mean?

- A.** Do not admit the patient to the ICU under any circumstances
- B.** Provide CPR but withhold defibrillation because DNR applies only to shocks
- C.** Stop all existing treatments immediately because DNR is equivalent to comfort-only care
- D.** Withhold all antibiotics, surgery, vasopressors, and analgesia automatically
- E.** Do not perform CPR for cardiac arrest; other treatments depend on the patient's separate goals and preferences

72. A patient with narrow-complex tachycardia at 190/min becomes hypotensive and confused. What is the best next step?

- A.** Try vagal maneuvers repeatedly until the blood pressure improves
- B.** Perform synchronized electrical cardioversion
- C.** Give oral beta blockade and reassess the rhythm in one hour
- D.** Administer adenosine only after obtaining a 12-lead ECG during symptoms
- E.** Use unsynchronized defibrillation despite a regular perfusing rhythm

73. A patient in generalized convulsive status epilepticus has been seizing for 7 minutes. What is the first-line medication?

- A.** Use neuromuscular blockade alone to stop visible convulsions without treating brain seizures
- B.** Wait for EEG confirmation before administering any anticonvulsant therapy
- C.** Start oral levetiracetam and reassess after gastrointestinal absorption
- D.** Give an adequate dose of an intravenous benzodiazepine immediately
- E.** Give haloperidol because motor activity is the primary threat in status epilepticus

74. A fully mechanically ventilated patient in sinus rhythm has a large pulse-pressure variation. Which condition is required for this finding to reliably predict fluid responsiveness?

- A.** Very low tidal volumes in every patient because they magnify cardiopulmonary interactions
- B.** Severe right ventricular failure because it guarantees a positive fluid response
- C.** Controlled positive-pressure ventilation with sufficiently regular tidal ventilation and no major confounder such as arrhythmia
- D.** Spontaneous irregular breathing because it improves the reliability of pulse-pressure variation
- E.** Atrial fibrillation because beat-to-beat variability is required for the calculation

75. A patient with a tibial fracture develops escalating pain despite analgesia, pain with passive toe stretch, and a tense leg. What is the treatment?

- A.** Wait for motor paralysis because pulses usually vanish early in compartment syndrome
- B.** Apply a tighter circumferential cast to reduce swelling
- C.** Perform venography before surgical decompression
- D.** Urgent fasciotomy for acute compartment syndrome
- E.** Elevate the limb far above heart level and observe until pulses disappear

76. A ventilated patient with severe asthma suddenly becomes profoundly hypotensive and the ventilator shows marked auto-PEEP. Which bedside maneuver can rapidly improve venous return while the ventilator is adjusted?

- A.** Increase respiratory rate immediately to clear carbon dioxide more rapidly

- B.** Briefly disconnect the ventilator circuit to allow trapped gas to escape
- C.** Increase PEEP substantially to raise intrathoracic pressure further
- D.** Give a large dose of diuretic to reduce pulmonary vascular volume
- E.** Clamp the endotracheal tube during expiration to prevent alveolar collapse

77. A cirrhotic patient is confused with asterixis after an upper GI bleed. There is no focal neurologic deficit. What is the most appropriate initial therapy for hepatic encephalopathy?

- A.** Give lactulose and treat precipitating factors such as bleeding, infection, constipation, or electrolyte disturbance
- B.** Use emergent dialysis solely to remove ammonia in every cirrhotic patient
- C.** Restrict all protein indefinitely because nutrition worsens every episode
- D.** Give high-dose benzodiazepines to suppress agitation and lower ammonia
- E.** Start mannitol because cerebral edema is the usual cause in chronic cirrhosis

78. A patient with diabetic ketoacidosis has glucose 540 mg/dL, pH 7.12, bicarbonate 10 mEq/L, and potassium 2.9 mEq/L. What should be done before starting insulin?

- A.** Restrict fluid because osmotic diuresis produces total-body water excess
- B.** Give a loop diuretic to correct the potassium deficit before insulin
- C.** Start insulin immediately because insulin raises serum potassium
- D.** Replace potassium until it is safely above the threshold for insulin therapy
- E.** Give bicarbonate first because pH above 7.0 always requires buffer therapy

79. A patient with prolonged nasogastric suction develops pH 7.53, bicarbonate 38 mEq/L, low urine chloride, and volume depletion. What is the most appropriate treatment?

- A.** Use aggressive loop diuresis to increase chloride loss further
- B.** Restrict chloride because urinary chloride is already low
- C.** Give chloride-rich isotonic fluid and potassium replacement

- D. Start dialysis solely to remove excess serum bicarbonate
- E. Give sodium bicarbonate because the patient is volume depleted

80. A 63-year-old postoperative patient has fever, confusion, lactate 5.2 mmol/L, and a mean arterial pressure of 54 mm Hg despite an initial crystalloid bolus. Which vasoactive agent is preferred first?

- A. Start dopamine because it reliably reduces tachyarrhythmias in septic shock
- B. Start phenylephrine because pure alpha stimulation is preferred in all septic patients
- C. Start dobutamine as the sole vasopressor despite persistent arterial hypotension
- D. Start nitroglycerin to recruit the microcirculation despite ongoing shock
- E. Start norepinephrine and titrate to restore adequate mean arterial pressure

81. A patient has rapidly progressive leg pain out of proportion to examination, fever, shock, bullae, and crepitus. What is the most important next step?

- A. Use high-dose corticosteroids to reduce fascial inflammation before debridement
- B. Immediate surgical exploration and debridement with broad-spectrum antibiotics
- C. Wait for MRI confirmation before involving surgery because imaging is required for diagnosis
- D. Treat with antibiotics alone until tissue cultures identify the organism
- E. Perform needle aspiration and observe if no pus is obtained

82. A 20-kg child has major burns and is undergoing resuscitation. Which urine-output target is generally appropriate?

- A. Exactly 0.5 mL/kg/hour because pediatric and adult targets are identical
- B. Approximately 1 mL/kg/hour during pediatric burn resuscitation
- C. Urine output should not be used to guide pediatric burn resuscitation
- D. Approximately 0.1 mL/kg/hour because children tolerate oliguria well
- E. At least 5 mL/kg/hour in every pediatric thermal injury

83. A kidney transplant recipient years after transplantation develops slowly progressive graft dysfunction, proteinuria, and biopsy evidence of interstitial fibrosis and vascular intimal thickening. What is most likely?

- A.** Chronic allograft dysfunction/rejection with irreversible fibrotic remodeling
- B.** Immediate ischemia-reperfusion injury that appears only years later
- C.** Acute antibody reaction that always resolves completely with one steroid dose
- D.** Normal calcineurin inhibitor effect that guarantees stable graft function
- E.** Hyperacute rejection that was missed at the time of implantation

84. A patient with a high cervical spinal cord injury has hypotension, warm skin, and heart rate 46/min after hemorrhage has been excluded. Which hemodynamic pattern is most likely?

- A.** Massive catecholamine release causing severe vasoconstriction and reflex bradycardia
- B.** Primary left ventricular failure causing pulmonary edema and elevated systemic vascular resistance
- C.** Loss of sympathetic tone causing reduced systemic vascular resistance with relative or absolute bradycardia
- D.** Obstructive shock from occult tension pneumothorax despite symmetric breath sounds
- E.** Hemorrhagic shock causing intense vasoconstriction with compensatory tachycardia

85. A preventable wrong-dose vasopressor event causes serious harm. Which process is designed to identify latent system contributors rather than blame one clinician?

- A.** Perform a root-cause analysis focused on process failures, safeguards, and contributing conditions
- B.** Remove all protocols because standardization increases human error
- C.** Use peer punishment alone without examining the medication-delivery system
- D.** Ignore the event if the individual clinician accepts responsibility
- E.** Repeat the same workflow because serious events are too rare to analyze

86. A patient trapped under debris for hours is extricated and then develops peaked T waves and ventricular ectopy. What is the most immediate concern?

- A.** Primary respiratory alkalosis from muscle compression
- B.** Life-threatening hyperkalemia from crush-related muscle necrosis
- C.** Hyponatremia caused by release of intracellular sodium
- D.** Hypokalemia from intracellular potassium sequestration after crush release
- E.** Isolated hypocalcemia without any potassium disturbance

87. A patient with COPD on volume-controlled ventilation has high peak inspiratory pressure but normal plateau pressure. Which problem is most likely?

- A.** Tension pneumothorax causing equal increases in peak and plateau pressure
- B.** Abdominal compartment syndrome causing isolated elevation of plateau pressure
- C.** Increased airway resistance from bronchospasm, secretions, or a narrowed endotracheal tube
- D.** Severe ARDS causing a large decrease in static compliance without airway resistance
- E.** Markedly reduced respiratory-system compliance from severe pulmonary edema

88. A postoperative patient has progressive abdominal distension, colonic dilation to 12 cm, no mechanical obstruction on CT, and no peritonitis. Conservative measures fail. What is the next treatment?

- A.** Perform immediate total colectomy because all colonic pseudo-obstruction is ischemic
- B.** Give loperamide to slow colonic motility and reduce diameter
- C.** Start high-dose opioid therapy to relax the colon
- D.** Administer monitored intravenous neostigmine if there is no contraindication
- E.** Use oral bowel preparation as the first decompressive treatment

89. A thromboelastography tracing during trauma resuscitation shows rapid clot breakdown consistent with marked hyperfibrinolysis. Which therapy directly addresses this abnormality when given in the appropriate time window?

- A.** Recombinant erythropoietin to stabilize formed fibrin clot
- B.** Tranexamic acid to inhibit fibrinolysis
- C.** Protamine to reverse endogenous tissue plasminogen activator
- D.** Vitamin K to inhibit plasmin generation immediately
- E.** Desmopressin as the specific antidote to fibrinolysis

90. A patient rescued from an enclosed-space fire has severe lactic acidosis, soot exposure, and cardiovascular collapse despite high-flow oxygen. Which antidote should be considered for cyanide toxicity?

- A.** Atropine because cyanide causes cholinergic crisis
- B.** Flumazenil because cyanide acts through benzodiazepine receptors
- C.** Methylene blue because cyanide primarily causes methemoglobinemia
- D.** Administer hydroxocobalamin for suspected cyanide toxicity from enclosed-space smoke
- E.** Naloxone because smoke inhalation blocks opioid receptors

91. A patient with aneurysmal subarachnoid hemorrhage is neurologically stable after aneurysm securing. Which medication reduces the risk of poor neurologic outcome related to delayed cerebral ischemia?

- A.** High-dose corticosteroids to prevent cerebral vasospasm
- B.** Prophylactic mannitol every 4 hours regardless of intracranial pressure
- C.** Continuous nitroprusside to maintain profound systemic hypotension
- D.** Routine prophylactic phenytoin for several months in every patient
- E.** Give enteral nimodipine throughout the recommended post-subarachnoid hemorrhage course

92. A spontaneously breathing septic patient has a collapsible inferior vena cava on ultrasound. What is the best interpretation?

- A.** The finding may suggest low right-sided filling but cannot alone prove fluid responsiveness

- B.** It proves that a fluid bolus will increase stroke volume in every spontaneously breathing patient
- C.** It proves severe right ventricular failure regardless of the rest of the examination
- D.** It excludes volume depletion because the IVC is not distended
- E.** It is equivalent to a pulmonary capillary wedge pressure measurement

93. A patient with hyperosmolar hyperglycemic state has glucose 950 mg/dL, severe dehydration, minimal ketones, and hypotension. What is the initial priority?

- A.** Start dialysis solely to remove glucose before restoring circulation
- B.** Begin high-dose insulin before fluids because dehydration is secondary to insulin deficiency
- C.** Give sodium bicarbonate routinely despite the absence of significant ketoacidosis
- D.** Restrict fluids because serum osmolality is already elevated
- E.** Restore intravascular volume with isotonic crystalloid before aggressive insulin therapy

94. A patient receives several liters of 0.9% saline and develops a non-anion-gap metabolic acidosis with rising serum chloride. What is the most likely mechanism?

- A.** Normal saline contains bicarbonate that is converted to carbonic acid
- B.** Hyperchloremia lowers the strong ion difference and produces a saline-associated metabolic acidosis
- C.** The sodium concentration in saline is too low and causes dilutional alkalosis
- D.** Saline directly generates lactic acid through hepatic metabolism
- E.** The chloride load causes ketoacid production independent of insulin

95. A 54-year-old man with blunt abdominal trauma remains hypotensive after initial blood product resuscitation. FAST shows free intraperitoneal fluid. Which next step is most appropriate?

- A.** Repeat FAST examinations every 30 minutes until the fluid collection enlarges
- B.** Perform diagnostic peritoneal lavage before operative exploration
- C.** Proceed directly to operative hemorrhage control

- D.** Observe in the ICU because FAST does not identify the injured organ
- E.** Obtain contrast-enhanced CT of the abdomen before deciding on intervention

96. A nonneutropenic critically ill patient has candidemia on two blood cultures and is hemodynamically unstable. Which initial antifungal is generally preferred?

- A.** Use topical nystatin alone because bloodstream *Candida* is usually colonization
- B.** Start oral terbinafine because it is first-line for invasive candidiasis
- C.** Give no antifungal unless endocarditis is already proven
- D.** Start an echinocandin and remove or assess intravascular sources when feasible
- E.** Use amphotericin bladder irrigation as definitive treatment for candidemia

97. A patient with a new harsh systolic murmur and pulmonary edema becomes unstable 3 days after myocardial infarction. Pulmonary artery tracing shows large V waves. Which complication is most likely?

- A.** Dynamic LV outflow obstruction caused by chronic hypertrophic cardiomyopathy
- B.** Right ventricular infarction producing isolated elevation of right-sided filling pressures
- C.** Acute severe mitral regurgitation from papillary muscle rupture
- D.** Ventricular septal rupture producing only diastolic flow across the septum
- E.** Free-wall rupture causing chronic constrictive pericarditis without tamponade

98. A patient with flail chest, multiple displaced ribs, respiratory failure, and difficulty weaning from ventilation remains unstable from chest wall mechanics despite optimal analgesia. Which intervention should be considered?

