



THE AMERICAN BOARD OF ANESTHESIOLOGY
Advancing the Highest Standards of the Practice of Anesthesiology

Practice Standardized Oral Exam Questions

SOE PRACTICE QUESTIONS

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ABA PRACTICE EXAMS

Practice Exam 1, Session 1

A 74 y.o., 80-kg, 5'11" man presents for a left carotid endarterectomy.

- HPI:** The patient has had 3 transient ischemic attacks in the last month.
- PMH:** He had a myocardial infarction 3 years ago. Stents were placed in 3 coronary arteries, and his left ventricle ejection fraction was 40% at that time. He has had no angina since placement of the stents. He has had insulin-dependent diabetes mellitus for the past 10 years and gastroesophageal reflux disease treated by making dietary changes.
- MEDS:** NPH insulin 30 units each A.M., 20 units each P.M. Regular insulin as needed.
Atenolol 30 mg each A.M.
Simvastatin 40 mg orally before bed.
Aspirin 81 mg each day.
- PHYS EXAM:** BP 160/80; HR 52; T 36.5°C; RR 16.
HEENT: neck supple, full range of motion; IV/VI bilateral bruits; good mouth opening; Mallampati 1.
Heart: S1, S2, S4, no rubs or murmurs.
Lungs: bilateral basilar rales.
- CAROTID**
- ANGIOGRAM:** Left carotid: 90% stenotic lesion with plaque ulceration.
Right carotid: 85% stenotic lesion. Basilar system without plaques. Incomplete circle of Willis noted.
- ECHO:** Echocardiogram the day prior to surgery: left ventricle ejection fraction 40% with inferior and anterior hypokinesis and paradoxical septal motion. Trace tricuspid regurgitation; otherwise, no valvular pathology present.
- CXR:** Good lung expansion, prominent Kerley B lines.
- LABS:** Hgb 14.0 g/dL; Na⁺ 140 mEq/L; K⁺ 4.5 mEq/L; fasting blood glucose 150 mg/dL.

The patient is on the OR table and extremely anxious. Standard ASA monitors, 2 16-gauge IVs, and a right radial arterial catheter are in place.

Practice Exam 1, Session 1 - Continued

A. INTRAOPERATIVE MANAGEMENT

1. **Monitoring:** Should this pt be monitored with an EEG intraop? Why? If so, is a processed EEG adequate? Why? Does anesthetic technique (Reg Anesth vs. GA) influence your choice? Why? Do monitoring requirements change if the surgeon is placing an endovascular carotid stent as opposed to an open procedure? Why?
2. **Anesthetic plan:** Does the incomplete circle of Willis affect your anesthetic plan? If so, how? If pt refuses GA, what Reg Anesth technique would you use? Why? Is there a need for both superficial and deep cervical plexus blocks? Explain. Landmarks for each? Your choice for local anesthetic? Why? Should epinephrine be included? Why?
3. **Insufficient cerebral perfusion:** What would be your intraop BP goals? Why? Surgeon clamps the carotid artery and the pt's speech slurs. Significance? Assume BP 90/50. How would you Rx insufficient cerebral perfusion? If BP is increased to 160/80 with no improvement in speech, what would you do? Should BP be increased further? Concerns? Should clamp be removed? Surgeon decides to use a shunt. Does this change your BP mgmt? If so, how?
4. **Heparin reversal:** (Assume cerebral perfusion issue is adequately addressed and surgery proceeds uneventfully.) Pt rec'd 5,000 u of heparin 5 min prior to cross-clamp. Carotid artery now closed and the surgeon requests protamine. Appropriate? Why? How much? ACT 155 after protamine. Is more protamine necessary? How would you decide? If pt's BP falls to 80/50 with protamine administration, what would you do? Fluids vs. pressors? Which? Why? Assume no BP response to first therapy. What would you do next? Why?

B. POSTOPERATIVE CARE

1. **Bleeding:** (Assume BP returns to baseline and pt extubated uneventfully.) Upon arrival in the PACU, the dressing is soaked with blood. 10 mins later, his neck is noticeably enlarged. Of concern? Should plts be given? FFP? Why? Assume pt develops respiratory distress. How would you determine if pt should be re-intubated? How would you determine if neck incision should be re-opened? Assume re-intubation attempted at bedside with surgeon present. Laryngoscopy reveals swollen tissues and no visible glottic opening. Your plan? SpO₂ falls to 90%. What would you do? SpO₂ continues to fall despite intervention. What would you do next?
2. **Ventilation:** Assume intubation successful. Pt arrives in the ICU after surgical neck re-exploration asleep and intubated. Ventilator settings? Assist-control vs. SIMV vs. pressure support? Why? Is PEEP necessary? Why? Would your ventilator weaning strategy be different for this pt than it would be for a pt who had no airway issues? Explain.
3. **Stroke:** After extubation, the pt is noted to have right-sided weakness. Is add'l evaluation necessary? If so, what? Head CT? MRI? Carotid Doppler? Carotid angiogram? Other diagnostic tests? Assume imaging suggests ischemic stroke. What are the Rx options? Embolectomy? Thrombolytics? Antiplatelet agents? Would the ischemic stroke impact your BP goals for this pt? Why? What would you tell the family about the long-term prognosis?
4. **Hyperglycemia:** 2 hrs later, the pt's blood glucose is 310. Rx? Insulin infusion? Sliding scale insulin? How would you decide? Would you evaluate electrolytes prior to insulin administration? Why? Which electrolytes would you be most concerned about? What would your target blood glucose be? Why?
5. **Oliguria:** Assume blood glucose is lowered to goal range. 3 hrs later, UO has fallen to less than 0.5 mL/kg/hr. How would you evaluate the etiology? Assume ultrasound reveals an inferior vena cava diameter of 15 mm with more than 50% respirophasic variation. What does this finding imply about the etiology of the oliguria? Would you request add'l diagnostic tests? Which? Why? How would you Rx the oliguria?
6. **Complications of arterial line:** POD#2. Pt's right thumb is dusky. DDX? Could this have been caused by the arterial line? Rx? Vasodilator? Is a nerve block appropriate? Other intervention appropriate? Which? Why? After stellate ganglion block, the pt is SOB. What is the most likely etiology of the SOB? How would you differentiate between pneumothorax and impact of stellate ganglion block on phrenic nerve? Assuming no pneumothorax, how would you Rx SOB?

C. ADDITIONAL TOPICS

1. **Neuroanesthesia:** A 45 y.o. woman is receiving an opioid/isoflurane anesthetic during a craniotomy for resection of a parietal glioma. The surgeon comments that the dura is "tight." Likely cause? If brain swelling, how would you Rx? Diuretic? If so, furosemide? Mannitol? Why? If K⁺ were 3.1 mEq/L, would you replace K⁺ prior to administering diuretic? Would you administer steroid? Which? Why? Would hyperventilation be appropriate with K⁺ 3.1 mEq/L? Why/why not? Other options for Rx of brain swelling?
2. **Amniotic fluid embolism:** A 39 y.o., G4P3 woman having a cesarean delivery under a spinal anesthetic c/o light-headedness and extreme SOB a few mins after delivery. DDX? (High subarachnoid block vs. venous air embolism vs. amniotic fluid embolism?) Is there a definitive way to diagnose amniotic fluid embolism? Is end-tidal CO₂ helpful? If amniotic fluid embolism, mgmt? SpO₂ decreases to 82%. Is intubation required? Administer a sedative/hypnotic before intubation? If so, which? Muscle relaxant? Which? With intubation, cardiac arrest ensues. Mgmt?

3. **Autism:** A 14 y.o., 75-kg autistic boy presents for extensive dental restorations. He is uncooperative with any exam. Oral midazolam? Ketamine? Which? Why? He refuses to take the oral premed. IM ketamine? Mother states that she might be able to help if she were present at induction. Would you permit this? If yes, any special precautions? If no, why not? How would you induce anesthesia? Inhalation induction appropriate? Your choice? Why?

Practice Exam 1, Session 2

A 38 y.o., 150-kg, 5'6" man is scheduled at 10:00 A.M. for elective arthroscopic repair of a left rotator cuff tear. Past medical history is significant for a 70 pack-year smoking history (quit 1 month ago). He is physically active and denies angina. Allergic to penicillin. Meds are oxycodone as needed and ibuprofen. HR 78; BP 150/95; RR 16; T 37°C. ECG: normal sinus rhythm with Q-waves in II, III, and aVF and non-specific ST-T wave changes.

A. PREOPERATIVE EVALUATION

1. **Obesity, airway evaluation:** Are the predictors of a difficult intubation the same as the predictors of a difficult mask airway? What are the predictors of a difficult intubation? If the pt snores during sleep, how would this finding impact your mgmt of the pt during the perioperative period? If he has sleep apnea, what criteria would you use to gauge the severity? Assume the pt has severe sleep apnea. What would you tell him about his perioperative risk based upon this finding?
2. **Cardiac evaluation:** Assume a cardiologist "cleared the pt" for surgery. Would you request add'l information? What information? What cardiovascular testing would you consider absolutely necessary for this pt before surgery? How would the results of this testing impact your anesthetic plan? If the pt were found to have left ventricle hypertrophy with diastolic dysfunction by echocardiogram, what implications would those findings have upon your hemodynamic management?
3. **Pulmonary status:** Based upon smoking hx, what would you tell pt regarding pulmonary risk? Would you expect pulmonary function to be better on the day of surgery if he quit smoking 3 days before surgery? Why? Would you request a preop CXR for this pt? Why? Request an ABG? Why? If yes, how might results alter your mgmt? Request PFTs? If so, which? Why?
4. **Premedication:** Should this pt receive GI/aspiration prophylaxis? Why? If so, what would you administer? Assume the pt had a history of PONV. Would preoperative administration of ondansetron reduce his risk of PONV? Is multi-modal Rx likely to be more effective than single agent Rx? Why? Which agents would you administer and when?

B. INTRAOPERATIVE MANAGEMENT (*Standard monitors and V5-lead ECG in place.*)

1. **Allergic reaction:** Cefazolin 1 gm is administered in holding area. Shortly after administration, pt c/o itching. Rx necessary? Diphenhydramine? Steroid? Other medication? Despite Rx, he begins to experience shortness of breath. SpO₂ on 2 L O₂ via NC 98%. However, BP decreases to 80/40; HR 120. How would you Rx?
2. **Choice of Reg Anesth/GA:** (*Assume BP improves after Rx and symptoms resolve; decision is made to proceed with the surgery.*) Pt requests Reg Anesth. Agree? Why? If Reg Anesth, which block? Is an interscalene block alone adequate for this surgery? Explain. Alternatives to interscalene block? Risks vs. benefits of block compared to GA? If interscalene block, how would you place it? Is ultrasound necessary? Which local anesthetic would you use? Why? Add epinephrine? HCO₃? Fentanyl? Would you place a catheter to allow for repeated dosing of the local anesthetic in the case of a prolonged surgery?
3. **Mgmt of failed interscalene block:** 25 min after block placed, pt has pain with incision. What would you do? No relief with IV fentanyl. Ketamine appropriate? Why? Assume decision is made to convert to GA. RSI necessary? Why? During intubation, gastric contents noted around the glottic opening. How would you manage this issue? Bronchoscopy indicated after intubation? Lavage necessary? CXR warranted? How would you decide if it is appropriate to proceed with surgery?
4. **Ventricular ectopy:** Assume pulmonary status is stable and decision is made to proceed with case. During emergence, pt develops multifocal PVCs. DDX? Evaluation? Check electrolytes? Which? Assume BP 180/104. Rx? Amiodarone? Lidocaine? Other medication(s)? While treating, pt develops Vtach. How would the mgmt differ if BP were 70/30 vs. 110/70? If no response to initial therapy, what next?
5. **Prolonged emergence:** Assume sinus rhythm and stable blood pressure achieved after 10 minutes of resuscitation. 20 min later, pt remains unresponsive. DDX? Evaluation? TOF monitor? CT scan? EEG? Other studies? Surgeon tells the pt's family that there was an anesthesia complication. What would you tell them? Would you notify risk management? Why?
6. **Ulnar nerve injury:** Pt regains consciousness in the ICU. After extubation, he c/o left arm numbness. Surgeon thinks it might be related to regional anesthetic. Your response? Evaluation? How could you determine if related to surgery, positioning, or regional block? EMGs helpful? What would they tell you? Assume ulnar neuropathy. What would you tell the pt? Time course for resolution of the neuropathy? Pt asks if this could have been prevented. Your response?

C. ADDITIONAL TOPICS

1. **Pediatric caudal:** An 11 m.o., 8-kg boy is having a hypospadias repair as an outpt. Urologist requests caudal for postop analgesia. Your response? Would you place the block after induction? Prior to emergence? Why? Landmarks for placement of block? Is it reasonable to use bupivacaine 0.25%, 0.7 mL/kg with clonidine 1.5 mcg/kg? Explain. Add epinephrine? Your choice? Why? What guidelines would you give to parents for post-discharge mgmt?
2. **Hypertrophic obstructive cardiomyopathy:** A 50 y.o. man with hypertrophic obstructive cardiomyopathy presents for knee arthroscopy as an outpt. Hemodynamic goals during anesthetic? Propofol an appropriate choice? Why? What about Reg Anesth? Spinal or epidural? Are they contraindicated? How would you manage hypotension after spinal or epidural? Peripheral block preferable? If so, which? Assume pt is in PACU after uneventful GA and coughing up frothy secretions (SpO₂ 92% with 40% O₂ via mask). How would you identify cause? Rx?
3. **Substance abuse:** A 60 y.o., 50-kg man with unexplained weight loss and anemia (Hct 27) presents for panendoscopy. Long hx of crack cocaine abuse. Limited exercise tolerance due to chronic heart failure. Is special monitoring needed for the procedure? GA or MAC? Defend choice. Assume he has moderately severe pulmonary hypertension. Anesthetic implications? Colleague suggests using dexmedetomidine for IV sedation. Agree? Your preference? Why?

Practice Exam 2, Session 1

A 68 y.o., 85-kg, 5'2" woman is scheduled for clipping of an aneurysm of the right middle cerebral artery.

HPI: The patient has a 3-week history of nausea, vomiting, and headaches. Diagnosis of an intracranial aneurysm was made the previous day by CT angiogram.

PMH: She has a history of hypothyroidism and gastroesophageal reflux disease.
She has no symptoms related to the cardiovascular system.
She has no known drug allergies.

MEDS: Omeprazole, levothyroxine, and phenytoin (Dilantin®).

PHYS EXAM: BP 148/97; HR 118; RR 16.

Airway exam reveals an edentulous class I airway and no restriction of neck movement.
Heart and lung sounds are normal.

CXR: Normal.

ECG: Sinus tachycardia, occasional premature ventricular contractions.

LABS: Hct 35%; Na⁺ 132 mEq/L; K⁺ 4.1 mEq/L; BUN 19 mg/dL; creatinine 0.9 mg/dL.

On arrival in the preoperative holding area, the patient is alert, oriented, and very anxious. A right-sided radial artery catheter and a 16-gauge peripheral IV catheter are in place.

Practice Exam 2, Session 1 - Continued

A. INTRAOPERATIVE MANAGEMENT

1. **Induction:** Is administration of midazolam appropriate for her anxiety? Is aspiration prophylaxis indicated? Why? If yes, sodium citrate, famotidine, and/or metoclopramide? Why? What are your hemodynamic goals for the induction and maintenance of anesthesia? Are propofol and rocuronium appropriate for induction? Would you administer other agents? Fentanyl, lidocaine, midazolam? Which? Why? During induction, pt's BP falls to 80/40. Rx necessary? Why/why not? If so, with what?
2. **Diuresis:** Surgeon requests that as soon as the pt is intubated, you begin mannitol, 1 g/kg, and give 10 mg furosemide. Would you agree? Why? When is the optimal time to administer these meds? Why? Surgeon requests placement of a lumbar CSF drain. Would you agree? Why? Concerns in this pt?
3. **Hypertension:** As the bone flap is being removed, pt's BP increases to 200/110. Rx necessary? With what? If deepen anesthesia: IV or inhalational agents? Why? If vasoactive Rx: beta blocker? Vasodilator? Which? Why? Different approach if HR were 50? 120? Pt's BP does not respond to first Rx. What would you do next? Why?
4. **Temporary clipping:** Surgeon plans to use a temporary clip. How would this impact anesthetic mgmt? BP mgmt while the clip is in place? Should you provide cerebral protection? Why/why not? If so, how? Should brain function be monitored during temporary clipping? How? SSEP? MEP? EEG? Which? Why? Aneurysm ruptures before temporary clip. BP 80/50; HR 100. Surgeon says she cannot see. How would you manage this situation? Why?