- A.** Perform sternotomy because flail segments cannot be stabilized through targeted fixation
- B.** Delay consideration of fixation for several weeks after all fractures have begun to heal
- C.** Avoid any operative stabilization because rib fractures must always heal without fixation
- D.** Early surgical stabilization of rib fractures in an appropriate candidate, ideally within the early post-injury window

E. Use prolonged deep sedation as the definitive treatment for chest wall instability

99. A ventilated trauma patient acutely becomes hypoxemic and hypotensive with absent left breath sounds and rising airway pressures. What is the first action?

- A. Increase PEEP to recruit the left lung before considering decompression
- B. Perform bronchoscopy first to exclude a mucus plug as the cause
- C. Treat presumed tension pneumothorax immediately with pleural decompression
- D. Wait for arterial blood gas confirmation of worsening oxygenation
- E. Obtain a portable chest radiograph before altering the ventilator or pleural space

100. A patient 6 days after colorectal anastomosis develops fever, tachycardia, ileus, and increasing abdominal pain. What is the best diagnostic approach if the patient is stable?

- A. Reassure the patient because anastomotic leaks never present after postoperative day 3
- B. Use serum amylase alone to exclude all postoperative intra-abdominal complications
- C. Perform colonoscopy first in every patient because CT cannot show extraluminal infection
- D. Delay imaging until the incision drains stool spontaneously
- E. Obtain contrast-enhanced CT to evaluate for an anastomotic leak or abscess

101. A chest tube placed for traumatic hemothorax immediately returns 1.8 L of blood and the patient remains hypotensive. What is the next step?

- A. Give diuretics to reduce pulmonary blood volume and chest-tube output
- B. Urgent operative thoracic exploration for major ongoing intrathoracic hemorrhage
- C. Clamp the chest tube and observe because large initial output is expected
- D. Remove the chest tube to allow pleural pressure to tamponade the bleeding
- E. Send the patient for routine CT before surgical consultation despite shock

102. A patient has massive hemoptysis originating from the right lung and is awaiting definitive bronchial artery control. How should the patient be positioned?

- A.** Use Trendelenburg positioning to direct blood toward the upper airway
- B.** Position solely according to the side with better radiographic aeration
- C.** Place the bleeding right lung dependent to protect the left lung from blood contamination
- D.** Place the bleeding lung uppermost to maximize drainage into the contralateral lung
- E.** Keep the patient flat and supine to equalize ventilation to both lungs

103. Which ICU patient has the clearest indication for pharmacologic stress-ulcer prophylaxis?

- A.** Every hospitalized patient regardless of bleeding risk or nutrition
- B.** A stable floor patient with no anticoagulation and no organ failure
- C.** A mechanically ventilated patient with significant coagulopathy and prolonged critical illness
- D.** A patient receiving enteral nutrition alone with no additional bleeding risk factors
- E.** A healthy postoperative patient eating normally and leaving the ICU within hours

104. A patient with shock has right atrial pressure 16 mm Hg, pulmonary capillary wedge pressure 7 mm Hg, low cardiac output, and markedly elevated pulmonary vascular resistance. Which diagnosis best fits?

- A.** Acute right ventricular failure from massive pulmonary embolism
- B.** Pure hypovolemic shock with low right- and left-sided filling pressures
- C.** Left ventricular cardiogenic shock with a markedly elevated wedge pressure
- D.** Early distributive shock with low systemic and pulmonary vascular resistance
- E.** High-output shock from severe anemia with elevated cardiac output

105. A profoundly immunosuppressed postoperative patient has nodular pulmonary infiltrates, hemoptysis, and a positive Aspergillus galactomannan assay. Which treatment is most appropriate?

- A.** Use acyclovir because herpesvirus infection is the usual cause of positive galactomannan

- B.** Use fluconazole because it has reliable activity against invasive *Aspergillus*
- C.** Treat with oral vancomycin because gram-positive bacteria cause the characteristic nodules
- D.** Wait for surgical lung biopsy before starting any antifungal in an unstable patient
- E.** Begin mold-active therapy such as voriconazole while pursuing diagnostic confirmation

106. During resuscitation of a patient with hemorrhagic shock, which change best indicates improvement in global tissue perfusion when interpreted with the clinical examination?

- A.** A single normal arterial pressure obtained after a vasopressor bolus
- B.** A falling serum lactate together with improving capillary refill and mental status
- C.** An isolated increase in urine specific gravity without improved urine output
- D.** A rising central venous pressure despite unchanged peripheral perfusion
- E.** Normalization of pulse oximetry while the patient remains cool and oliguric

107. A patient with acute cervical spinal cord injury has persistent hypotension after bleeding is excluded. Which treatment goal is most important for preventing secondary cord ischemia?

- A.** Support systemic arterial pressure with vasopressors and adequate volume to maintain spinal cord perfusion
- B.** Give high-dose corticosteroids routinely because they are mandatory standard care
- C.** Avoid vasopressors because all agents worsen spinal cord microcirculation
- D.** Induce profound hypocapnia to reduce spinal cord blood flow and edema
- E.** Use permissive hypotension because spinal cord tissue tolerates low perfusion better than other organs

108. During cardiac arrest, end-tidal CO₂ abruptly rises from 12 to 38 mm Hg during ongoing compressions. What is the most likely explanation?

- A.** Complete endotracheal tube obstruction causing carbon dioxide retention
- B.** Worsening chest-compression quality causing less pulmonary perfusion

- C. Acute pulmonary embolism developing during compressions
- D. Failure of the capnography sensor because true ROSC lowers end-tidal CO₂
- E. Return of spontaneous circulation with a sudden increase in pulmonary blood flow

109. A hemodynamically stable ICU patient cannot eat after major abdominal surgery and is expected to remain unable to take oral nutrition for several days. Which strategy is generally preferred?

- A. Use parenteral nutrition solely because mechanical ventilation is present
- B. Use total parenteral nutrition immediately in every postoperative patient
- C. Keep the patient without nutrition for seven days to avoid aspiration risk
- D. Begin enteral nutrition early when the gastrointestinal tract is functional and perfusion is adequate
- E. Delay all nutrition until bowel sounds are audible in every abdominal quadrant

110. A patient with septic shock has pH 7.24 and lactate 6 mmol/L from hypoperfusion but no severe acute kidney injury. What is the best approach to the acidosis?

- A. Delay source control until arterial pH has normalized with buffer therapy
- B. Restore perfusion and treat the cause rather than giving bicarbonate solely to improve hemodynamics
- C. Intentionally hypoventilate to raise PaCO₂ and correct the lactate
- D. Give bicarbonate routinely whenever lactate exceeds 4 mmol/L regardless of pH
- E. Use acetazolamide to increase bicarbonate loss despite acidemia

111. A patient from an enclosed-space fire has headache and confusion with carboxyhemoglobin 24%. Pulse oximetry reads 100%. What is the immediate treatment?

- A. Administer 100% oxygen and assess for indications for hyperbaric oxygen
- B. Give methylene blue because it is the antidote for carbon monoxide poisoning
- C. Use room air to accelerate dissociation of oxygen from hemoglobin

- D.** Treat with bicarbonate alone because oxygen does not alter carboxyhemoglobin
- E.** Rely on the normal pulse oximetry and stop supplemental oxygen

112. A postoperative patient has a platelet fall from 240,000 to 90,000/mm³ on day 6 of heparin exposure and develops a new proximal DVT. What is the best initial management?

- A.** Continue heparin because thrombosis makes immune HIT unlikely
- B.** Transfuse platelets routinely and withhold all anticoagulation despite acute thrombosis
- C.** Stop all heparin and start a non-heparin anticoagulant while evaluating for heparin-induced thrombocytopenia
- D.** Switch from unfractionated heparin to low-molecular-weight heparin because it cannot cross-react
- E.** Give vitamin K as the specific reversal agent for HIT antibodies

113. A child with severe traumatic brain injury becomes hypotensive after sedation. What is the most important resuscitation principle?

- A.** Correct hypotension promptly to preserve cerebral perfusion and prevent secondary brain injury
- B.** Use aggressive hyperventilation as the primary method to restore systemic pressure
- C.** Accept prolonged permissive hypotension because it reduces intracranial bleeding in children
- D.** Avoid vasoactive support because pediatric cerebral perfusion is independent of blood pressure
- E.** Delay treatment until intracranial pressure monitoring is available

114. A kidney transplant recipient on tacrolimus develops hypertension, tremor, hyperkalemia, and rising creatinine without rejection on biopsy. Which adverse effect is most likely?

- A.** Valganciclovir-induced acute antibody-mediated rejection
- B.** Trimethoprim effect causing biopsy-proven transplant vasculitis
- C.** Mycophenolate-induced isolated renal vasodilation with hypokalemia
- D.** Calcineurin inhibitor nephrotoxicity from tacrolimus exposure

E. Prednisone withdrawal syndrome despite continued high-dose steroids

115. A patient has residual clotted hemothorax on CT after tube thoracostomy and develops persistent fever and impaired lung expansion. Which intervention is preferred early?

- A.** Perform repeated blind chest-tube insertion until the clot fragments
- B.** Give prolonged antibiotics alone without removing the retained collection
- C.** Video-assisted thoracoscopic evacuation of the retained hemothorax
- D.** Use high-dose anticoagulation to dissolve the pleural clot
- E.** Observe indefinitely because retained blood cannot become infected

116. A postoperative patient develops abrupt hypoxemia after a mucus plug obstructs the right main bronchus. Which intervention is most appropriate when suctioning fails?

- A.** Increase FiO₂ alone and wait for spontaneous re-expansion over several days
- B.** Start systemic anticoagulation for presumed pulmonary embolism without imaging
- C.** Place a chest tube because lobar collapse from a plug is a pleural-space problem
- D.** Use high-dose diuresis as the primary treatment for endobronchial obstruction
- E.** Perform therapeutic bronchoscopy to remove the obstructing mucus plug

117. A critically ill patient has acute calculous cholecystitis but remains in refractory shock and is a prohibitive operative risk. What is the best source-control option?

- A.** Total parenteral nutrition alone until the gallstone dissolves
- B.** Immediate elective laparoscopic cholecystectomy despite uncontrolled shock and prohibitive risk
- C.** Observation without antibiotics because gallbladder infection cannot cause sepsis
- D.** Percutaneous cholecystostomy with antibiotics and reassessment for definitive surgery later
- E.** Endoscopic variceal banding because it decompresses the gallbladder

118. In a patient with acute right ventricular failure and systemic hypotension from massive pulmonary embolism, which vasopressor is generally preferred to support coronary and systemic perfusion?

- A.** Norepinephrine titrated to restore systemic arterial pressure
- B.** Diltiazem infusion to slow sinus tachycardia despite low cardiac output
- C.** Aggressive diuresis before supporting arterial pressure or considering reperfusion
- D.** Nitroprusside titrated to lower systemic vascular resistance despite hypotension
- E.** High-dose phenoxylbenzamine to reduce pulmonary and systemic vascular tone

119. An ICU team wants to test a new extubation checklist on one unit before hospital-wide adoption. Which quality-improvement method best fits rapid iterative testing?

- A.** Wait for a randomized national trial before testing any local workflow change
- B.** Change multiple unrelated processes simultaneously without defining measures
- C.** Use root-cause analysis only after a serious adverse event occurs
- D.** Use Plan-Do-Study-Act cycles to test, measure, refine, and retest the change
- E.** Adopt the checklist permanently without collecting process or outcome data

120. A critically ill patient after major surgery develops unexplained fever, leukocytosis, cholestatic liver tests, and right upper quadrant tenderness. Ultrasound shows gallbladder wall thickening without stones. What is the most likely diagnosis?

- A.** Uncomplicated biliary colic from an obstructing cholesterol stone
- B.** Acute acalculous cholecystitis related to critical illness and gallbladder stasis
- C.** Chronic pancreatitis causing isolated gallbladder wall thickening
- D.** Viral hepatitis as the typical cause of ICU gallbladder ischemia
- E.** Primary sclerosing cholangitis presenting abruptly after surgery

121. A trauma patient with facial burns, soot in the mouth, progressive hoarseness, and increasing work of breathing is still maintaining oxygen saturation. What is the best next step?

- A.** Obtain CT of the neck before deciding whether airway protection is required
- B.** Observe until oxygen saturation falls because edema rarely compromises the airway early
- C.** Use noninvasive positive-pressure ventilation and defer definitive airway control
- D.** Give racemic epinephrine and wait for the hoarseness to resolve before intubating
- E.** Perform early endotracheal intubation before progressive airway edema makes intubation difficult

122. A mechanically ventilated patient with severe acute kidney injury requires a continuous opioid infusion for analgesia. Which opioid is least likely to accumulate clinically important active renally cleared metabolites and is therefore a reasonable titratable choice?

- A.** Morphine, whose glucuronide metabolites can accumulate when renal clearance is markedly reduced
- B.** Meperidine, whose normeperidine metabolite can accumulate and produce neurotoxicity
- C.** Fentanyl, which lacks clinically important active metabolites that depend on renal clearance
- D.** Codeine, whose active metabolite exposure can become less predictable in severe renal dysfunction
- E.** Long-acting oral morphine, which provides less titratable analgesia in an unstable ICU patient

123. An unconscious patient arrives with ruptured abdominal aortic aneurysm, no surrogate is immediately available, and delay would likely be fatal. What consent principle applies?

- A.** No treatment can occur without written consent from a family member
- B.** Emergency treatment may proceed under implied consent when immediate care is necessary to prevent death or serious harm
- C.** Only diagnostic testing is permitted; life-saving surgery requires prospective written consent
- D.** The patient is presumed to refuse treatment because no surrogate can be reached
- E.** All treatment must wait until a court order is obtained regardless of urgency

124. After transsphenoidal surgery, a patient develops urine output 500 mL/hour, serum sodium 154 mEq/L, and very dilute urine. What is the most likely diagnosis?

- A.** SIADH causing excess water retention and concentrated urine
- B.** Central diabetes insipidus from deficient antidiuretic hormone activity
- C.** Cerebral salt wasting causing natriuresis with low serum sodium
- D.** Primary hyperaldosteronism causing sodium retention with low urine volume
- E.** Acute glomerulonephritis causing oliguria and concentrated urine

125. A stable patient after blunt trauma has a seat-belt sign, focal abdominal tenderness, and CT with free fluid but no solid-organ injury. What is the major concern?

- A.** Immediate discharge is appropriate if the initial hematocrit is normal
- B.** The findings exclude bowel injury because no solid-organ injury is visible
- C.** Hollow-viscus or mesenteric injury requiring close observation and possible exploration
- D.** Free fluid proves isolated urinary retention and needs no serial examination
- E.** The seat-belt sign is unrelated to intra-abdominal injury when blood pressure is normal

126. A patient has been mechanically ventilated for 4 days and is awake, hemodynamically stable, and oxygenating on low support. Which test best determines readiness for extubation?

- A.** A single normal arterial blood gas while still deeply sedated
- B.** A vital capacity measurement alone without evaluating cough or airway patency
- C.** A spontaneous breathing trial combined with assessment of airway protection and secretion management
- D.** A normal chest radiograph regardless of respiratory mechanics or mental status
- E.** A respiratory rate below 30/min while receiving full ventilator support

127. A patient with obstructive pyelonephritis has fever, shock, and hydronephrosis from a ureteral stone. What is the definitive urgent treatment?

- A.** Drain the infected collecting system with ureteral stent or percutaneous nephrostomy in addition to antibiotics

- B.** Use loop diuretics to force urine past the obstructing stone
- C.** Delay drainage until all blood cultures are negative
- D.** Perform extracorporeal shock-wave lithotripsy during uncontrolled septic shock
- E.** Treat with antibiotics alone until the stone passes spontaneously despite septic obstruction

128. A diagnostic test has sensitivity 90% and specificity 80%. What does sensitivity describe?

- A.** The proportion of patients without disease who have a negative test
- B.** The probability that a positive test proves disease in every population
- C.** The proportion of all positive tests that are false positives
- D.** The prevalence of disease among all patients who undergo testing
- E.** The proportion of patients with the disease who have a positive test

129. A patient in escalating vasopressor-dependent shock is receiving tube feeds and develops increasing abdominal distension and rising lactate. What is the best nutrition decision?

- A.** Ignore the abdominal findings because lactate is never related to intestinal hypoperfusion
- B.** Increase enteral calories because shock raises metabolic demand regardless of gut perfusion
- C.** Continue full feeds because enteral nutrition cannot contribute to mesenteric ischemia
- D.** Switch immediately to high-dose lipid infusion before stabilizing perfusion
- E.** Hold or reduce enteral feeding while urgently reassessing gut perfusion and the shock state

130. A chronically malnourished patient begins enteral feeding and 24 hours later develops weakness, respiratory failure, and phosphate 1.0 mg/dL. Which diagnosis is most likely?

- A.** Respiratory acidosis causing extracellular phosphate accumulation
- B.** Acute adrenal crisis causing isolated phosphate depletion
- C.** Tumor lysis syndrome with release of phosphate from lysed cells
- D.** Refeeding syndrome with intracellular phosphate shift

E. Primary hyperparathyroidism causing severe hyperphosphatemia

131. A mechanically ventilated patient with septic shock has new atrial fibrillation with rapid ventricular response, MAP 72 mm Hg on low-dose norepinephrine, and no evidence of preexcitation. Which approach is reasonable if the arrhythmia is contributing to hemodynamic stress but not immediate collapse?

- A.** Give a large digoxin loading dose as the fastest and most reliable drug in catecholamine excess
- B.** Perform unsynchronized defibrillation despite a perfusing organized rhythm
- C.** Start flecainide without evaluating structural heart disease or ischemia
- D.** Ignore the rhythm because all ICU atrial fibrillation is benign and self-limited
- E.** Use a titratable rate-control strategy such as amiodarone or a short-acting beta blocker while treating the underlying trigger

132. A patient with a circumferential full-thickness forearm burn develops worsening pain, cool fingers, weak Doppler signals, and rising compartment pressure despite adequate systemic resuscitation. What is the next step?

- A.** Apply a tighter circumferential dressing to reduce edema
- B.** Wait for complete loss of pulses before intervening
- C.** Use systemic thrombolysis because the problem is arterial embolism
- D.** Perform escharotomy to release the constricting burn eschar
- E.** Perform only a skin graft without releasing the eschar

133. A patient with fever, jaundice, hypotension, and biliary obstruction on imaging has acute ascending cholangitis. What is the key definitive treatment in addition to antibiotics and resuscitation?

- A.** Urgent biliary decompression, usually by endoscopic retrograde cholangiopancreatography
- B.** Use total parenteral nutrition to decompress the common bile duct
- C.** Delay drainage until bilirubin normalizes with antibiotics alone
- D.** Perform elective cholecystectomy months later without relieving the obstruction

E. Treat with proton-pump inhibitor infusion as definitive biliary source control

134. A patient with destructive abdominal trauma, profound hypothermia, acidosis, coagulopathy, and ongoing bleeding is in the operating room. Which strategy best fits damage-control surgery?

- A. Delay hemorrhage control while correcting coagulopathy in the ICU
- B. Close the abdomen under maximal tension to prevent postoperative fluid loss
- C. Perform every definitive anastomosis and abdominal-wall reconstruction during the initial unstable operation
- D. Control hemorrhage and contamination rapidly, use temporary abdominal closure, then resuscitate before definitive reconstruction
- E. Continue the operation until all laboratory abnormalities normalize under anesthesia

135. A patient has PaO₂ 60 mm Hg on FiO₂ 0.60 with PEEP 8 cm H₂O. What is the PaO₂/FiO₂ ratio?

- A. 60, because FiO₂ should not be included in the calculation
- B. 167, which is calculated by multiplying PaO₂ by FiO₂
- C. 360, which would represent severe shunt physiology
- D. 36, which would indicate normal oxygen transfer at this FiO₂
- E. 100, consistent with severe oxygenation impairment

136. A patient with pelvic trauma has blood at the urethral meatus and inability to void. What should be done before blind urethral catheterization?

- A. Force a large-bore Foley catheter past the suspected injury to tamponade bleeding
- B. Perform cystoscopy only after several blind catheter attempts fail
- C. Give diuretics until spontaneous voiding confirms urethral integrity
- D. Perform retrograde urethrography to evaluate for urethral disruption
- E. Place the catheter balloon in the urethra intentionally to control pelvic hemorrhage

137. A patient with severe hemorrhage is cold, acidemic, and diffusely coagulopathic. Which strategy most directly interrupts the trauma-induced lethal triad?

- A.** Correct acidosis with bicarbonate before attempting definitive hemorrhage control
- B.** Rapid hemorrhage control with warmed balanced blood products and active rewarming
- C.** Large-volume room-temperature crystalloid until the base deficit fully normalizes
- D.** Delay blood products until conventional coagulation tests return from the laboratory
- E.** Use isolated vasopressor support while minimizing transfusion to avoid pulmonary edema

138. A patient with septic shock develops diffuse oozing, thrombocytopenia, prolonged PT, low fibrinogen, and markedly elevated D-dimer. What is the best treatment principle?

- A.** Use aspirin as the primary therapy for consumption of clotting factors
- B.** Ignore the underlying infection because DIC resolves independently of source control
- C.** Give long-term warfarin because DIC is primarily a vitamin K deficiency
- D.** Treat the underlying sepsis and provide blood-component support when bleeding or procedures require it
- E.** Transfuse plasma and platelets to normal laboratory values in every nonbleeding patient

139. A patient with cardiac tamponade is mechanically ventilated. Which ventilator change is most likely to worsen the hemodynamics?

- A.** Using the lowest effective intrathoracic pressure until tamponade is relieved
- B.** Increasing PEEP substantially, thereby reducing venous return to an already preload-limited heart
- C.** Treating severe hypoxemia while arranging urgent pericardial decompression
- D.** Maintaining adequate venous return with cautious volume support if needed
- E.** Reducing excessive mean airway pressure while maintaining adequate oxygenation

140. A patient with subarachnoid hemorrhage develops hyponatremia, high urine sodium, high urine output, and clinical volume depletion. Which diagnosis is most likely?

- A. SIADH, which typically produces euvolemia rather than clear volume depletion
- B. Diabetes insipidus, which causes hypernatremia and dilute urine
- C. Cerebral salt wasting causing renal sodium loss and hypovolemia
- D. Primary hyperaldosteronism, which causes sodium retention and hypertension
- E. Psychogenic polydipsia, which usually produces low urine osmolality without natriuresis

141. A therapy reduces mortality from 20% to 15%. What is the number needed to treat?

- A. 40 patients, because the relative risk is 0.75
- B. 5 patients, because the relative risk reduction is 5%
- C. 10 patients, because mortality fell by one half of 20%
- D. 15 patients, because the treated event rate is 15%
- E. 20 patients, based on an absolute risk reduction of 5 percentage points

142. A ventilated patient has highly variable energy expenditure and prolonged ICU stay. Which method most directly measures resting energy expenditure when available?

- A. Urine urea nitrogen alone because it measures total energy expenditure
- B. Daily serum glucose because it quantifies resting oxygen consumption
- C. Indirect calorimetry using oxygen consumption and carbon dioxide production
- D. Serum albumin concentration because it directly measures caloric expenditure
- E. Body mass index alone because it accurately predicts ICU metabolic rate

143. During massive transfusion a patient develops hypotension and diffuse oozing. Ionized calcium is 0.78 mmol/L. What is the most appropriate treatment?

- A. Stop all blood products until total serum calcium returns to normal spontaneously
- B. Give bicarbonate because it directly releases ionized calcium from citrate
- C. Use a loop diuretic to reduce calcium loss during transfusion

- D.** Administer intravenous calcium and continue serial ionized calcium monitoring
- E.** Give phosphate replacement because citrate causes acute hypercalcemia

144. A patient improves after source control for septic intra-abdominal infection, cultures identify a susceptible organism, and vasopressors are stopped. What is the best antimicrobial stewardship step?

- A.** Continue the broadest empiric regimen until hospital discharge regardless of cultures
- B.** Add a second agent from the same class to prevent resistance during recovery
- C.** Continue antibiotics until all inflammatory markers are completely normal
- D.** Switch to antifungal therapy even when cultures show only susceptible bacteria
- E.** Narrow the regimen to the least broad effective therapy and use an appropriate shorter duration

145. A hemodynamically stable patient has a stab wound to the anterior abdomen without peritonitis or evisceration. Which management strategy is acceptable in an experienced trauma center?

- A.** Selective nonoperative management with serial examinations and targeted imaging as indicated
- B.** Routine broad-spectrum antibiotics alone without serial examination
- C.** Mandatory laparotomy for every anterior abdominal stab wound regardless of findings
- D.** Immediate discharge because stability eliminates the possibility of intra-abdominal injury
- E.** Diagnostic peritoneal lavage is mandatory before any clinical observation

146. A patient with isolated severe respiratory failure is placed on extracorporeal support. Which circuit configuration provides gas exchange without direct arterial circulatory support?

- A.** Left ventricular assist support alone, which directly removes carbon dioxide
- B.** Continuous venovenous hemofiltration, which provides extracorporeal oxygenation
- C.** Venoarterial ECMO, which is required whenever oxygenation is impaired
- D.** Venovenous ECMO, with venous drainage and venous return
- E.** Intra-aortic balloon counterpulsation, which oxygenates blood outside the body

147. A patient with crush injury has dark urine, CK 35,000 U/L, rising potassium, and no pulmonary edema. Which initial renal-protective strategy is most important?

- A.** Restrict fluids because myoglobin causes kidney injury only when urine output is high
- B.** Use loop diuretics as the sole proven prevention of pigment nephropathy
- C.** Delay treatment until creatinine rises because early fluids do not affect risk
- D.** Routine mannitol and bicarbonate are mandatory before any crystalloid is given
- E.** Aggressive isotonic crystalloid resuscitation with close electrolyte and urine-output monitoring

148. A toddler with bronchiolitis has increasing work of breathing and hypoxemia despite low-flow oxygen but is still protecting the airway. Which escalation is reasonable before intubation?

- A.** Immediate tracheostomy because bronchiolitis does not respond to noninvasive support
- B.** Routine antibiotics because bronchiolitis is primarily bacterial
- C.** High-flow nasal cannula with close monitoring for failure
- D.** Continuous bronchoscopy to remove viral secretions from small airways
- E.** Large tidal-volume bag ventilation for several hours without monitoring

149. A solid-organ transplant recipient 2 months after transplantation develops fever, leukopenia, diarrhea, and viral inclusions with positive CMV testing. What is the most likely diagnosis?

- A.** Pneumocystis pneumonia despite absence of respiratory findings
- B.** Hyperacute rejection caused by preformed ABO antibodies
- C.** Cytomegalovirus disease during the period of intense immunosuppression
- D.** Clostridioides difficile infection proven solely by CMV viremia
- E.** Chronic rejection because leukopenia is diagnostic of graft fibrosis

150. A patient on an intra-aortic balloon pump has correct timing. Which physiologic effect is expected?

- A.** Continuous inflation directly replaces native left ventricular stroke volume
- B.** The device primarily oxygenates venous blood rather than altering aortic pressure

- C. Systolic inflation raises afterload to increase myocardial oxygen consumption intentionally
- D. Diastolic deflation decreases coronary perfusion to reduce ventricular filling pressures
- E. Diastolic inflation augments coronary perfusion and systolic deflation reduces left ventricular afterload

151. A patient with suspected life-threatening traumatic hemorrhage arrives 90 minutes after injury. There is no contraindication to antifibrinolytic therapy. Which approach is appropriate?