B. POSTOPERATIVE CARE

1. **Decreased compliance/low SpO₂:** Pt is admitted to the ICU postop intubated and sedated. 4 hrs later, peak airway pressures begin to increase and SpO₂ declines to 92%. FiO₂ is 0.6. How would you determine cause? Exam reveals decreased breath sounds in the right lower lobe. Next steps? Why? CXR confirms right lower lobe infiltrate. How would you Rx? Initiate antibiotics? Which? Why? Bronchoscopy? Other Rx? How would you improve oxygenation? Increase FiO₂? Add PEEP? Change to different mode of ventilation? Which? Why?
2. **Decreased UO:** 8 hrs after admission to ICU, pt's UO has decreased to 5 mL/hr. BP 120/70; HR 110 reg. DDx? How would you determine the etiology? Rx? Add'l mannitol? IV fluids? If so, which? Crystalloid? LR or NS? Colloid? Goals for Rx? Why?
3. **Unexplained somnolence:** POD#2. Pt is extubated and awake but remains somnolent. DDx? How would you evaluate? If you suspected vasospasm, would Doppler blood flow velocity measurements or CT angiogram be a better initial test? Why? If vasospasm, how would you Rx? IV saline administration? How much? Systemic vasopressor? Which? Why? IV nimodipine? Why? Intra-arterial nicardipine? Why? Cerebral angioplasty?
4. **Metabolic acidosis:** An ABG demonstrates pH 7.29; PaCO₂ 37; PaO₂ 212. Interpret. Of concern? Likely etiology? Could this be due to saline administration intra- and postop? How? Add'l labs required? Is Rx necessary? Necessary with pH 7.20? Why? How would you Rx? Concerns with doing so?
5. **Jaundice:** Pt develops scleral icterus on POD#2. Could this be due to the anesthetic? Why? How could anesthesia be ruled out as a cause? Other possible causes? What lab tests would you order? Why?
6. **Hoarseness:** On POD#4, pt's mental status is improved. However, she notes hoarseness. DDx? What would you tell her? Colleague suggests that ENT consult would be premature if obtained prior to 4 wks. Agree/disagree? Could this be due to her having been intubated for 2 days? Likely due to trauma of intubation if intubation had been accomplished easily? How?

C. ADDITIONAL TOPICS

1. **Obstetrical:** A 31 y.o., 85-kg primigravida presents for elective cesarean delivery for breech presentation. Because of a hx of recurrent pulmonary emboli, pt has received enoxaparin subcutaneously every 12 hrs throughout this pregnancy. Her last dose was 24 hrs ago. Obstetrician suggests spinal anesthesia. Your response? Pt requests an epidural. Reasonable? Would class III airway change approach? Epidural placed but spotty anesthesia 30 min after injection. Mgmt? If proceed with GA, how would you manage her airway? Assume GA induced but pt vomits during intubation. What would you do?
2. **Mitral stenosis:** A 60 y.o., 70-kg man with mitral stenosis requires surgery for a perforated duodenal ulcer. What are your primary concerns regarding his cardiac status? Why? Pt's HR is 100. ECG shows atrial fibrillation. How would you evaluate his cardiac function? Rx for Afib necessary before surgery? What would be your cardiovascular goals during GA? Why? How would you achieve these goals during induction and maintenance of anesthesia?
3. **Allergy:** During a routine preop interview of a healthy 35 y.o. man scheduled for elective inguinal hernia repair under regional anesthesia, he states that he commonly experiences wheezing and facial swelling after drinking wine. He has been told that he is allergic to sulfites. What are the anesthetic implications of sulfite allergy? Should he receive prophylaxis? If so, what meds? How would you Rx an allergic reaction in the recovery room (rash only vs. hypotension

vs. airway manifestations)? Assume your first interventions were unsuccessful and the pt developed respiratory distress. What would you do to escalate your Rx?

Practice Exam 2, Session 2

A 47 y.o., 75-kg man is scheduled for resection of a carcinoma of the sigmoid colon. He receives hemodialysis once a week for chronic renal failure. He has longstanding insulin-dependent diabetes mellitus and hypertension. Medications include insulin, enalapril, and clonidine. BP 190/100; HR 104; glucose 320 mg/dL; Hgb 7.1 g/dL; K⁺ 5.9 mEq/L; Na⁺ 131 mEq/L; BUN 100 mg/dL; creatinine 9.1 mg/dL.

A. PREOPERATIVE EVALUATION

1. **Renal failure/dialysis:** What is the significance of the pt's azotemia? Would he require dialysis preop? Why? If dialysis is scheduled at 8:00 A.M. before the scheduled noon surgery, are post-dialysis labs required? Which, specifically? Why? Proceed with surgery if K⁺ decreased to 5.2? Necessary to lower it further? Why?
2. **Anemia:** Why is pt anemic? Of concern? Why? Preop transfusion required? Why? Threshold for transfusion preop? Would you plan for intraop transfusion? Goals for therapy? Would renal failure affect choice of blood products? Why?
3. **Mgmt of blood pressure:** Is the pt's BP adequately controlled? Should it be lowered preop? If so, how would you do this? Should he take all or some of his antihypertensive meds the morning of surgery? Why/why not? If his BP remains elevated immediately preop, would you administer alternative antihypertensive agents before surgery begins? Why? Would your response differ if BP were 170/90? 210/112? Why?
4. **Mgmt of glucose:** If glucose were 320 mg/dL on the day before surgery, would you obtain an ABG? Why? How would you Rx? Regular insulin bolus vs. regular insulin infusion? Why? Assume glucose were 120 mg/dL the day before surgery and the pt was using insulin glargine (Lantus®) at home. How would you advise him to use this medication on the day of surgery? Why?

B. INTRAOPERATIVE MANAGEMENT

1. **Monitoring:** How would you gauge the pt's intravascular volume status during the surgery? Surgeon requests a CVP catheter capable of continuously evaluating ScvO₂. Her rationale is that she wishes to limit the amount of IV fluids administered, but she wants to maintain adequate tissue perfusion. How might frequent evaluation of ScvO₂ help to ensure adequate tissue perfusion? Would you place an arterial catheter in this pt? Could the arterial catheter be used to help evaluate the intravascular volume status? How?
2. **Anesthesia induction/intubation:** What medication(s) would you use for induction of anesthesia? Why? What muscle relaxant would you use to facilitate intubation? Under what circumstances would you consider succinylcholine contraindicated? You are unable to visualize vocal cords and esophagus is advertently intubated. What would you do? Second attempt at intubation is unsuccessful. What would you do next?
3. **Ischemia/arrhythmia:** Following multiple and prolonged laryngoscopies, pt's BP is 220/120; HR 115, with ST segment depression in V₅. Mgmt? No response to first Rx. What would you do next? Pt suddenly develops Vtach. BP is 90/P. Rx? Would your mgmt have been different if the pt had experienced Vtach with a BP of 120/80? How? Why?
4. **Anesthesia maintenance:** Assume intubation eventually successful and arrhythmia effectively Rx'd. How would you maintain anesthesia? TIVA? Which agents would you choose? Balanced anesthetic? Which inhaled anesthetic would you use? Desflurane? Sevoflurane? Why? Which muscle relaxant would you use? Rocuronium? Cisatracurium? Defend choice.
5. **Hypotension:** 1 hr after start of surgery, BP decreases to 80/40. DDx? How would you distinguish between myocardial depression, hypovolemia, and vasodilation? Necessary to distinguish between them before initiating Rx? Is Rx necessary at all? What is an "adequate" BP for this pt? How would you determine?
6. **Fluid replacement:** Assume you decide that the hypotension was caused by hypovolemia. How would you determine the amount of IV fluids to administer? Would his renal failure impact your calculation? How? Which IV fluids would you use? Why? During closure of the abdomen, the surgeon says that the abdomen is "tight". Likely etiology? Excessive IV fluids vs. inadequate NMB? Mgmt?

C. ADDITIONAL TOPICS

1. **Pediatric orthopedic emergency:** A 5 y.o., 20-kg boy requires emergent ORIF of tib-fib fracture. He has an unrepaired VSD. Further evaluation required? What? Would you delay surgery to wait for results? How would the results impact your periop mgmt? How would the VSD influence your choice of anesthetic agents? Would Rx of sudden hypotension be different because of VSD (phenylephrine vs. ephedrine vs. fluid)? Explain. How would you prevent right-to-left shunt? Caudal anesthesia is administered. Expected hemodynamic effects?
2. **Complex regional pain syndrome:** A 55 y.o. woman fell 2 weeks ago and sustained a distal radius fracture initially treated with closed reduction. Now she c/o burning pain in the entire arm and cannot abduct at shoulder. Arm has erythema, edema, increased temperature, and tenderness to touch from elbow to hand. Cause of symptoms? Any diagnostic tests required? Which? If reflex sympathetic dystrophy, what intervention(s) would you recommend? Should

pt receive tricyclic antidepressant? Gabapentin? Other medication? Explain. Stellate ganglion block? IV regional block? Which? Why?