- A. Administer tranexamic acid as early as possible and within 3 hours of injury
- B. Give tranexamic acid only after the patient has received at least ten units of red cells
- C. Avoid tranexamic acid because it is useful only for isolated intracranial hemorrhage
- D. Delay antifibrinolytic therapy until operative hemostasis has already been achieved
- E. Wait until 6 hours after injury so that fibrinolysis can be confirmed by standard coagulation tests

152. A patient with circumferential full-thickness chest burns develops rising airway pressures and poor chest excursion despite a patent endotracheal tube. What intervention is most appropriate?

- A. Chest-wall escharotomy to restore thoracic compliance
- B. Increase tidal volume aggressively because the chest wall restriction is harmless
- C. Place bilateral chest tubes despite no evidence of pleural pathology
- D. Use neuromuscular blockade alone because paralysis releases burn eschar
- E. Perform pericardiocentesis because burn eschar causes tamponade

153. During a mass-casualty event, ICU capacity is overwhelmed. Which triage principle is ethically and operationally most appropriate?

- A. Never reassess resource allocation even when prognosis changes substantially
- B. Use transparent, consistently applied clinical triage criteria with scheduled reassessment
- C. Allocate scarce resources solely according to social status or ability to pay
- D. Reserve all resources for the first patients who arrive regardless of prognosis

E. Change criteria secretly for different clinicians to preserve flexibility

154. A patient with blunt renal trauma is stable. CT shows a deep laceration with contained urinary extravasation but no expanding hematoma or active bleeding. What is the general management principle?

- A.** Use angiography only when there is no vascular bleeding
- B.** Observe nonoperatively with urologic follow-up unless complications or ongoing bleeding develop
- C.** Avoid repeat assessment because stable renal injuries cannot develop complications
- D.** Perform immediate nephrectomy for any urinary extravasation
- E.** Explore the kidney surgically solely because the laceration is deep

155. Seven days after tracheostomy, a patient has a small sentinel bleed from the stoma followed by sudden massive pulsatile hemorrhage. Which complication should be assumed?

- A.** Diffuse alveolar hemorrhage best treated with bronchoalveolar lavage alone
- B.** Pulmonary embolism causing retrograde bleeding through the tracheostomy
- C.** Esophageal variceal hemorrhage entering the airway through an intact tracheal wall
- D.** Tracheo-innominate artery fistula requiring immediate temporizing compression and emergent operative control
- E.** Minor granulation tissue bleeding that can be observed without urgent intervention

156. A postoperative patient has sudden anuria. Bladder scan shows 900 mL of urine. What is the next step?

- A.** Start dialysis immediately because all postoperative anuria represents intrinsic renal failure
- B.** Give high-dose furosemide before confirming urinary tract patency
- C.** Decompress the bladder with urinary catheterization and evaluate the cause of retention
- D.** Administer hypertonic saline to draw water into the bladder
- E.** Restrict fluids and wait for spontaneous resolution despite severe retention

157. A septic patient has adequate source control but the optimal antibiotic duration remains uncertain. Which biomarker may be used together with clinical assessment to help decide when to stop therapy?

- A.** Creatine kinase used as the primary marker of antimicrobial efficacy
- B.** Troponin measured daily until it becomes undetectable
- C.** D-dimer used alone as a specific marker of bacterial clearance
- D.** Serum amylase because it tracks resolution of systemic infection
- E.** Serial procalcitonin interpreted with the clinical course

158. A mechanically ventilated ICU patient is agitated at night, inattentive, and fluctuates between somnolence and hyperactivity. Which management strategy is best?

- A.** Treat reversible causes, use a validated delirium assessment, promote sleep and mobility, and minimize deliriogenic sedatives
- B.** Use physical restraints as the primary treatment because they reduce delirium duration
- C.** Ignore fluctuating inattention because delirium does not affect ICU outcomes
- D.** Start routine long-term antipsychotic therapy because it shortens delirium in all ICU patients
- E.** Deeply sedate the patient with benzodiazepines until all agitation disappears

159. A randomized trial reports a mortality hazard ratio of 0.82 with 95% CI 0.66-1.03. What is the best interpretation?

- A.** The therapy definitively increases mortality because the confidence interval crosses 1
- B.** The estimate favors treatment, but the 95% CI crosses 1, so statistical significance is not established
- C.** The trial proves equivalence because the confidence interval contains 1
- D.** The hazard ratio means exactly 18% of treated patients will survive who otherwise would die
- E.** The therapy definitively reduces mortality because every hazard ratio below 1 is significant

160. A severely malnourished patient is about to start nutrition support. Which preventive step is most appropriate to reduce refeeding complications?

- A.** Begin full caloric goals immediately and avoid electrolyte checks during the first week
- B.** Give thiamine, correct phosphate/potassium/magnesium deficits, and advance calories cautiously
- C.** Restrict thiamine because carbohydrate loading lowers vitamin requirements
- D.** Give only sodium replacement because phosphate shifts do not occur during refeeding
- E.** Start high-dose insulin prophylactically before any carbohydrate is delivered

161. A patient with acute kidney injury has pulmonary edema despite diuretics, potassium 6.4 mEq/L despite temporizing therapy, and severe metabolic acidosis. What is the best next step?

- A.** Use dopamine at renal-dose infusion because it reliably restores kidney function
- B.** Continue escalating diuretics indefinitely because dialysis is contraindicated in acute kidney injury
- C.** Wait for the creatinine to exceed 10 mg/dL before considering renal replacement
- D.** Initiate renal replacement therapy for refractory life-threatening complications
- E.** Give large-volume crystalloid to increase renal perfusion despite pulmonary edema

162. A patient in septic shock has adequate volume resuscitation, MAP 68 mm Hg on norepinephrine, and persistently low central venous oxygen saturation with evidence of low cardiac output. What does the low venous saturation most directly indicate?

- A.** Tissues are unable to extract oxygen, which typically causes a high venous saturation
- B.** Pulmonary shunt is absent because mixed venous saturation is reduced
- C.** Arterial oxygen content is necessarily normal because venous saturation is low
- D.** Systemic oxygen delivery is inadequate relative to tissue oxygen consumption
- E.** The patient has excessive systemic oxygen delivery relative to tissue demand

163. A patient on warfarin has life-threatening intracranial hemorrhage and an INR of 4.8. What is the preferred urgent reversal strategy?

- A.** Give four-factor prothrombin complex concentrate plus intravenous vitamin K

- B.** Use platelet transfusion as the primary reversal of warfarin effect
- C.** Give protamine because it directly neutralizes warfarin-bound clotting factors
- D.** Administer idarucizumab because it specifically reverses vitamin K antagonists
- E.** Give vitamin K alone and wait for hepatic synthesis over many hours

164. A patient with penetrating chest trauma has hypotension, elevated jugular venous pressure, muffled heart sounds, and a positive pericardial FAST. The patient is deteriorating despite transfusion. What is the definitive priority?

- A.** Repeated crystalloid boluses until the jugular venous pressure normalizes
- B.** Observation after pericardiocentesis because traumatic blood rarely reaccumulates
- C.** CT angiography to identify the precise cardiac chamber involved
- D.** Diuresis to lower right-sided filling pressure before surgical intervention
- E.** Immediate operative relief of tamponade with control of the cardiac injury

165. A patient with a blunt abdominal injury has CT evidence of active arterial splenic bleeding but remains stable after resuscitation. Which adjunct can preserve splenic tissue?

- A.** Percutaneous transhepatic embolization of the portal vein
- B.** Routine total splenectomy despite sustained hemodynamic stability
- C.** Splenic artery angioembolization to control arterial bleeding while preserving the spleen
- D.** Systemic thrombolysis to stop focal arterial extravasation
- E.** Endoscopic clipping of the splenic arterial branch

166. A patient with ARDS is ventilated with tidal volume 6 mL/kg PBW. Plateau pressure is 27 cm H₂O and total PEEP is 12 cm H₂O. What is the driving pressure?

- A.** 27 cm H₂O, because plateau pressure itself equals driving pressure
- B.** 15 cm H₂O, calculated as plateau pressure minus total PEEP
- C.** 39 cm H₂O, calculated by adding plateau pressure and PEEP

- D.** 9 cm H₂O, calculated by subtracting tidal volume from plateau pressure
- E.** 12 cm H₂O, because driving pressure is identical to total PEEP

167. A woman develops massive postpartum hemorrhage immediately after delivery. The uterus is enlarged and boggy. What is the most likely cause and first uterotonic treatment?

- A.** Uterine rupture; treat with oxytocin alone and no operative evaluation
- B.** Pulmonary embolism; begin anticoagulation before controlling uterine bleeding
- C.** Uterine atony; begin uterine massage and oxytocin
- D.** Amniotic fluid embolism; use methylergonovine as the only therapy
- E.** Retained urine; give furosemide and avoid uterotonics

168. A patient with a postoperative incisional abscess has erythema, fluctuance, and purulent drainage but no necrotizing features. What is the central treatment principle?

- A.** Treat with antibiotics alone while leaving the purulent collection undrained
- B.** Close the skin tightly to prevent additional bacterial entry
- C.** Use corticosteroids to reduce erythema before considering drainage
- D.** Delay drainage until culture results identify the exact pathogen
- E.** Open and drain the infected collection, with antibiotics added according to systemic illness and risk

169. A patient has deep partial- and full-thickness burns that will not heal promptly. Which wound strategy generally reduces infection risk and length of illness?

- A.** Early excision of nonviable burn tissue with definitive wound coverage when feasible
- B.** Perform repeated superficial cleansing without addressing full-thickness necrosis
- C.** Leave full-thickness eschar in place until it separates spontaneously over months
- D.** Use systemic antibiotics alone instead of removing devitalized tissue
- E.** Delay grafting until every burn wound has developed a dense bacterial biofilm

170. A ventilated patient is receiving dexmedetomidine for light sedation. Which adverse effect is most characteristic and should be monitored?

- A.** Malignant hyperthermia as a routine dose-related complication
- B.** Irreversible neuromuscular blockade after short infusions
- C.** Bradycardia and hypotension from alpha-2 agonist sympatholysis
- D.** Profound respiratory depression at usual sedative doses as its defining toxicity
- E.** Severe hyperglycemia caused by direct pancreatic beta-cell stimulation

171. A patient with irreversible multiorgan failure is receiving treatments that no longer achieve the patient's goals. The family asks whether withdrawing a ventilator is ethically different from deciding not to start dialysis. What is the best response?

- A.** Withholding is always acceptable but withdrawal is legally considered euthanasia
- B.** Dialysis can be withheld but mechanical ventilation can never be withdrawn
- C.** Withholding and withdrawing life-sustaining treatment are ethically equivalent when guided by the same patient goals
- D.** Treatment decisions should be based only on how long a therapy has already been used
- E.** Withdrawal is ethically prohibited once a treatment has been started

172. A patient with septic shock develops mottled extremities and rising lactate despite MAP 70 mm Hg on escalating vasopressors. Bedside echocardiography shows a hyperdynamic small LV and collapsible veins. What is the best interpretation?

- A.** Macrovascular pressure is acceptable, but intravascular volume and effective forward flow may still be inadequate
- B.** A normal MAP proves that additional hemodynamic assessment is unnecessary
- C.** The hyperdynamic LV confirms cardiogenic shock from severe systolic dysfunction
- D.** Collapsible veins prove fluid responsiveness in every mechanically ventilated patient
- E.** Rising lactate proves tissue hypoxia from low hemoglobin alone

173. A ventilated ICU patient requires ongoing light sedation and has recurrent agitation during weaning. Which sedative has the advantage of minimal respiratory depression and can facilitate interactive sedation?

- A.** Haloperidol infusion as the standard primary sedative for ventilator liberation
- B.** High-dose continuous midazolam because benzodiazepines consistently shorten delirium
- C.** Long-acting oral phenobarbital because it permits rapid moment-to-moment titration
- D.** Dexmedetomidine, while monitoring for bradycardia and hypotension
- E.** Continuous neuromuscular blockade without sedation to avoid respiratory depression

174. A smoke-inhalation patient has pulse oximetry of 99% but neurologic symptoms and suspected carbon monoxide exposure. Which measurement is required?

- A.** Co-oximetry to directly measure carboxyhemoglobin
- B.** Capillary refill time because it directly quantifies carboxyhemoglobin percentage
- C.** Pulmonary artery occlusion pressure because it measures hemoglobin species
- D.** Standard pulse oximetry alone because it distinguishes carboxyhemoglobin from oxyhemoglobin
- E.** Central venous pressure because carbon monoxide is diagnosed by elevated preload

175. A patient with blunt abdominal trauma has peritonitis and free intraperitoneal air on CT. What is the most appropriate management?

- A.** Angioembolization as definitive treatment for bowel perforation
- B.** Colonoscopy before surgery to identify the exact perforation site
- C.** Delay intervention until leukocytosis develops
- D.** Immediate operative exploration for hollow-viscus perforation
- E.** Observation because free air after blunt trauma is usually benign

176. A patient with pulmonary edema has severe hypoxemia but is awake, protecting the airway, and hemodynamically stable. Which noninvasive support is especially useful when positive pressure is desired to reduce work of breathing and preload?

- A.** Low-flow nasal cannula only, regardless of respiratory distress severity
- B.** Immediate tracheostomy before any trial of noninvasive support
- C.** Heliox as the primary therapy for alveolar flooding from cardiogenic edema
- D.** Noninvasive positive-pressure ventilation such as CPAP or bilevel support
- E.** Bronchoscopy as first-line therapy to remove transudative alveolar fluid

177. A pregnant patient at 34 weeks has severe hypertension, headache, right upper quadrant pain, and a generalized seizure. Which medication is given to prevent recurrent eclamptic seizures?

- A.** Levetiracetam alone while leaving severe hypertension untreated
- B.** Phenytoin as the preferred first-line prophylaxis in all eclampsia
- C.** Intravenous magnesium sulfate for treatment and prevention of recurrent eclamptic seizures
- D.** Mannitol because the seizure is presumed due to intracranial mass effect
- E.** Nitroprusside as the primary anticonvulsant therapy

178. A patient receiving a high-dose propofol infusion is also receiving enteral nutrition. Which nutrition consideration is important?

- A.** Add dextrose to offset the caloric deficit created by propofol infusion
- B.** Treat propofol calories as protein equivalents when calculating nitrogen balance
- C.** Ignore propofol because it contains no metabolizable energy
- D.** Stop all protein because propofol provides complete parenteral nutrition
- E.** Count propofol's lipid calories when assessing total energy delivery

179. A patient with severe hypernatremia from free-water loss is hemodynamically stable. Which correction principle is safest when the hypernatremia is chronic or of uncertain duration?

- A.** Use hypertonic saline because hypernatremia reflects total-body sodium deficiency
- B.** Avoid enteral free water because only isotonic crystalloid can lower serum sodium
- C.** Give sodium bicarbonate to shift water from cells into the extracellular space

- D.** Replace free water gradually with frequent sodium checks to avoid overly rapid reduction
- E.** Normalize sodium within 2 hours using large boluses of sterile water intravenously

180. A 30-year-old trauma patient has heart rate 132/min and systolic pressure 92 mm Hg before analgesia. Which bedside value most strongly supports clinically significant circulatory compromise?

- A.** A pulse pressure greater than 60 mm Hg, indicating severe arterial vasoconstriction
- B.** A shock index above 1, reflecting tachycardia out of proportion to systolic pressure
- C.** A respiratory rate below 12/min, indicating compensated hemorrhage
- D.** A normal pulse oximetry value, which excludes clinically important shock
- E.** A temperature of 36.8 C, which rules out major occult blood loss

181. A patient with septic shock has a suspected urinary source and prior colonization with an ESBL-producing Enterobacterales strain. What should guide the empiric regimen?

- A.** Treat only with an anti-MRSA agent because resistance risk applies only to gram-positive organisms
- B.** The patient's prior resistant organisms, recent antibiotics, local susceptibility data, and current severity
- C.** Use the same narrow regimen for every septic urinary infection regardless of resistance history
- D.** Ignore prior cultures because colonization never predicts subsequent infection
- E.** Avoid gram-negative therapy until the urine culture is finalized

182. An infant in septic shock remains hypotensive after cautious fluid boluses and shows cold extremities with weak pulses. What is the next step?

- A.** Use dopamine exclusively because other vasoactive agents are contraindicated in children
- B.** Avoid all catecholamines because pediatric shock responds only to fluid
- C.** Continue unlimited crystalloid until peripheral edema is severe
- D.** Start epinephrine or norepinephrine promptly according to shock physiology and local protocol

E. Delay vasoactive drugs until central venous access is surgically placed

183. A patient with massive tissue injury develops systemic inflammatory response followed days later by profound lymphopenia and susceptibility to secondary infection. Which concept best explains this later phase?

- A. Permanent absence of adaptive immunity caused by a single episode of tissue injury
- B. Exclusive B-cell hyperfunction that prevents bacterial superinfection
- C. Compensatory immune suppression and immune-cell dysfunction after severe critical illness
- D. Complete elimination of apoptosis in circulating lymphocytes during sepsis
- E. Persistent unchecked innate activation with no counter-regulatory immune response

184. A patient with septic shock has persistent MAP 58 mm Hg despite norepinephrine and vasopressin. Which next vasoactive step is reasonable while reassessing source control and cardiac function?

- A. Stop norepinephrine and use oral midodrine as sole support for profound shock
- B. Add nitroglycerin because venodilation reliably raises mean arterial pressure
- C. Replace both vasopressors with dobutamine even if arterial pressure falls further
- D. Use adenosine infusion to suppress catecholamine-associated sinus tachycardia
- E. Add epinephrine for refractory vasodilatory shock

185. An ICU has frequent unplanned extubations. What is the best first systems-management response?

- A. Measure when and why events occur, identify modifiable patterns, and implement targeted multidisciplinary prevention
- B. Stop reporting unplanned extubations because surveillance encourages blame
- C. Immediately restrain every ventilated patient regardless of delirium or mobility goals
- D. Assume individual nurse negligence without reviewing sedation, staffing, or device practices
- E. Increase deep sedation for all patients without tracking ventilator duration or delirium

186. A patient with blunt chest trauma has a widened mediastinum and CT angiography confirms a grade III blunt thoracic aortic injury. The patient is otherwise stable. What is the preferred definitive approach in most suitable patients?

- A.** Systemic anticoagulation alone to prevent progression of the aortic lesion
- B.** Thoracic endovascular aortic repair after anti-impulse stabilization
- C.** Balloon angioplasty without stent-graft placement as definitive therapy
- D.** Open thoracotomy is mandatory for every contained aortic injury
- E.** Observation alone indefinitely because contained pseudoaneurysm never ruptures

187. A ventilated patient has PaCO₂ 60 mm Hg with acceptable pH during lung-protective ventilation for ARDS. Oxygenation and plateau pressure are within target. What is the best response?

- A.** Eliminate PEEP to increase alveolar ventilation despite worsening shunt
- B.** Begin bicarbonate solely to normalize PaCO₂ while leaving ventilation unchanged
- C.** Accept permissive hypercapnia rather than increasing tidal volume to injurious levels
- D.** Switch to routine high-frequency oscillation for any PaCO₂ above 50 mm Hg
- E.** Increase tidal volume above lung-protective targets until PaCO₂ is normal

188. A pregnant trauma patient at 30 weeks becomes hypotensive when supine but improves when turned slightly left. What is the mechanism?

- A.** Pulmonary embolism that resolves immediately with lateral positioning
- B.** Neurogenic shock caused by fetal movement against the spinal cord
- C.** Acute mitral stenosis that is corrected by uterine displacement
- D.** Placental abruption that stops bleeding when the mother turns left
- E.** Aortocaval compression by the gravid uterus reducing venous return

189. A patient taking apixaban has life-threatening intracranial bleeding and took the last dose 3 hours ago. Which reversal approach is appropriate?

- A.** Use desmopressin alone because it eliminates circulating apixaban
- B.** Use andexanet alfa or a protocol-based PCC strategy for urgent factor Xa reversal
- C.** Use idarucizumab because it is the specific antidote for apixaban
- D.** Give protamine because it completely neutralizes factor Xa inhibitors
- E.** Give vitamin K because apixaban blocks vitamin K recycling

190. A patient with severe frostbite of the hands presents shortly after rescue. What is the initial local treatment once refreezing risk has been eliminated?

- A.** Immerse the extremity in ice water to reduce reperfusion injury
- B.** Rapid rewarming in circulating water around 37-39 C with analgesia
- C.** Apply direct dry heat from a heater to temperatures above 50 C
- D.** Rub the frozen tissue vigorously with snow to restore microcirculation
- E.** Allow slow passive thawing at room temperature over many hours

191. Before determining death by neurologic criteria, which prerequisite must be satisfied?

- A.** Accept profound hypothermia because it increases the specificity of the apnea test
- B.** Skip assessment of reversible metabolic abnormalities if cranial reflexes appear absent
- C.** Require a family decision to withdraw treatment before the neurologic examination can begin
- D.** Perform the examination immediately after paralytic administration because motor responses are unnecessary
- E.** Exclude drug effect, paralysis, severe metabolic disturbance, and hypothermia before the neurologic examination

192. A quality-improvement study compares two ICU protocols and reports $p=0.03$ for a difference in length of stay. What does the p value mean?

- A.** There is a 97% probability that the new protocol is clinically superior
- B.** Exactly 3% of patients were harmed by the new protocol

- C. Under the null hypothesis, data this extreme or more would occur about 3% of the time
- D. The observed difference has a 3% chance of being caused by bias
- E. The study result will replicate with 97% certainty in another hospital

193. A patient on prolonged high-dose propofol develops new metabolic acidosis, rhabdomyolysis, hyperkalemia, and cardiovascular collapse. What is the most likely diagnosis?

- A. Thyroid storm caused by lipid emulsion exposure
- B. Malignant hyperthermia caused by enteral nutrition
- C. Serotonin syndrome caused by catecholamine vasopressors alone
- D. Propofol infusion syndrome requiring prompt discontinuation and supportive care
- E. Refeeding syndrome caused by excess phosphate administration

194. A patient with oliguria after septic shock receives a loop diuretic and urine output rises markedly, but creatinine continues to increase. What is the correct interpretation?

- A. A diuretic response eliminates the need to monitor electrolytes or renal function
- B. The rising creatinine is expected to be harmless whenever urine output exceeds 1 mL/kg/hour
- C. The diuretic can manage volume status but does not prove renal recovery or improve intrinsic AKI
- D. The increased urine output proves glomerular filtration has normalized
- E. Loop diuretics reverse acute tubular necrosis when urine output increases

195. During massive transfusion for uncontrolled hemorrhage, which laboratory-guided strategy best limits empiric overtransfusion once immediate balanced resuscitation is underway?

- A. Stop plasma once the INR is below 2.5 regardless of ongoing bleeding
- B. Use viscoelastic testing to target fibrinogen, platelet, and antifibrinolytic therapy to the observed clot defect
- C. Use platelet count alone to determine whether fibrinogen replacement is required

- D.** Wait for a normal activated partial thromboplastin time before giving any hemostatic product
- E.** Rely exclusively on hemoglobin concentration because it identifies every major coagulation deficit

196. A mechanically ventilated patient has *Candida albicans* isolated from endotracheal aspirate but no candidemia, no compatible invasive disease, and improving oxygenation. What is the best interpretation?

- A.** It proves invasive *Candida* pneumonia and mandates prolonged amphotericin therapy
- B.** It confirms catheter-related candidemia despite negative blood cultures
- C.** Respiratory *Candida* usually represents colonization and does not by itself require antifungal therapy
- D.** It indicates fungal endocarditis and requires valve surgery
- E.** It proves *Pneumocystis pneumonia* because both organisms colonize the airway

197. A patient with cardiogenic shock after acute myocardial infarction has cold extremities, oliguria, low cardiac output, and pulmonary edema. Which hemodynamic profile is most consistent?

- A.** Low systemic vascular resistance with high venous oxygen saturation from distributive shock
- B.** Low systemic vascular resistance with low filling pressures and high cardiac output
- C.** High systemic vascular resistance with elevated left-sided filling pressure and reduced cardiac output
- D.** Low pulmonary capillary wedge pressure with high cardiac output and warm extremities
- E.** Normal filling pressures with isolated high-output physiology and bounding pulses

198. A trauma patient with severe TBI has a normal first head CT but deteriorates neurologically 6 hours later. What is the best next step?

- A.** Give systemic thrombolysis because delayed decline usually reflects ischemic stroke
- B.** Remove cervical-spine precautions as the first response to neurologic deterioration
- C.** Assume the change is sedation related and wait until the next morning

- D.** Repeat urgent neuroimaging and reassess for evolving intracranial hemorrhage or edema
- E.** Use permissive hypercapnia to increase cerebral blood flow before imaging

199. A patient with ARDS has refractory hypoxemia. Increasing PEEP from 10 to 18 cm H₂O raises central venous pressure, lowers arterial pressure, and worsens echocardiographic right ventricular dilation without improving oxygenation. What is the best interpretation?

- A.** The fall in blood pressure confirms improved left ventricular afterload and should be accepted
- B.** Right ventricular dilation indicates better pulmonary recruitment and improved perfusion
- C.** Lack of oxygenation response means tidal volume should be doubled immediately
- D.** The response proves more PEEP is needed because central venous pressure increased
- E.** The higher PEEP is causing hemodynamic harm and likely overdistension, so the setting should be reduced and reassessed

200. A postoperative patient with severe pancreatitis develops infected pancreatic necrosis but is hemodynamically stable. Which management principle is preferred when feasible?

- A.** Use a step-up approach beginning with antibiotics and delayed minimally invasive drainage/debridement
- B.** Perform emergency open necrosectomy on the first day of necrosis in every stable patient
- C.** Avoid drainage because infected necrosis resolves with parenteral nutrition alone
- D.** Use prophylactic antifungals as the only treatment for proven infected necrosis
- E.** Delay all antibiotics until the necrotic cavity liquefies completely

Answers

- 1. E.** Hemodynamically stable blunt splenic injury is often managed nonoperatively, even at high grade, with close observation and embolization for selected vascular findings such as active extravasation or pseudoaneurysm. Instability or failed nonoperative management prompts surgery.
- 2. B.** ARDS ventilation is based on predicted body weight, which reflects lung size, not actual body weight. Low tidal volumes around 6 mL/kg PBW reduce ventilator-induced lung injury; permissive hypercapnia is often accepted if needed to maintain protective pressures.