3. **Carotid surgery:** A 78 y.o. man is undergoing left carotid endarterectomy for TIAs. Preop BP 124/70. He had 2 MIs prior to angioplasty of LAD 3 yrs ago. Preop meds include metoprolol and NTG as needed. During isoflurane-N₂O anesthesia, left hemisphere EEG power abruptly decreases after cross clamp. Initial mgmt? With phenylephrine, BP increases from 120/60 to 150/80 and EEG normalizes, but now 2-mm ST segment depression. What would you do?

Practice Exam 3, Session 1

A 5 y.o., 19-kg, 3'2" girl requires an emergency exploratory laparotomy.

HPI: The girl was riding her bicycle in front of her home shortly after eating lunch when she was struck by a car. She was wearing a helmet and had a brief loss of consciousness immediately following the accident.

PMH: She was the full-term product of a normal pregnancy.
Previously healthy.
No allergies.

MEDS: Multivitamin.

PHYS EXAM: BP 70/55; HR 164; RR 40; SpO₂ 92% on 2 liters per minute O₂ via face mask.
She has bruises on her upper abdomen and lower chest. She has multiple small cuts and abrasions.
She is pale; trachea is midline. She is in a C-collar without neck tenderness; her airway appears normal. She has diminished breath sounds over the left chest.
Her abdomen is tender and distended.

X-RAY: No pneumothorax. Fractures of her left sixth, seventh, and eighth ribs with moderate left pleural effusion.

**FAST (FOCUSED
ASSESSMENT
WITH SONOGRAPHY
IN TRAUMA) SCAN:**

Perisplenic fluid, moderate left pleural effusion, small pericardial effusion with a hyperdynamic left ventricle.

LABS: Hgb 8.1 g/dL; serum glucose 115 mg/dL; HCO₃ 14 mEq/L; remainder of electrolytes are normal.

She is frightened and 200 mL of normal saline has been administered since arrival in the ED. She has a 22-gauge IV in her hand.

Practice Exam 3, Session 1 - Continued

A. INTRAOPERATIVE MANAGEMENT

1. **Access/monitoring:** Is add'l intravenous access necessary? Why? Is a femoral venous catheter appropriate? Why/why not? Would it provide an accurate CVP? Is an arterial catheter appropriate? Why/why not? Should it be placed prior to induction?
2. **Induction of anesthesia:** Is an RSI indicated? How would you induce GA? Which agent(s)? Why? Succinylcholine appropriate? Concerns? Does the pericardial effusion need to be drained prior to induction? Why/why not?
3. **Arrest/arrhythmia:** When the abdomen is opened, 300 mL of blood is lost. HR 170; BP unobtainable. Mgmt? Give epinephrine? Chest compressions? Transfuse? Which products? Bleeding from ruptured spleen is controlled. As blood rapidly infused, pt develops peaked T waves on ECG. Probable etiology? K^+ 7.1. Mgmt? (Calcium, insulin/glucose?)
4. **Coagulopathy:** BP returns to normal range after fluid resuscitation and splenectomy performed. However, diffuse oozing noted. DDx? DIC? Dilutional coagulopathy? Transfusion reaction? How would you determine the etiology? If DIC, how would you Rx?

B. POSTOPERATIVE CARE

1. **Postop ventilation:** Pt is transferred to ICU intubated. What ventilator settings would you choose? Pressure control vs. volume control? Tidal volume? RR? PEEP? Why? Would you sedate this child to tolerate mechanical ventilation? Why? Which agent(s)? Propofol? Dexmedetomidine? Other? Why?
2. **Myocardial contusion/post CPR:** POD#1. Pt has an elevated troponin level. Of concern? DDx? Would an ECG be useful for determining the etiology? Transthoracic echocardiogram? Rx necessary? How would you decide? How long would this pt need monitoring if she had a myocardial contusion?
3. **Extubation criteria:** Would you obtain an ABG or would pulse oximetry be sufficient to determine adequacy of mechanical ventilation? Why? Assume pressure control ventilation is used postop. Would it be necessary to change modes when weaning the pt from ventilator support? Why? Which mode would you use for weaning? Pressure support? CPAP? Why? What would be your extubation criteria for this pt? Would they be different if the child had undergone an elective surgery with minimal blood loss? Why?
4. **Post-extubation stridor:** Immediately after extubation, pt develops stridor. DDx? Laryngospasm? Edema? Rx? Racemic epinephrine? Steroids? SpO_2 falls to 85%. What would you do? LMA? CPAP or BIPAP? Reintubate? Necessary to induce anesthesia prior to intubation? If reintubate, what size ETT? Cuffed or uncuffed? Defend choices.
5. **Postop pain mgmt:** (*Assume stridor is effectively Rx'd. Pt does not require re-intubation.*) How would you manage postop pain in this child with a left chest tube and laparotomy incision? Is PCA appropriate? Controlled by child, parent, or nurse? Basal infusion rate? What opioid? Why? Could an epidural be used? Lumbar or thoracic? What agent(s) would you infuse through the catheter? Local anesthetic? Opioids? Combination? Would you sedate the child for catheter insertion? Why? Which agent(s)?
6. **Behavioral issues:** 1 week after the child is discharged from the hospital, you are contacted by the parents regarding behavioral issues (poor sleep, regressive behavior, anxiety). Could this be related to anesthesia? Her hospital course? When would you expect it to resolve? Would you expect the child's subsequent emotional/intellectual development to be affected?

C. ADDITIONAL TOPICS

1. **Renal transplant:** A 48 y.o., 80-kg man with chronic renal failure requires anesthesia for a deceased-donor renal transplant. He underwent hemodialysis earlier in the day. Any additional laboratory test necessary? K^+ 5.6 mEq/L. Rx required? Why? How would you treat? Does pt require prophylaxis for a "full stomach"? Why? What agents? Pt requests a regional anesthetic for the procedure. Agree? Why? If so, which? If not, how would you proceed with induction and maintenance? Why?
2. **Neurosurgical anesthesia:** A morbidly obese 37 y.o. woman has a large skull-base tumor and is scheduled for a craniotomy and facial reconstruction that will last at least 24 hrs. Would you be concerned about potential complications associated with the duration of this surgery? Explain. Would your anesthetic mgmt differ from a case with a duration of only 4 hours? How? Why? What type of ETT would you use? Would you require special neuromonitoring? (SSEP, EEG, cerebral oximetry?) How would you assess neurologic function at conclusion of surgery?
3. **Chronic pain - epidural steroid injection:** A 55 y.o. otherwise healthy man presents with a 1-month hx of back pain radiating down his left lower extremity to his big toe. MRI: large herniated disc at L4-5. Minimal relief from oral analgesics. What would you recommend for analgesia? Epidural steroid injection indicated? Why/why not? Risks?

Fluoroscopy required? Why/why not? Lumbar epidural steroid injection reduces leg pain, but pt now complains that low back pain is more severe. DDx? (Epidural hematoma vs. reaction to steroids?) Evaluation and mgmt?

Practice Exam 3, Session 2

A 60 y.o., 120-kg, 5'10" man is scheduled for right total knee arthroplasty. He has a history of hypertension, asthma, mild gastroesophageal reflux disease, and obstructive sleep apnea requiring continuous positive airway pressure (CPAP) at night. Medications: lisinopril, albuterol inhaler, and omeprazole. BP 160/90; HR 95; RR 20; Hgb 15.5 g/dL. ECG: normal sinus rhythm with nonspecific ST-T wave changes and right axis deviation.

A. PREOPERATIVE EVALUATION

1. **Airway, obesity, OSA:** Concerns about OSA? What? Why? Significance of CPAP use? Impact on postop management? Why? BMI is 38. Is this patient morbidly obese? Associated comorbidities? What? How would this affect anesthetic management? Additional testing necessary? Which? Why?
2. **Pulmonary function:** You note that pt has a few scattered wheezes on PE. Rx necessary? Why? If so, with what? Rationale? If the pt states that this is his baseline, is Rx necessary? Additional evaluation of pulmonary function necessary? Which tests? Why? ABG on room air shows: pH 7.35; PaCO₂ 48; PaO₂ 65. Interpret. Rx necessary? Delay surgery?
3. **Hypertension:** Is this pt's BP adequately controlled? Would it need to be lowered preop? Why? How would you do this? Beta blockers, diuretics, calcium channel blockers, other? Why? Over what time-course? Could it be safely lowered the day of surgery? Why? What would be your target BP for this pt? Why?
4. **Premedication:** Would you administer medications for mild GERD? Which agents would you prescribe? Why? Pt is very anxious. Would you sedate this pt preop? If so, with what? Concerns? Why?