- 3. C.** Abdominal compartment syndrome is sustained intra-abdominal pressure above the pathologic threshold with new organ dysfunction. Initial medical measures may reduce pressure, but refractory ACS requires prompt surgical decompression.
- 4. A.** In septic shock with persistent hypoperfusion and cardiac dysfunction despite adequate arterial pressure, an inotrope such as dobutamine can improve forward flow. The vasopressor is generally continued because inotropy alone may worsen hypotension.
- 5. D.** Septic shock is a medical emergency. Empiric antimicrobial therapy should be started immediately while cultures and source-control planning proceed; treatment should not wait for definitive microbiology.
- 6. C.** This is tension pneumothorax causing obstructive shock. Decompression must occur immediately on clinical grounds and should not be delayed for imaging; definitive pleural drainage follows. Positive-pressure ventilation before decompression can worsen the hemodynamic collapse, and the unilateral absent breath sounds favor tension pneumothorax over tamponade.
- 7. C.** Cerebral perfusion pressure equals MAP minus ICP. Here, $82 - 24 = 58$ mm Hg. Management aims to avoid both intracranial hypertension and inadequate systemic pressure.
- 8. D.** Overdamping attenuates high-frequency components of the arterial waveform, lowering displayed systolic pressure and raising displayed diastolic pressure while MAP is often less affected. The tubing, flush system, catheter, and air bubbles should be checked.
- 9. C.** Moderate glucose control is preferred in most critically ill adults because very tight control increases dangerous hypoglycemia without improving outcomes. Insulin protocols should prioritize reliable monitoring and avoidance of both severe hyperglycemia and hypoglycemia.
- 10. E.** Seizure from severe symptomatic hyponatremia is an emergency treated with hypertonic saline boluses to achieve a small prompt sodium increase and stop life-threatening cerebral edema. Subsequent correction must be controlled to reduce osmotic demyelination risk.
- 11. B.** The starting estimate is $2 \text{ mL} \times 70 \text{ kg} \times 30 = 4,200 \text{ mL}$ over 24 hours. The formula is only a starting point; actual fluid is titrated to urine output and overall perfusion while avoiding fluid creep.
- 12. D.** For most stable critically ill adults, a restrictive red-cell strategy around a hemoglobin threshold of 7 g/dL is appropriate, with clinical context guiding exceptions such as active ischemia or ongoing hemorrhage.
- 13. C.** Pediatric septic shock resuscitation uses cautious isotonic boluses with repeated reassessment for perfusion and fluid overload. Vasoactive support should begin early when shock persists or further fluid is unsafe.

- 14. B.** Hyperacute rejection occurs within minutes to hours when preformed antibodies bind donor antigens, activate complement, and cause thrombosis and graft necrosis. It is prevented by compatibility testing and generally requires graft removal.
- 15. C.** Stable blunt hepatic injuries are commonly managed nonoperatively with close monitoring. Angioembolization is useful for active arterial bleeding, while surgery is reserved for hemodynamic instability, peritonitis, or failure of nonoperative care.
- 16. C.** Plateau pressure reflects alveolar pressure during an inspiratory hold and should generally remain below 30 cm H₂O in ARDS. Tidal volume may need to be reduced below 6 mL/kg PBW to achieve this goal.
- 17. A.** Early enteral nutrition is preferred in severe pancreatitis when feasible. It is associated with fewer infectious complications than routine parenteral nutrition and does not require waiting for enzyme normalization.
- 18. D.** Vasopressin is commonly added when norepinephrine requirements are escalating in septic shock. It raises vascular tone through a noncatecholamine pathway and can reduce norepinephrine exposure.
- 19. C.** Standardized handoff tools reduce omission of critical information by creating a consistent structure and allowing interactive clarification. Effective handoffs include illness severity, active problems, pending tasks, and contingency plans.
- 20. A.** Antibiotics cannot substitute for control of a surgically remediable source. Current sepsis guidance emphasizes rapid evaluation and early source control, generally as soon as medically and logistically practical.
- 21. B.** In uncontrolled hemorrhage without major TBI, permissive hypotension or limited resuscitation can reduce disruption of early clot formation while expediting definitive hemostasis. Large crystalloid loads and normalization of pressure before control can worsen bleeding and dilutional coagulopathy. TBI is an important exception because cerebral perfusion must be protected.
- 22. E.** Critical illness can cause rapidly changing volume of distribution and renal clearance, including augmented clearance or abrupt AKI. Therapeutic drug monitoring and repeated dose reassessment are important for narrow-therapeutic-index antimicrobials.
- 23. B.** When a patient's preferences are known, the surrogate should use substituted judgment and represent what the patient would choose. If preferences are truly unknown, a best-interest standard is generally used.
- 24. A.** Both mannitol and hypertonic saline can reduce ICP, but mannitol causes osmotic diuresis and may worsen hypotension. Hypertonic saline is often attractive when intracranial hypertension coexists with hemodynamic instability.

- 25. C.** Hard signs of major vascular or aerodigestive injury—such as active severe bleeding, expanding hematoma, shock, or major air leak—require urgent operative management rather than diagnostic delay.
- 26. C.** Prolonged prone positioning is recommended for severe ARDS and improves outcomes when combined with lung-protective ventilation. Routine prolonged recruitment maneuvers and high-frequency oscillation are not preferred, while inhaled pulmonary vasodilators are generally rescue therapies rather than mortality-reducing routine treatment.
- 27. D.** In most acute GI bleeding, a restrictive transfusion strategy around 7 g/dL is appropriate, with individualized thresholds for ischemia or ongoing shock. Resuscitation and timely endoscopic diagnosis and hemostasis proceed in parallel.
- 28. D.** A normal square-wave test has a brisk return with about one to two oscillations. Excessive ringing suggests underdamping, which can exaggerate systolic pressure and pulse pressure.
- 29. C.** Adrenal crisis causes vasodilatory shock, volume depletion, hyponatremia, hyperkalemia, and hypoglycemia. Treatment should not wait for confirmatory testing when suspicion is high; hydrocortisone and aggressive supportive care are required.
- 30. B.** High-risk chronic hyponatremia should be corrected conservatively. An unexpectedly rapid water diuresis can overshoot safe limits; desmopressin and electrolyte-free water may be used to halt or reverse overcorrection.
- 31. E.** Right ventricular infarction can be highly preload dependent. A cautious fluid challenge may improve output, whereas nitrates, diuresis, or excessive PEEP can reduce venous return and precipitate further hypotension.
- 32. C.** For typical adult thermal burns, urine output around 0.5 mL/kg/hour is a standard bedside resuscitation endpoint, interpreted with the rest of the clinical picture. Electrical injury with significant myoglobinuria may justify a higher target.
- 33. B.** Severe complicated intra-abdominal infection requires prompt coverage for enteric gram-negative organisms and anaerobes, with additional MDR or enterococcal coverage individualized to patient and institutional risk. Therapy is narrowed after microbiology and source control.
- 34. D.** Blunt diaphragmatic rupture, more commonly recognized on the left, can allow stomach or bowel to herniate into the chest. Definitive treatment is operative repair after stabilization of immediate threats.
- 35. B.** For moderate-to-severe ARDS, higher PEEP without prolonged recruitment maneuvers is conditionally supported. The balance between recruitment and overdistension must be individualized because excessive PEEP can impair venous return and right ventricular function.
- 36. B.** Suspected acute variceal hemorrhage is treated with resuscitation, early vasoactive therapy, prophylactic antibiotics, and urgent endoscopic therapy. Overtransfusion can increase portal pressure and should be avoided.

- 37. C.** Permissive hypotension is inappropriate in severe TBI because cerebral perfusion depends on adequate arterial pressure. Hypoxemia and hypotension are major preventable causes of secondary brain injury, so airway control and restoration of perfusion take priority while hemorrhage is treated.
- 38. E.** Early balanced component therapy during massive hemorrhage limits dilutional coagulopathy and approximates the composition of whole blood. Viscoelastic or laboratory data can then guide targeted hemostatic therapy.
- 39. D.** Dynamic LV outflow obstruction worsens with low preload, low afterload, and excessive contractility. Volume restoration, reduction of inotropes, vasoconstrictor support when needed, and cautious beta blockade can reduce the gradient.
- 40. A.** Propofol can reduce cerebral metabolic demand and facilitate ICP control, but hypotension and dose-related toxicities must be monitored. Modern evidence does not support an absolute prohibition of ketamine in TBI, but propofol is a commonly used titratable sedative in this setting.
- 41. A.** Large wedge V waves can occur when severe mitral regurgitation abruptly raises left atrial pressure during ventricular systole. The tracing should be interpreted with the clinical examination and echocardiography.
- 42. C.** Thyroid storm treatment blocks adrenergic effects, thyroid hormone synthesis, and hormone release while supporting organ dysfunction. Iodine is given after a thionamide so it does not provide substrate for new hormone synthesis.
- 43. C.** With hyperkalemic ECG changes, intravenous calcium is given immediately to stabilize myocardial excitability. Insulin with glucose and other shifting therapies follow, while definitive potassium removal is arranged when needed.
- 44. E.** Late-onset VAP with resistance risk requires empiric coverage guided by local antibiograms, often including MRSA and Pseudomonas-active therapy. Respiratory cultures allow subsequent narrowing; Candida from airway cultures usually represents colonization.
- 45. D.** Anti-impulse therapy reduces shear stress at the injured aorta while definitive management, commonly TEVAR for appropriate injuries, is arranged. Uncontrolled hypertension and tachycardia increase risk of progression or rupture.
- 46. B.** VV-ECMO can provide gas exchange in selected patients with severe potentially reversible ARDS that remains refractory to evidence-based conventional management. VA-ECMO is primarily used when circulatory support is also required.
- 47. E.** Acute mesenteric ischemia often presents with severe pain before peritoneal findings develop. CTA rapidly evaluates arterial and venous mesenteric circulation and should not be delayed when suspicion is high.

- 48. D.** In children, severe bradycardia commonly reflects hypoxemia. Airway position, tube patency, ventilation, and oxygen delivery should be checked immediately while resuscitation proceeds.
- 49. A.** Acute cellular rejection typically occurs days to months after transplant and is characterized by T-cell infiltration and tissue injury. Pulse corticosteroids are common first-line therapy, with escalation for steroid-resistant disease.
- 50. D.** Initial beta blockade reduces heart rate and the force of ventricular ejection, limiting dP/dt. A vasodilator can then be added if needed; giving vasodilator therapy first can provoke reflex tachycardia and increase aortic shear.
- 51. A.** Citrate in transfused blood products chelates ionized calcium, and clinically important hypocalcemia can cause hypotension, myocardial dysfunction, QT prolongation, and impaired coagulation. Calcium should be monitored and replaced during massive transfusion rather than waiting for total serum calcium.
- 52. A.** Electrical injury can cause extensive deep muscle necrosis despite limited skin findings, leading to rhabdomyolysis, hyperkalemia, compartment syndrome, and AKI. Cardiac and renal monitoring are important, and fluid is titrated to perfusion and pigment clearance.
- 53. D.** CLABSI prevention depends on reliable bundle implementation during insertion and maintenance, including daily removal of unnecessary lines. Routine prophylactic systemic antibiotics or scheduled guidewire exchanges are not standard prevention.
- 54. C.** A negative FAST in a shocked patient with an unstable pelvic fracture increases concern for retroperitoneal pelvic hemorrhage. Definitive control may involve preperitoneal packing, angioembolization, or complementary strategies depending on instability and institutional capability.
- 55. B.** Current ARDS guidance supports neuromuscular blockers selectively in early severe ARDS, particularly when dyssynchrony prevents lung-protective ventilation. They are not routine for mild disease and require adequate sedation and monitoring.
- 56. A.** Watershed colonic regions are vulnerable after systemic hypoperfusion. Ischemic colitis often affects the left colon and may improve with supportive care when there is no transmural necrosis; peritonitis or deterioration requires operative evaluation.
- 57. B.** *S aureus* catheter-related bloodstream infection carries substantial risk of persistent bacteremia and metastatic seeding. The infected catheter should generally be removed, repeat cultures obtained, and the patient evaluated for endocarditis or other secondary foci as indicated.
- 58. B.** High-risk TBI patients often receive short-course prophylaxis to reduce early seizures, generally during the first week. Prophylaxis has not been shown to prevent late post-traumatic epilepsy when continued routinely beyond that window.

- 59. E.** With arterial oxygen content and hemoglobin held constant, a low SvO₂ suggests oxygen delivery is low relative to consumption, commonly because cardiac output is reduced or metabolic demand is increased.
- 60. C.** Myxedema coma is severe decompensated hypothyroidism requiring IV thyroid hormone, empiric glucocorticoid coverage until adrenal insufficiency is excluded, and careful cardiorespiratory support. Passive rewarming is generally favored over aggressive peripheral warming.
- 61. A.** Hypomagnesemia can make hypokalemia refractory by increasing renal potassium loss and also increases arrhythmia risk. Magnesium replacement is therefore essential along with potassium repletion.
- 62. E.** Torsades de pointes in the setting of QT prolongation is treated acutely with intravenous magnesium, along with correction of precipitating factors. Unstable patients may also require immediate defibrillation.
- 63. B.** Fibrinogen is often the first coagulation substrate to fall critically during major hemorrhage. Cryoprecipitate or fibrinogen concentrate provides targeted replacement when functional or measured fibrinogen is low.
- 64. A.** A properly positioned pelvic binder reduces pelvic volume and can tamponade venous and cancellous bleeding. It should be centered at the greater trochanters, not the iliac crests, and repeated mechanical examination can disrupt clot formation.
- 65. B.** Open fractures require early systemic antibiotics, tetanus assessment, surgical debridement, and fracture stabilization. Antibiotic timing is important and should not wait for operative cultures.
- 66. C.** Severe airflow obstruction causes dynamic hyperinflation and intrinsic PEEP. Reducing respiratory rate, lowering minute ventilation, and increasing expiratory time reduces air trapping; permissive hypercapnia is often safer than aggressive ventilation.
- 67. A.** N-acetylcysteine replenishes glutathione and is standard therapy for acetaminophen toxicity, including established acute liver failure. Early transplant-center involvement is also important in severe hepatic failure.
- 68. C.** Fulminant *C. difficile* infection requires aggressive therapy with enteral vancomycin and IV metronidazole; rectal vancomycin can be added when ileus limits drug delivery. Early surgical consultation is essential for toxic megacolon, shock, or clinical deterioration.
- 69. D.** Bronchoscopy is the standard diagnostic tool for grading tracheobronchial inhalation injury. Airway edema may also require early intubation based on clinical signs before bronchoscopy is performed.
- 70. A.** For serious MRSA infection, AUC-guided vancomycin dosing is preferred to trough-only targeting because it better links exposure to efficacy while limiting nephrotoxicity. Critical illness often requires repeated pharmacokinetic reassessment.