B. INTRAOPERATIVE MANAGEMENT

1. **Choice of anesthesia:** Regional vs. GA? Risks/benefits of each? Pt desires regional. Your recommendation? Spinal vs. epidural vs. peripheral nerve blocks (lumbar plexus, femoral, and/or sciatic)? Surgeon plans to use LMW heparin for postop thromboprophylaxis. Would this influence your choice of regional technique? Why?
2. **Failed regional/difficult intubation:** Pt agrees to epidural anesthesia. What agents would you use? Local anesthetic? Opioid? Why? What sensory level necessary to achieve? 20 min after incision, pt becomes agitated and c/o pain in the back of his knee. DDx? Rx? More sedation? Why? Alternatives? In spite of Rx, pt is increasingly uncomfortable and the surgeon is unable to continue. How would you proceed? Convert to GA? Intubate? LMA? Why? Unable to visualize vocal cords with laryngoscopy. Next steps? If able to ventilate through LMA, could you use this throughout surgery? Why/why not? Allow the pt to breathe spontaneously or control ventilation? Why?
3. **Pulmonary embolism:** Assume pt is intubated. 30 minutes into the surgery, BP suddenly drops to 80/60; SpO₂ 80%; ETCO₂ 20 mmHg. DDx? SpO₂ continues to fall and ETCO₂ undetectable. Pulmonary embolism suspected. How would you confirm the diagnosis? TEE useful? Assume HR 160 with wide QRS complex on ECG. BP 70/P. Rx (drugs vs. cardiovert vs. defibrillate vs. combination)? Vfib follows. Rx? First Rx fails. What next?
4. **Induced hypothermia post-arrest:** Resuscitation successful after 20 min. Bispectral index monitor reading 15. Concerned? Why? Neurologist suggests induced hypothermia to minimize possible neurologic injury. Agree? Why? If so, how would you cool the pt? Target temperature? How long would it be necessary to maintain hypothermia? Why?
5. **Delayed emergence:** (Assume no induced hypothermia.) Surgery was completed 60 mins ago and pt remains unresponsive in ICU. DDx? Metabolic vs. residual neuromuscular blockade vs. neurologic injury. How evaluate? Rx? Why?
6. **Altered mental status postop:** Pt now awake in PACU. You attempt to assess his mental status and he is cooperative, but he thinks that it is 1989 and he is in a hotel. He has no family members or designated power of attorney for the team to contact regarding the course of care. How would you proceed?

C. ADDITIONAL TOPICS

1. **Labor analgesia:** Your colleague administered a combined spinal-epidural for labor analgesia to a healthy 22 y.o., G1P0 woman at term who was 3-cm dilated. She received 25 µg fentanyl intrathecally. Are there advantages or disadvantages to combined spinal-epidural compared to only epidural analgesia? Fetal risks? 10 minutes after fentanyl administration, profound fetal bradycardia occurs. Could this be related to the block? How? Rx? Terbutaline or nitroglycerin?
2. **Periop blindness:** A 54 y.o., healthy, 70-kg man is awake in the PACU after a 5-hour lumbar laminectomy in the prone position and reports that he is unable to see. DDx? How would you evaluate? What would you tell the pt and family about prognosis? Could this have been prevented? How?

3. **Cardiac surgery and cerebral function:** A 68 y.o. man with a left carotid bruit requires urgent CABG surgery for left main coronary artery lesion with angina. Assume episodic TIAs. Surgeon plans combined CEA and CABG. Is further evaluation required preop? If so, what? How would it impact your Rx? Explain difference in risk from pt's perspective for combined procedure. Anesthetic plan and monitoring for the anticipated combined procedure? Defend approach. What would be your goals for BP Rx during the course of the procedure?

Practice Exam 4, Session 1

A 2 y.o., 13-kg girl is admitted to the ED after a motor vehicle crash.

HPI: The child was extracted from the burning vehicle by emergency medical technicians. She was awake and crying throughout the rescue. Second-degree burns are noted on her arms and chin. In addition, she has an open fracture of the right tibia.

PMH: Prior to this event, her development was unremarkable. Her mother reports that she has no other significant medical history.

PHYS EXAM: HR 145; BP 70/40; RR 28; T 36.7°C. She is crying and combative. Her tongue has several small lacerations. Auscultation of the chest reveals clear lungs and normal heart sounds.

CXR: No acute processes.

LABS: Hgb 10.0 g/dL; Hct 34%; WBC 9,600/mm³; platelets 253,000/mm³.

After evaluation by the orthopedic surgeons, an open reduction internal fixation of the right tibia is scheduled as an urgent procedure. A 20-gauge IV catheter is in place in the left hand.

Practice Exam 4, Session 1 - Continued

A. INTRAOPERATIVE MANAGEMENT (*Standard monitors in place.*)

1. **Fluid status/mgmt:** Would UO be an adequate indicator of volume status for this child? If not, how would you determine if this pt were hypovolemic? Which IV fluids would you administer during surgery? Saline? LR? 5% albumin? Why?
2. **Anesthesia induction/airway mgmt:** Mother would like to remain with the pt until she is asleep. Agree? How would you induce GA? Why? LMA reasonable for airway mgmt? ETT preferable? Why? Assume you cannot visualize the vocal cords during laryngoscopy. What would you do? Mask ventilation is difficult. SpO₂ decreases to 85%. What would you do next? SpO₂ continues to fall. Next step? LMA? Other airway device? Which? LMA placed. Ventilation and oxygenation are adequate. Could LMA be used throughout the surgery? Concerns with doing so?
3. **Anesthetic maintenance:** (*Assume airway is eventually secured with ETT.*) How would you maintain anesthesia? TIVA? Using which drugs? Inhalational agents? Why? Would you use opioids as part of your anesthetic? How would you dose them? Which would you choose? Why? Is morphine preferable to fentanyl? Concerns with use of opioids in pediatric pt?
4. **Hypothermia:** Pt's T decreases to 35°C during surgery. Rx necessary? Why? How would you warm the pt? Is a forced-air warming unit appropriate in a pt with a burn? Why? Alternative measures to warm the pt? Could hypothermia have been prevented? How? Special concerns with hypothermia in children vs. adults?

B. POSTOPERATIVE CARE

1. **Extubation/stridor:** (*Assume surgery proceeds uneventfully. Pt normothermic by end of case.*) What would be your extubation criteria? Assume pt remains intubated after surgery. However, inadvertent extubation occurs during transport to the ICU. Stridor is noted. How would you manage? Racemic epi? IV steroids? Re-intubation? Why? Assume the glottic opening is swollen and you cannot pass an ETT. What would you do next? LMA? Smaller ETT? How small? Cricothyrotomy?
2. **Post-obstructive pulmonary edema/hypoxia:** Assume pt re-intubated. SpO₂ 92% on FiO₂ 1.0. DDx? Need ABG prior to beginning therapy? CXR? Why? Would results change your mgmt? Rx? Diuretics? Which? Why? Higher FiO₂? PEEP? To what endpoint?
3. **Low UO:** (*Assume post-obstructive pulmonary edema effectively managed.*) UO has been 5 mL/hr since admission to the ICU, despite furosemide administration. BP 100/60; HR 100. DDx? Urine electrolytes useful? Why? Which electrolytes? Would FENa be helpful in the evaluation of oliguria? Explain. What other studies might be useful? Would you wait for results before Rx? Why? How Rx? Add'l furosemide? IV fluids? If IV fluids, how much? No response to initial bolus. What would you do next?
4. **Pain mgmt:** How would you provide postop pain Rx for this child? Caudal analgesia? Epidural? Which? Why? Assume caudal. How would you dose? Local anesthetic? Opioid? Which? Why? Parents refuse caudal. Would PCA be appropriate? Which opioids would you use? How would you dose? Basal rate? Would parent-controlled dosing be appropriate? Why?
5. **Hepatic dysfunction:** POD#3. Pt is jaundiced. Could this be due to anesthetic mgmt? How would you evaluate to establish cause? Implications if w/u revealed increased aminotransferases? What would you tell the parents? Rx necessary? Prognosis?
6. **Reoperation for scar revision:** 7 months later, the child requires reoperation for scar revision. Would succinylcholine be contraindicated at that point? For how long would it be contraindicated? Explain. The pt is very fearful in the preoperative holding area. How would you manage premedication? How would you induce GA?

C. ADDITIONAL TOPICS

1. **Renal transplantation:** A 42 y.o. man with CRF secondary to longstanding hypertension is to undergo a deceased-donor renal transplant in several hrs. What are your primary anesthetic concerns? Is the time since last dialysis important in this pt? Why? Assume dialysis 48 hrs ago. How would this influence anesthetic plan? K⁺ is 5.9 mEq/L. Would it need to be reduced preop? Why? If so, how? Add'l preop evaluation required? Your choice for induction and maintenance of anesthesia in this pt? Why?
2. **Neurosurgical anesthesia:** A 38 y.o. man with a seizure disorder is scheduled for craniotomy and awake functional mapping. Surgeon requests an asleep-awake-asleep technique. Pt asks about pain during surgery. Your response? Choice of anesthetic? Airway mgmt? LMA adequate? Why? Mgmt during awake phase? Dexmedetomidine appropriate? Why? How would you assess adequacy of ventilation? During the awake phase, the pt has a grand mal seizure. Rx? Is intubation required? If so, how would you accomplish it?

3. ***Cardiac surgery:*** A 54 y.o. man with angina presents for CABG. Is it important to ask about the character of the angina? Why? Would your anesthetic management differ if it was unstable rather than stable angina? How? Why? Explain. Under what circumstances would TEE be of value for this patient? Why? How would you determine what is an adequate BP and flow while on bypass? If the PaCO₂ were 60 on bypass, would you treat? How?

Practice Exam 4, Session 2

A 24 y.o., 80-kg, G4P3 parturient presents at term in early labor with severe abdominal pain. Her past medical history is notable for mitral valve prolapse and cocaine use (most recently 3 hours ago). Her vital signs are BP 180/105; HR 120; RR 27; T 37°C. Hgb 7.9 g/dL. She is requesting an epidural.

A. PREOPERATIVE EVALUATION

1. **Hypertension:** What is the most likely etiology of her high BP? How would you differentiate pain vs. acute cocaine toxicity vs. pregnancy-induced hypertension? Would lab values be helpful? If so, which ones? Why? Would etiology impact Rx? How? Assume hypertension is due to acute cocaine toxicity. Would you treat it preop? Why? If so, how? Goals for BP Rx? Explain.
2. **Anemia:** Is the pt's Hgb abnormally low? Possible causes? Could this be due to physiologic anemia of pregnancy? Should she have a type and screen or a type and crossmatch prior to receiving any anesthetic? Why? Does her anemia increase the risk of epidural analgesia? How? Plt count required before epidural placement?
3. **Cardiac disease:** Does this pt require further cardiac evaluation? Why? Specifically, what hx would you try to elicit? If the pt tells you she occasionally feels palpitations and SOB, would she need an echo? Why? How would results impact your anesthetic plan? Would you place an epidural without it? ECG? Prophylactic antibiotics before epidural?
4. **Informed consent:** The pt is extremely uncomfortable with each contraction. Is it necessary to obtain a separate consent for placement of the epidural? Suppose the obstetrician had given morphine for analgesia before you were asked to see the pt. Would it be possible in this case to obtain informed consent? Should you ask her spouse to consent for her? How would you proceed?

B. INTRAOPERATIVE MANAGEMENT

1. **Epidural placement:** At which level would you attempt to place the epidural catheter? Why? Monitor FHR during placement of the epidural? Why? After several attempts, you get a wet tap at L4-5. What would you do? CSE? Attempt placement at another level? Why? The epidural space is successfully located at L3-4 and a catheter is inserted. You administer test dose and the FHR falls to 60. DDx? Rx? Bradycardia persists. Pt requires emergent cesarean delivery.
2. **Induction:** How would you anesthetize the pt for the cesarean delivery? Why? Epidural level is inadequate to proceed with surgery. Dose further? The obstetrician states that the fetus needs to be delivered immediately. Proceed with GA? No longer able to measure FHR. What meds for induction? Why? With intubation, pt's BP increases to 210/120. Rx necessary? Why? How Rx? Other info necessary to decide? What? Why?
3. **Neonatal resuscitation:** The infant is delivered and is apneic with a HR of 60. A colleague is available to care for the mother. How would you resuscitate the infant? You are having difficulty ventilating with a mask. Intubate vs. LMA? Why? Following intubation, the infant's HR remains 60. What would you do next? Chest compressions? Epinephrine? Calcium? NaHCO₃? Naloxone? The infant does not have an IV. Route of administration? No response to first choice of Rx. What would you do next?
4. **Hemorrhage:** You are now caring for the mother and blood loss has been continuous. Her BP is 60/30 and blood not in OR. Next step? Crystalloid vs. colloid? Pressors? Which? The obstetrician notes a large retroplacental collection of blood. Transfuse? To what endpoint? If crossmatched blood is not yet available, would you give type-specific or O negative? Why?
5. **DIC:** During resuscitation, you notice that the pt is bleeding from her nose and previous needle stick sites. DDx? Evaluation? TEG? Would serum fibrinogen level be useful? Fibrin split products? Rx if DIC? FFP vs. recombinant factor VIIa vs. aminocaproic acid? Why for each?
6. **SVT:** During resuscitation, the pt develops SVT with HR 170; BP 90/50. Rx? Adenosine? Cardioversion? Why? A colleague suggests phenylephrine. Agree/disagree? Would your response be different if BP were 60/palp? No response to initial attempt at cardioversion. What would you do next?

C. ADDITIONAL TOPICS

1. **Anaphylaxis and cardiac anesthesia:** A 57 y.o. obese man with multiple allergies is scheduled for an aortic valve replacement for severe aortic stenosis. Hemodynamic goals for induction? How would you accomplish this? Choice for meds? Assume induction uneventful. 5 min after receiving 2 gm cefazolin, pt is tachycardic with no detectable BP. Diffuse rash noted. DDx? Assume anaphylaxis. Rx? No response to first Rx. Next steps?
2. **Lupus pericarditis:** A 49 y.o. woman with systemic lupus erythematosus presents for an ORIF of a fractured humerus. Pt reports occasional chest pain, SOB, and cough. Add'l eval required? Which tests? ECG? TTE? Why? ECG

demonstrates ST segment elevations in all leads. DDx? Surgeon anxious to proceed. Agree? Assume pericarditis. How would you Rx?

3. **Cancer pain:** A 55 y.o. woman with unresectable cervical cancer is seen in the outpt pain clinic for intractable pain. She is expected to live only another 2-3 months. What steps would you take initially? Why? Use of adjuvant meds in addition to oral opioids (nonsteroidals, gabapentin, tricyclics, steroids) appropriate? Why? Prefer more invasive approaches (subcutaneous opioid infusion, intrathecal vs. epidural infusion)? Which? Why? Which local anesthetic?

Practice Exam 5, Session 1

A 50 y.o., 101-kg, 5'2" woman is brought to the operating room for right open thoracotomy to remove a right upper lobe lung cancer diagnosed after she presented with hemoptysis.

PMH: The patient has an idiopathic dilated cardiomyopathy. No coronary artery obstructions were noted on cardiac catheterization 2 years ago. She has a history of recurrent ventricular tachycardia, and an automated implantable cardioverter-defibrillator (AICD) was placed 2 years ago. The patient also has a history of positional gastric reflux.

MEDS: Cimetidine, hydrochlorothiazide, amiodarone, verapamil, and warfarin.

PHYS EXAM: BP 145/92; HR 85 (irregular); RR 20; T 37.2°C.

Her mouth is small and only the tip of the uvula is visible.

Chest auscultation reveals mild diffuse expiratory wheezes without rales or rhonchi.

She has no cardiac murmurs, but an S₃ gallop is heard.

Distal pulses are palpable, and she has no edema.

CXR: Lungs without infiltrates or effusions, enlarged heart, AICD noted.

ECG: Sinus rhythm with premature ventricular contractions. Right bundle branch block.

LABS: Hgb 14.3 g/dL; normal electrolytes and creatinine phosphokinase; PT 12.4 sec with a control of 10.1 sec. A transthoracic echocardiogram performed preoperatively showed global hypokinesis and an ejection fraction of 35%.

The patient arrives in the operating room anxious, with a radial arterial line and a triple-lumen central venous pressure catheter in place. The AICD has been inactivated.