- 71. E.** DNR addresses cardiopulmonary resuscitation after arrest; it does not automatically define the entire treatment plan. Other interventions should be aligned with the patient's goals through explicit discussion.
- 72. B.** Hemodynamic instability from a tachyarrhythmia requires immediate synchronized cardioversion. Pharmacologic maneuvers are appropriate when the patient remains stable enough to tolerate them.
- 73. D.** Convulsive status epilepticus requires immediate benzodiazepine therapy, followed promptly by a longer-acting antiseizure drug if seizures continue. Paralysis can hide motor activity without treating the underlying electrical seizure.
- 74. C.** Dynamic indices such as pulse-pressure variation are useful only under specific conditions, including regular rhythm and controlled positive-pressure ventilation. Spontaneous breathing, arrhythmias, low tidal volumes, open chest, and RV failure can make the result unreliable.
- 75. D.** Acute compartment syndrome is a clinical emergency; severe pain, pain with passive stretch, and tense compartments are early findings. Pulses may remain present until late, so treatment should not wait for vascular collapse.
- 76. B.** Severe dynamic hyperinflation can obstruct venous return and cause peri-arrest hypotension. Brief circuit disconnection permits exhalation of trapped gas while definitive ventilator changes reduce minute ventilation and prolong expiration.
- 77. A.** Lactulose reduces intestinal ammonia absorption and is first-line therapy for overt hepatic encephalopathy, often with rifaximin for recurrent disease. Identifying and treating the precipitating event is equally important.
- 78. D.** DKA causes total-body potassium depletion even when serum potassium is initially normal or high. When potassium is markedly low, insulin is delayed while potassium is replaced because insulin can drive potassium intracellularly and provoke fatal arrhythmias.
- 79. C.** Gastric acid loss produces chloride-responsive metabolic alkalosis with volume and potassium depletion. Isotonic chloride and potassium restore effective volume and permit renal bicarbonate excretion.
- 80. E.** Norepinephrine is the preferred first-line vasopressor for septic shock. Dopamine causes more arrhythmias, phenylephrine is not routine first-line therapy, and dobutamine is an inotrope used for selected low-output states after arterial pressure is supported.
- 81. B.** Necrotizing soft-tissue infection is a surgical emergency. Early aggressive debridement is the key life-saving intervention, accompanied by broad empiric antibiotics and resuscitation; imaging should not delay surgery when the clinical picture is compelling.

- 82. B.** Children generally require a higher urine-output target than adults during burn resuscitation, commonly about 1 mL/kg/hour. Maintenance fluid requirements and glucose needs also differ in smaller children.
- 83. A.** Chronic allograft dysfunction evolves over months to years through immune and nonimmune injury, producing vascular changes and interstitial fibrosis. Management focuses on modifiable causes and immunologic assessment, but established fibrosis is often irreversible.
- 84. C.** Neurogenic shock after high spinal cord injury results from loss of sympathetic vascular tone and unopposed vagal influence. The combination of hypotension with warm vasodilated skin and bradycardia is characteristic once bleeding and other shock states are excluded.
- 85. A.** Root-cause analysis examines how system design, communication, equipment, staffing, and safeguards contributed to an adverse event. The goal is durable risk reduction rather than simple attribution of blame.
- 86. B.** Crush injury and rhabdomyolysis release large amounts of intracellular potassium, which can cause lethal arrhythmias shortly after reperfusion. Cardiac stabilization and potassium-shifting/removal therapies should begin promptly when ECG changes occur.
- 87. C.** Peak pressure reflects airway resistance plus elastic pressure, whereas plateau pressure approximates alveolar pressure after flow stops. A high peak with preserved plateau pressure points toward increased resistance rather than low compliance.
- 88. D.** Acute colonic pseudo-obstruction (Ogilvie syndrome) can often be treated with neostigmine after supportive measures fail, with cardiac monitoring because bradycardia can occur. Colonoscopic decompression is an alternative when medication is contraindicated or ineffective.
- 89. B.** Tranexamic acid inhibits plasminogen activation and can reduce fibrinolysis when used early in appropriate bleeding trauma patients. Viscoelastic testing can help identify a hyperfibrinolytic phenotype.
- 90. D.** Cyanide poisoning can occur with enclosed-space smoke exposure and causes cellular hypoxia with severe lactic acidosis and shock. Hydroxocobalamin binds cyanide and is commonly used when clinical suspicion is high.
- 91. E.** Nimodipine is standard therapy after aneurysmal subarachnoid hemorrhage because it improves neurologic outcomes associated with delayed cerebral ischemia. Hypotension should be avoided because it can compromise cerebral perfusion.
- 92. A.** IVC size and respiratory variation are affected by breathing pattern, intrathoracic pressure, right-heart function, and abdominal pressure. They can contribute to assessment but should not be used alone as a universal fluid-responsiveness test.

- 93. E.** HHS is characterized by profound free-water and volume loss. Initial resuscitation focuses on circulation with isotonic fluid, followed by electrolyte-guided insulin and gradual correction of hyperosmolality.
- 94. B.** Large chloride loads from 0.9% saline can produce hyperchloremic non-anion-gap metabolic acidosis. Balanced crystalloids reduce chloride exposure and are often favored for large-volume resuscitation.
- 95. C.** Hemodynamic instability plus intraperitoneal free fluid after trauma is an indication for immediate operative hemorrhage control. CT is useful in stable patients but should not delay definitive treatment in ongoing shock.
- 96. D.** Candidemia is invasive infection, not colonization. Echinocandins are preferred initial therapy for many critically ill adults, with subsequent step-down based on species, susceptibility, clinical stability, and blood culture clearance.
- 97. C.** Papillary muscle rupture produces abrupt severe mitral regurgitation, pulmonary edema, shock, and prominent V waves in the pulmonary capillary wedge tracing. This is a mechanical emergency requiring rapid stabilization and surgical evaluation.
- 98. D.** Selected patients with flail chest or severe displaced rib fractures can benefit from surgical stabilization, especially when respiratory failure, deformity, or failure of nonoperative therapy is present. Current trauma guidance favors early fixation when feasible.
- 99. C.** The combination of sudden hypoxemia, hypotension, unilateral absent breath sounds, and rising airway pressure in a ventilated patient is classic for tension pneumothorax. Immediate decompression is required; imaging should not delay treatment.
- 100. E.** New systemic inflammatory signs and abdominal dysfunction several days after colorectal surgery should raise concern for anastomotic leak. CT can identify extraluminal gas, fluid collections, and alternative diagnoses and guide drainage or operative management.
- 101. B.** Massive initial chest-tube output with persistent shock suggests major intrathoracic vascular or pulmonary bleeding and is a classic indication for urgent thoracic operative control. Exact thresholds are contextual, but 1.5 L or more initially is highly concerning.
- 102. C.** In massive unilateral hemoptysis, the bleeding lung is placed down to reduce spillover into the nonbleeding lung. Airway protection and rapid localization and control of bleeding remain priorities.
- 103. C.** Stress-ulcer prophylaxis is targeted to ICU patients with meaningful bleeding risk, classically including prolonged mechanical ventilation and coagulopathy. Unnecessary acid suppression can increase medication burden and infectious complications.

- 104. A.** Massive pulmonary embolism creates an acute rise in pulmonary vascular resistance, elevates right-sided pressures, reduces left-sided filling, and lowers cardiac output. The hemodynamic profile distinguishes it from LV failure and hypovolemia.
- 105. E.** Invasive pulmonary aspergillosis requires prompt mold-active therapy in a compatible high-risk host. Voriconazole is a standard first-line option; fluconazole does not provide reliable *Aspergillus* coverage.
- 106. B.** Resuscitation should be judged by integrated perfusion endpoints. Trends in lactate, capillary refill, mental status, urine output, and hemodynamics are more informative than any single pressure measurement.
- 107. A.** Secondary spinal cord ischemia is worsened by hypotension. Hemodynamic support with adequate volume and vasopressors is used to maintain perfusion; routine high-dose methylprednisolone is not universally recommended and carries risk.
- 108. E.** ETCO₂ during CPR reflects pulmonary blood flow generated by compressions. A sudden sustained increase can be an early clue to return of spontaneous circulation before a pulse is confidently palpated.
- 109. D.** When the gut is functional and the patient is adequately resuscitated, early enteral nutrition is generally preferred. It supports gut integrity and avoids many catheter and metabolic complications of unnecessary parenteral nutrition.
- 110. B.** For lactic acidosis from septic hypoperfusion, source control and restoration of perfusion are primary. Routine bicarbonate does not improve hemodynamics in typical hypoperfusion-induced lactic acidemia, although selected patients with severe acidemia and significant AKI may differ.
- 111. A.** Standard pulse oximetry cannot distinguish oxyhemoglobin from carboxyhemoglobin and can appear falsely reassuring. High-concentration oxygen accelerates carbon monoxide elimination; hyperbaric therapy is considered for severe neurologic, cardiac, pregnancy, or high-level presentations.
- 112. C.** The timing, magnitude of platelet fall, and new thrombosis strongly suggest immune HIT. All heparin should be stopped and therapeutic non-heparin anticoagulation started unless contraindicated; platelet transfusion is not routine in the absence of major bleeding.
- 113. A.** As in adults, hypotension after pediatric TBI is strongly associated with worse outcome. Age-appropriate blood pressure and oxygenation must be preserved while the cause of shock is treated.
- 114. D.** Tacrolimus and cyclosporine can cause afferent arteriolar vasoconstriction and chronic nephrotoxicity, along with hypertension, hyperkalemia, and neurologic effects. Drug levels, interactions, and alternative causes of graft dysfunction must be assessed.
- 115. C.** Retained traumatic hemothorax increases the risk of empyema and fibrothorax. Early VATS effectively evacuates clot and restores lung expansion when tube drainage is inadequate.

- 116. E.** A large mucus plug causing lobar or lung collapse may require bronchoscopy when routine suctioning is ineffective. Restoring airway patency addresses the cause rather than simply increasing oxygen concentration.
- 117. D.** In an unstable high-risk patient, percutaneous gallbladder drainage can provide source control when immediate cholecystectomy is unsafe. Definitive operative management can be reconsidered after recovery.
- 118. A.** Norepinephrine can improve systemic pressure and right coronary perfusion while definitive reperfusion is pursued. Vasodilators that lower systemic pressure may worsen RV ischemia and collapse.
- 119. D.** PDSA cycles are designed for iterative local quality improvement: plan a change, test it, study the results, and adapt the next cycle. Clear process, balancing, and outcome measures help determine whether the change is beneficial.
- 120. B.** Acalculous cholecystitis occurs in critically ill, postoperative, trauma, and burn patients due to stasis and ischemia. In unstable patients, percutaneous cholecystostomy is often used for source control when immediate cholecystectomy is not appropriate.
- 121. E.** Progressive upper-airway edema after thermal injury can rapidly make intubation impossible. Clinical signs such as hoarseness, soot, facial burns, and worsening work of breathing justify early definitive airway control even before hypoxemia develops.
- 122. C.** Fentanyl is commonly favored when severe renal dysfunction makes accumulation of active opioid metabolites a concern. Morphine and meperidine have renally cleared metabolites that may accumulate, and long-acting enteral opioids are poorly suited to rapid titration in an unstable ventilated patient.
- 123. B.** In a true emergency, necessary treatment may proceed under implied consent when the patient lacks capacity and no authorized surrogate is available in time. Efforts to identify preferences and surrogates continue as soon as feasible.
- 124. B.** Polyuria with hypernatremia and inappropriately dilute urine after pituitary-region surgery is classic for central diabetes insipidus. Desmopressin and careful free-water replacement are used according to severity and ongoing losses.
- 125. C.** Free fluid without solid-organ injury plus a seat-belt sign and tenderness raises concern for bowel or mesenteric injury. These injuries can evolve, so serial examination, repeat imaging, or operative exploration may be required.
- 126. C.** Liberation requires both physiologic readiness to breathe with minimal support and the ability to protect the airway. A spontaneous breathing trial is central, but successful extubation also depends on mental status, cough, secretion burden, and airway patency.

- 127. A.** An infected obstructed urinary tract is a source-control emergency. Antibiotics alone are inadequate when infected urine cannot drain; decompression by stent or nephrostomy is required urgently.
- 128. E.** Sensitivity is the true-positive rate: among patients who truly have the disease, the fraction detected by the test. Positive and negative predictive values depend on disease prevalence, whereas sensitivity and specificity are test characteristics.
- 129. E.** Enteral nutrition should be used cautiously in uncontrolled shock because mesenteric perfusion may be inadequate. New distension, feeding intolerance, or rising lactate during escalating vasopressors requires reassessment and often temporary feed reduction or cessation.
- 130. D.** Refeeding raises insulin, driving phosphate, potassium, and magnesium into cells. Severe hypophosphatemia can impair diaphragmatic and myocardial function; prevention includes risk recognition, thiamine, cautious calorie advancement, and electrolyte monitoring.
- 131. E.** New ICU atrial fibrillation often reflects sepsis, catecholamine exposure, electrolyte disturbance, or volume stress. If the patient is not crashing, treatment includes correction of triggers and a titratable rate or rhythm strategy; synchronized cardioversion is reserved for clear hemodynamic instability attributable to the arrhythmia.
- 132. D.** Circumferential full-thickness eschar can become a noncompliant tourniquet as edema develops. Escharotomy restores tissue expansion and perfusion; delay until pulse loss risks irreversible ischemia.
- 133. A.** Severe cholangitis is infection behind an obstructed biliary system. Antibiotics and resuscitation are essential, but definitive source control requires prompt drainage, most often by ERCP.
- 134. D.** Damage-control surgery abbreviates the first operation in physiologically exhausted patients. Hemorrhage and contamination are controlled, the abdomen is temporarily closed, and definitive reconstruction follows after correction of hypothermia, acidosis, and coagulopathy.
- 135. E.** The P/F ratio is PaO_2 divided by FiO_2 expressed as a decimal: $60/0.60 = 100$. In the ARDS framework, a ratio at or below 100 with sufficient PEEP indicates severe hypoxemia severity.
- 136. D.** Blood at the meatus after pelvic trauma is a classic sign of urethral injury. Retrograde urethrography is performed before transurethral catheter placement; suprapubic drainage is used when appropriate.
- 137. B.** Hemorrhage, hypothermia, acidosis, and coagulopathy reinforce one another. Damage-control resuscitation prioritizes rapid hemostasis, warmed blood products, calcium and coagulation support, and active prevention of hypothermia rather than large crystalloid loads or delayed source control.
- 138. D.** Disseminated intravascular coagulation is driven by the underlying illness. Source control and treatment of sepsis are primary, with platelets, plasma, fibrinogen, or anticoagulation used selectively according to bleeding, thrombosis, and procedural needs.