Practice Exam 5, Session 1 - Continued

A. INTRAOPERATIVE MANAGEMENT

1. **Aspiration pneumonia:** During laryngoscopy and intubation you note yellow fluid in the pharynx. How would you proceed? How could you rule out aspiration? SpO₂ is unchanged. If intraop CXR is clear, could you assume aspiration did not occur? Why? If aspiration suspected, would you treat with steroids? Antibiotics? Other meds? When would bronchoscopy be indicated? Must surgery be delayed? Why?
2. **Anesthesia maintenance:** (Assume aspiration did not occur.) Your plan for maintenance? How would pt obesity affect your plan? After premedication with midazolam, is opioid, N₂O, O₂ anesthesia acceptable for maintenance? Why? Is TIVA preferable if OLV is planned? Which drugs would you use for TIVA? Why? OLV is begun and SpO₂ decreases to 90%. Response? Why? Is PEEP to dependent lung indicated? CPAP to nondependent lung? Which first? Why? SpO₂ continues to decline despite intervention. Next steps? Surgeon states he cannot see well with CPAP on operative lung. SpO₂ has decreased to 70%. What would you do?
3. **Myocardial ischemia:** (Assume SpO₂ improves to 94% on FiO₂ 1.0.) 1 hour into surgery, you notice ST depression in V₅. How do you interpret? Is Rx indicated? Why? BP 80/40, how to Rx? Would HR influence Rx decision? How? ST segments resolved, but BP does not increase. Rx options? Mgmt if this is due to myocardial ischemia? Start an inotrope? Which one? Pt becomes tachycardic with Rx, and ST segments depress again. Next steps?
4. **Intraop hemorrhage:** (Assume ischemia resolves.) Surgeon reports extensive bleeding. HR 120 and BP 90/40. Rx? Pressors vs. IV fluids vs. blood? How decide? EBL is 800 mL. If Hct intraop is 33, is transfusion necessary? How would you decide when to transfuse? If EBL was 1,500 mL, would you transfuse? Why? Goals for transfusion therapy? Why? First unit of blood is started. Pt develops hemoglobinuria and BP falls. DDX? Mgmt if this is a transfusion reaction?

B. POSTOPERATIVE CARE

1. **Hypothermia/shivering/extubation:** At conclusion of surgery, pt's T is 34°C. Of concern? Why? Your plan to warm the pt? Why? Would you extubate if her T increases to 35°C? Why? Concerns with doing so? Pt self-extubates and begins to shiver violently. Reintubate? She is alert and refuses reintubation. Your response? SpO₂ is 93% on face mask oxygen at 6 L/min. Is Rx required? Why? What would your Rx include?
2. **Metabolic acidosis:** (Pt remains extubated.) Shortly after admission to the ICU, ABG (on FiO₂ 0.5) demonstrates pH 7.13; PaCO₂ 35; PaO₂ 96. Interpret. Could her shivering cause this ABG? DDX? Rx necessary? With what? Concerns with treating? Endpoint for therapy?
3. **Ventricular tachycardia:** 1 hr after admission to the ICU, pt becomes tachycardic with HR 130 and is agitated. DDX? Is adenosine indicated? Esmolol? Why? Her AICD has been reactivated but does not deliver a shock. Could this still be Vtach? If Vtach, amiodarone vs. lidocaine vs. cardioversion? Why? Could you cardiovert without deactivating the AICD?
4. **Postop pain mgmt:** Pt refused epidural for postop pain mgmt and now c/o 10/10 pain. How would you Rx her pain? Is IV PCA appropriate? Why? Specific concerns in this pt? A colleague suggests a fentanyl PCA. Would you agree? Your preference? How would you dose it? Would a basal rate be appropriate? Add NSAIDs? Why?
5. **Seizure after intercostal block:** You offer and the pt consents to intercostal blocks for postop pain mgmt. What meds would you use? Ropivacaine preferable to bupivacaine? Why? Additives (epinephrine, bicarbonate, dexamethasone)? Why? Your choice? During local anesthetic injection pt becomes restless and has a seizure. How would you manage? Propofol vs. benzodiazepines? Would you need to reintubate? Why?
6. **Medication error:** As you're reviewing the pt's anesthetic record, you realize that immediately preop you administered cefoxitin rather than the vancomycin that had been ordered. Of concern? Why? Do you have to report the error? To whom? What would you tell the pt?

C. ADDITIONAL TOPICS

1. **Nerve injury:** A 37 y.o. man had an interscalene block placed using nerve stimulator guidance 2 weeks ago for repair of a right rotator cuff injury. He now has persistent numbness in his right little finger. What evaluation would you do? Likely etiology? How could you differentiate ulnar nerve from cervical nerve root injury? Important to do so? Why? Would you obtain an EMG now or wait another month? Would nerve conduction velocity studies be of any value? What Rx could you offer if this is due to a cervical nerve root injury? Prognosis?
2. **Amniotic fluid embolus:** A 29 y.o., G3P2 woman c/o dyspnea just after her baby was delivered via cesarean delivery under epidural anesthesia. DDX? Evaluation? SpO₂ 80% on NC oxygen 2 L/min. BP has decreased to 80/40. How would you make a Dx of amniotic fluid embolus (AFE)? If you suspect AFE, mgmt? Is immediate intubation mandatory?

Justify approach. If AFE, coagulopathy likely? Are coagulation tests indicated? Which? Fibrinolysis documented. Give epsilon-aminocaproic acid? Tranexamic Acid? Why? Other meds useful? Is factor VIIa indicated?

3. **Cushing syndrome:** A 64 y.o. man with Cushing syndrome presents for laparoscopic resection of an adrenal adenoma. BP 164/100. Meds include a diuretic and an oral hypoglycemic agent. Would he require “stress dose” steroids? Why? Should you treat BP before induction? Why? Other preop lab tests required? Which ones? Why? K^+ is 3.2 mEq/L. Rx required? K^+ supplementation? If so, how much? Concerns with doing so? A colleague suggests administration of spironolactone. Would you agree? Should you check glucose level preop? Why? Glucose is 254 mg/dL. Rx required? Why? Goals for mgmt of glucocorticoids intraop?

Practice Exam 5, Session 2

A 5 y.o., 21-kg boy presents with right lower quadrant abdominal pain and vomiting of 30 hours' duration prior to admission. He is scheduled for an emergent laparoscopic appendectomy. His past medical history is notable for mild cerebral palsy and a cousin with Duchenne muscular dystrophy. HR 133; BP 85/45; T 38.6°C.

A. PREOPERATIVE EVALUATION

1. **Volume status:** Is this child hypovolemic? How would you assess? Would you hydrate the child preop? Why? Would you delay surgery for hydration? Which fluid? How much? Any benefit to colloid over crystalloid? Add dextrose to solution? Why? Goals for therapy? If child had already received NS 20 mL/kg, would your fluid plan be different? How? Why?
2. **Family hx:** What further info do you need regarding the family hx of Duchenne muscular dystrophy? Risk of muscular dystrophy in this child? Preop CPK useful in the diagnosis? Concerns if this child has Duchenne? Suppose the cousin had MH instead of Duchenne? Would this change your preop evaluation? If MH, preop dantrolene? Would you require a "clean" anesthesia machine? Explain.
3. **Lab studies:** Would this pt require a CBC? Why? Would Hgb alone be sufficient? Why? Are serum electrolytes required? Why? If so, which ones? Glucose is 200 mg/dL, but there is no hx of diabetes. Significance? Is crossmatch needed?
4. **Preop medication:** Child had scopolamine patch placed in emergency department and has not vomited in the last hour. Would he require meds for aspiration prophylaxis? Why? If so, which ones? Famotidine? Sodium citrate? Metoclopramide? All? The child refuses to take the sodium citrate. Alternatives? Would you sedate this child? How if no IV in place?