- 139. B.** Tamponade limits diastolic filling and makes cardiac output highly preload dependent. High intrathoracic pressure and excessive PEEP reduce venous return and can precipitate cardiovascular collapse before decompression.
- 140. C.** Cerebral salt wasting and SIADH can both produce hyponatremia with urine sodium elevation, but the key distinction is volume status. Cerebral salt wasting causes true sodium loss and hypovolemia and is treated with volume and sodium replacement.
- 141. E.** The absolute risk reduction is $0.20 - 0.15 = 0.05$. NNT is $1/0.05 = 20$. Relative risk reduction describes proportional change but is not used directly to calculate NNT.
- 142. C.** Indirect calorimetry is the reference method for estimating energy expenditure in critically ill patients when feasible. Predictive equations can be inaccurate during dynamic critical illness.
- 143. D.** Clinically significant ionized hypocalcemia during massive transfusion results from citrate binding and contributes to cardiovascular dysfunction and coagulopathy. Intravenous calcium should be replaced based on clinical and ionized calcium monitoring.
- 144. E.** Once the source is controlled and microbiology is available, antimicrobial therapy should be de-escalated to reduce toxicity, resistance, and collateral damage. Modern sepsis guidance also favors shorter courses when adequate source control has been achieved.
- 145. A.** Selected stable patients without peritonitis can undergo selective nonoperative management of penetrating abdominal trauma when reliable serial examination and diagnostic resources are available. Deterioration or peritoneal signs mandate exploration.
- 146. D.** VV-ECMO supports oxygenation and carbon dioxide removal when cardiac function is adequate. VA-ECMO returns blood to the arterial circulation and provides both respiratory and hemodynamic support.
- 147. E.** Early isotonic fluid is the foundation of rhabdomyolysis management when not contraindicated. Hyperkalemia requires urgent treatment, while routine bicarbonate or mannitol is not universally required and dialysis is based on standard clinical indications.
- 148. C.** High-flow nasal cannula can reduce work of breathing and improve oxygenation in selected children with bronchiolitis. Progressive fatigue, apnea, or failure of oxygenation still requires timely escalation to invasive ventilation.
- 149. C.** CMV can cause systemic and tissue-invasive disease after transplantation, particularly during periods of intense immunosuppression. Treatment commonly uses ganciclovir or valganciclovir with adjustment of immunosuppression as clinically appropriate.
- 150. E.** The balloon inflates during diastole to augment aortic diastolic pressure and coronary perfusion, then deflates just before systole to reduce afterload. It provides counterpulsation rather than direct blood pumping or gas exchange.

- 151. A.** Tranexamic acid provides its trauma benefit when given early, with treatment generally limited to the first 3 hours after injury. Waiting for massive transfusion thresholds or conventional laboratory confirmation can miss the useful treatment window.
- 152. A.** A circumferential thoracic eschar can mechanically restrict ventilation. Escharotomy of the chest wall can restore compliance when rising pressures and poor excursion reflect external constriction.
- 153. B.** Crisis triage should use predefined, transparent, equitable criteria focused on clinical benefit and should include reassessment as new information emerges. Arbitrary social worth or inconsistent hidden rules undermine fairness and trust.
- 154. B.** Many high-grade renal injuries can be managed nonoperatively in stable patients. Urinary extravasation often resolves, while persistent urinoma, infection, obstruction, or active vascular bleeding may require stenting, drainage, or angioembolization.
- 155. D.** A sentinel tracheostomy bleed followed by brisk hemorrhage is a tracheo-innominate fistula until proven otherwise. Temporizing maneuvers include cuff hyperinflation and digital compression while mobilizing immediate surgical control.
- 156. C.** Postrenal obstruction must be excluded promptly in new oliguria or anuria. A large bladder volume indicates retention and should be relieved before pursuing more complex intrinsic renal diagnoses.
- 157. E.** Procalcitonin should not replace clinical judgment for diagnosing sepsis, but serial values can be used with clinical assessment to support antimicrobial discontinuation when duration is uncertain after adequate source control.
- 158. A.** ICU delirium management emphasizes identification of causes, nonpharmacologic prevention and treatment, sleep promotion, mobility, and minimizing unnecessary sedatives, especially benzodiazepines. Antipsychotics are not proven routine disease-modifying therapy for all delirium.
- 159. B.** For a ratio measure, a confidence interval that includes 1 does not exclude no effect at the conventional two-sided 0.05 level. The point estimate may still be clinically interesting, but statistical and clinical uncertainty remain.
- 160. B.** High-risk patients should receive thiamine and careful electrolyte correction before and during cautious calorie advancement. Refeeding can rapidly produce hypophosphatemia, hypokalemia, hypomagnesemia, fluid retention, and cardiac or respiratory failure.
- 161. D.** Renal replacement is indicated for refractory hyperkalemia, severe acid-base disturbance, volume overload, or uremic complications rather than at a particular creatinine threshold. The clinical consequences of AKI drive the decision.

- 162. D.** A low mixed or central venous oxygen saturation generally reflects increased extraction because oxygen delivery is inadequate relative to demand. Causes include low cardiac output, anemia, hypoxemia, or increased metabolic demand.
- 163. A.** Life-threatening warfarin-associated bleeding requires rapid factor replacement with four-factor PCC plus vitamin K for sustained reversal. Vitamin K alone acts too slowly for an intracranial emergency.
- 164. E.** Traumatic tamponade from a penetrating cardiac wound requires urgent operative decompression and repair. Pericardiocentesis may be a temporizing maneuver in selected circumstances but does not provide definitive control of ongoing traumatic bleeding.
- 165. C.** Angioembolization is an important adjunct to nonoperative management for selected stable splenic injuries with vascular blush, pseudoaneurysm, or high-grade injury. It can control arterial bleeding while preserving splenic function.
- 166. B.** Driving pressure is plateau pressure minus total PEEP. Here, $27 - 12 = 15$ cm H₂O. It reflects the pressure applied across the respiratory system to deliver the tidal volume.
- 167. C.** Uterine atony is the most common cause of postpartum hemorrhage and presents with a boggy enlarged uterus. Immediate management includes massage, oxytocin, resuscitation, and escalation to additional uterotonics or procedural control as needed.
- 168. E.** Purulent surgical-site infection requires source control by opening and drainage. Antibiotics are added for systemic illness, surrounding cellulitis, immunocompromise, or other appropriate indications.
- 169. A.** Early excision and grafting of deep burns removes devitalized tissue, reduces inflammatory and infectious burden, and accelerates wound closure. Timing is individualized to physiology and available donor sites.
- 170. C.** Dexmedetomidine is an alpha-2 agonist that allows relatively interactive sedation with little direct respiratory depression. Bradycardia and hypotension are the clinically important dose-related adverse effects.
- 171. C.** Ethically, there is no categorical distinction between not starting and stopping a life-sustaining treatment when it no longer aligns with informed patient goals. Good practice includes symptom control, clear communication, and support for family and staff.
- 172. A.** A pressure target does not guarantee adequate flow or tissue perfusion. Echocardiographic findings and the overall clinical context may identify persistent preload deficiency, but dynamic assessment and repeated reassessment are needed before further fluids.
- 173. D.** Dexmedetomidine provides cooperative sedation with little direct respiratory depression, which can be useful around ventilator liberation. Bradycardia and hypotension are important adverse effects, and sedation should remain goal directed.

- 174. A.** Conventional pulse oximetry can misread carboxyhemoglobin as oxyhemoglobin and appear normal. Co-oximetry directly measures different hemoglobin species and is needed for diagnosis.
- 175. D.** Peritonitis and free intraperitoneal air after blunt trauma strongly indicate hollow-viscus perforation. Operative exploration and control of contamination should not be delayed for additional diagnostic procedures.
- 176. D.** Noninvasive positive pressure can rapidly improve oxygenation and reduce work of breathing in acute cardiogenic pulmonary edema while also decreasing preload and afterload. It requires an awake cooperative patient without immediate need for airway protection.
- 177. C.** Magnesium sulfate is first-line treatment and seizure prophylaxis for eclampsia. Severe hypertension also requires prompt treatment, and obstetric management proceeds once the mother is stabilized.
- 178. E.** Propofol is delivered in a lipid emulsion and contributes meaningful nonprotein calories. Ignoring that energy can lead to overfeeding, especially during prolonged high-dose infusion.
- 179. D.** Chronic hyponatremia produces cerebral adaptation, so overly rapid correction can cause cerebral edema. Free-water replacement should be calculated, delivered gradually, and adjusted to serial sodium measurements.
- 180. B.** Shock index is heart rate divided by systolic blood pressure; a value greater than 1 in this context supports significant hemodynamic stress and should heighten concern for occult hemorrhage. It complements rather than replaces the overall examination and response to resuscitation.
- 181. B.** Empiric therapy in severe sepsis should be individualized to the likely source and MDR risk. Prior microbiology, recent antimicrobial exposure, local antibiograms, and illness severity are key inputs, followed by de-escalation when susceptibilities return.
- 182. D.** Persistent pediatric septic shock after appropriate fluid requires early vasoactive therapy. Epinephrine or norepinephrine is selected according to physiology; vasoactive infusion can be started through carefully monitored peripheral access when central access would delay treatment.
- 183. C.** Severe trauma and sepsis can produce both hyperinflammation and a later or concurrent immunosuppressive phenotype, including lymphocyte apoptosis and impaired antigen presentation. This helps explain vulnerability to secondary and opportunistic infections during prolonged critical illness.
- 184. E.** For septic shock with inadequate MAP despite norepinephrine and vasopressin, epinephrine is a reasonable additional vasopressor. Ongoing management also requires reassessment of volume status, source control, and myocardial function.
- 185. A.** Quality improvement begins with reliable event measurement and analysis of contributing factors such as sedation targets, delirium, staffing, securement, mobility, and communication. Targeted interventions should then be tested while monitoring unintended consequences.

186. B. For many significant blunt thoracic aortic injuries, TEVAR has become preferred over open repair because it reduces physiologic stress. Anti-impulse therapy is used while coordinating repair when no competing injury dictates immediate intervention.

187. C. Permissive hypercapnia is often accepted when needed to maintain lung-protective tidal volumes and pressures, provided severe contraindications are absent and pH remains tolerable. Normalizing PaCO₂ is less important than avoiding ventilator-induced lung injury.

188. E. In late pregnancy, the gravid uterus can compress the inferior vena cava and aorta when supine, reducing venous return and uteroplacental perfusion. Left uterine displacement or left lateral tilt relieves this mechanical effect during resuscitation.

189. B. Apixaban is a direct factor Xa inhibitor. Andexanet alfa is a specific reversal agent in selected life-threatening bleeding, while PCC-based strategies are used in many protocols when specific reversal is unavailable or unsuitable. Idarucizumab reverses dabigatran, not factor Xa inhibitors.

190. B. Rapid controlled water-bath rewarming is the initial treatment for frostbite when refreezing will not occur. Rubbing and excessive direct heat cause additional tissue injury; analgesia is essential because thawing is painful.

191. E. Brain-death determination requires a known irreversible cause and exclusion of reversible confounders such as hypothermia, drug intoxication, paralysis, or major metabolic derangement. The neurologic examination and apnea testing are performed only after prerequisites are met.

192. C. A p value is the probability of obtaining data at least as extreme as observed if the null hypothesis and model assumptions are true. It is not the probability that the hypothesis is true and does not measure clinical importance.

193. D. Propofol infusion syndrome is a rare but life-threatening complication associated with high doses and prolonged exposure, characterized by metabolic acidosis, rhabdomyolysis, hyperkalemia, cardiac dysfunction, and renal failure. The drug must be stopped immediately.

194. C. Diuretics can convert oliguria to nonoliguria and help manage fluid overload, but they do not repair acute tubular injury or guarantee improved filtration. Renal function, electrolytes, and clinical indications for RRT must still be followed.

195. B. Viscoelastic assays provide rapid functional information about clot initiation, strength, fibrinogen contribution, and fibrinolysis. They can help transition from empiric balanced resuscitation to targeted hemostatic therapy during ongoing hemorrhage.

196. C. Candida is commonly recovered from respiratory secretions in intubated patients and usually reflects colonization. Antifungal therapy should be based on evidence of invasive candidiasis rather than airway culture alone.

197. C. Classic LV cardiogenic shock produces low output, high wedge pressure from pulmonary venous congestion, and compensatory vasoconstriction with increased systemic vascular resistance. Mixed shock states can occur, but this is the typical profile.

198. D. Neurologic deterioration after trauma is an emergency and can reflect evolving hemorrhage, edema, hydrocephalus, or other intracranial complications. Immediate reassessment and repeat imaging are warranted rather than attributing the change to medications without evaluation.

199. E. PEEP can recruit lung but can also overdistend alveoli, raise pulmonary vascular resistance, and reduce venous return. Worsening RV function and hypotension without oxygenation benefit indicate that the higher setting is harmful.

200. A. When infected pancreatic necrosis can be managed without emergency surgery, a step-up approach allows the collection to mature and begins with drainage, escalating to minimally invasive debridement if needed. Immediate open necrosectomy carries substantial morbidity.