B. INTRAOPERATIVE MANAGEMENT

1. **Induction:** Mom requests to be present for induction. Your response? After sedation you place a 20-gauge antecubital IV. How would you secure the airway? RSI and intubation appropriate? Why? Your choice for induction? Which meds? Why? Is rocuronium preferable to SUX? Why? Would you intubate with a cuffed or uncuffed ETT? Why?
2. **Anaphylaxis:** After induction and intubation, the child receives cefazolin. BP falls to 40. Likely etiology? Evaluation? On auscultation you note bilateral wheezing. Mgmt? IV fluids? Phenylephrine? Ephedrine? Epinephrine? No response to first therapy and the pt's SpO₂ decreases to 80% on 100% O₂. What would you do next? Why? Is there a limit to how much epinephrine could be administered? Epinephrine infusion? Is central line needed? Why?
3. **CO₂ embolism:** (Assume wheezing resolves and BP returns to baseline.) During insufflation of the abdomen, BP suddenly decreases to 60/30. DDx? Differentiate CO₂ embolism from typical hemodynamic changes with laparoscopy. Hypotension is accompanied by a decrease in ET CO₂. Explain. If due to a CO₂ embolus, how would you Rx? Alter pt position? Why? O₂ saturation 85%. Next steps? Meds? Which ones? Pulseless electrical activity ensues. Rx? Epinephrine or vasopressin? Explain.
4. **Temperature:** (Assume NSR and normal BP restored.) Remainder of laparoscopy has proceeded uneventfully. During the procedure, however, the pt's T has increased to 40.0°C. Concerns? How could you rule out MH? ABG on FiO₂ 0.5: pH 7.30; PaCO₂ 48; PaO₂ 102; HCO₃ 20. Consistent with MH? Effect of increased T on your mgmt of the pt intraop? Should his T be lowered? How? Why? If pt received antibiotics, are add'l antibiotics indicated? Should forced-air warming unit be discontinued? Should fresh gas flows be increased? Cooled IV fluids? Cooling blanket?
5. **Extubation:** What are your extubation criteria for this pt? Are they the same as for an adult on a per-kg basis? If pt does not meet extubation criteria, how would you proceed? SIMV vs. assist-control vs. CPAP with pressure support? Why? How do you decide on amount of pressure support? Sedate for continued ventilation in the PACU? How? Since he is unable to be extubated immediately postop, must pt undergo CPAP trial prior to extubation? Pt is agitated. Your response?
6. **Pain mgmt:** Plan for postop pain mgmt? Ketorolac? Opioids? IV Tylenol®? Would you use PCA in this 5 y.o.? Why? Would you allow the pt's parents or nurse to control PCA? Does it matter who? Assume initial opioid ineffective, what next?

C. ADDITIONAL TOPICS

1. **CT scan:** A 25 y.o. man is in ED after sustaining a head injury in a car crash. He is mildly combative, has a C-collar in place, and smells of ETOH. Anesthesia assistance with sedation is requested for CT. What evaluation would you do? The left side of pt's head is contused and swollen. He has a short thick neck, poor mouth opening, blood in his mouth,

and his tongue is swollen. Is monitored anesthesia care appropriate? Why? If so, what would you use? Concerns in this pt? Assume you proceed with GA. RSI or awake fiberoptic intubation? Rationale? Alternatives to secure his airway?

2. **Equipment malfunction:** A 55 y.o. woman has been anesthetized for a colon resection using propofol, fentanyl, rocuronium, and desflurane. A fluid warmer is plugged into the back of the anesthesia machine, causing a complete electrical failure of the machine. Likely cause of the power failure? Current leak from the fluid warmer? Power surge to the anesthesia machine? How would you ventilate and oxygenate the pt? How would you continue the anesthetic if another machine is not available? The power is reset and the fluid warming unit has been removed from the OR. Could the anesthesia machine be used in the next case? Why/why not?
3. **Transplantation anesthesia:** A 45 y.o. man with ESRD secondary to hypertensive nephropathy is to undergo deceased-donor renal transplantation in 1 hr. What are the anesthetic implications of CRF? Pt was last dialyzed 36 hrs ago. Specific concerns? Serum K⁺ 5.8 mEq/L. Treat? Why? Today's CXR reveals marked cardiomegaly. Causes? Anesthetic implications? Surgeon asks if transplant can be performed using epidural anesthesia. Your response and reasons?

Practice Exam 6, Session 1

A 28 y.o., 246-kg, 5'11" man is scheduled for an elective laparoscopic gastric bypass and abdominal panniculectomy.

HPI: The patient reports a sedentary lifestyle and obesity since childhood.

PMH: Diabetes mellitus for 10 years.
Broken ankle repaired 15 years ago, for which he received a spinal anesthetic without complications.

MEDS: NPH insulin 30 units subcutaneous every morning; over-the-counter antacid as needed for heartburn.

PHYS EXAM: BP 150/90; HR 84; RR 18; T 37°C.
The patient prefers to be in a semi-sitting position.
He has adequate mouth opening and a short, thick neck.
Breath sounds are distant but clear.
There are no cardiac murmurs.

CXR: Poor penetration, but no infiltrates.

ECG: Left axis deviation. Isoelectric T waves in leads V5 and V6.

LABS: Hgb 16 g/dL. ABG: pH 7.38; PaCO₂ 42; PaO₂ 65; BE +1. Electrolytes within normal limits; glucose 195 mg/dL.

The patient arrives in the operating room with an 18-gauge IV through which normal saline is being infused. He received 15 units of NPH insulin subcutaneously 1 hour ago and 30 mL of sodium citrate orally 15 minutes prior to arriving in the operating room. A left radial arterial catheter is in place.

Practice Exam 6, Session 1 - Continued

A. INTRAOPERATIVE MANAGEMENT

1. **Induction and intubation:** How would you induce anesthesia? RSI? Why/why not? What approach would you use for endotracheal intubation? Video laryngoscope? Asleep fiberoptic? Awake fiberoptic? Why? If you chose awake fiberoptic intubation, what might be the risks of anesthetizing the airway in this pt? Would you administer IV sedation? Which? Why? Assume awake intubation is successful. Would obesity affect maintenance drug choices? Why? Is TIVA w/remifentanyl, propofol, and rocuronium a reasonable choice? Why? Your choice for maintenance?
2. **Supine hypotension:** After intubation and induction of GA, BP falls to 90/50 and HR increases to 110 when pt positioned supine for surgery. DDx? Rx? Position change? IV fluids? Pressors? Would you expect Trendelenburg position to improve or worsen the hypotension and tachycardia? Why? During insufflation of the abdomen, PIP rises to 45 cmH₂O. Are ventilator adjustments needed? What adjustments? Why?
3. **Ketoacidosis:** 3 hrs into procedure, pt's glucose is 440 mg/dL. DDx? Are additional lab data needed prior to Rx? Why? Assume the pt is experiencing DKA. How would you Rx? Would the Rx be different if the pt were experiencing hyperglycemia without DKA? How? What would be your glucose target as you Rx this pt for hyperglycemia?
4. **Supraventricular tachyarrhythmia:** During surgical closure, pt's HR suddenly increases to 160 bpm and it is difficult to discern P waves. DDx? If the rhythm were SVT, what additional information would you need to decide how to Rx? Assume BP 105/60. Which pharmaceutical agent(s) would be most appropriate? Adenosine? Esmolol? Diltiazem? Why?

B. POSTOPERATIVE CARE

1. **Extubation criteria:** How would you determine whether it was safe to extubate the pt at the end of surgery? Does his morbid obesity impact your extubation criteria? How? Does the type of surgery influence your extubation criteria? Would you place the patient in a sitting position for the extubation? Why/why not?
2. **Hypoxemia:** After extubation, SpO₂ falls to 89% while pt is breathing with face mask oxygen at 10 liters per minute. DDx? Assume pt is ventilating. How would you Rx hypoxemia? Increase FiO₂? CPAP? BIPAP? Is an ABG necessary before Rx is initiated? Why? ABG: pH 7.32; PaCO₂ 60; PaO₂ 58; FiO₂ 0.5. Interpret. How would these results impact your management?
3. **Suspected pulmonary aspiration:** (Assume hypoxemia worsens and pt is reintubated.) SpO₂ 90% on FiO₂ of 1.0. CXR demonstrates low lung volumes and an opacification in the right lower lobe consistent with pneumonia. Additional Rx necessary to address the hypoxemia? Lung recruitment maneuver? How? PEEP? How much? Why? Would you initiate antibiotic Rx? Which medication(s)? Why?
4. **Hypovolemia:** 5 hrs after ICU arrival, UO decreases from 1 to 0.2 mL/kg/hr. Of concern? How would you assess volume status? Transthoracic echocardiogram? What would you look for? Place CVP catheter? What CVP value would suggest hypovolemia? Why? Other evaluation necessary? If so, what? Assume pt is hypovolemic. How would you Rx? Add'l IV fluids? Which? Why? How much IV fluid would you administer?
5. **Postop analgesia:** If pt had a working epidural in place, would you use it for pain control while the pt was intubated? Which drugs? Why? Would you also administer IV analgesics and/or sedatives? Which? Why? Assume pt develops pruritus from epidural opioid. How would you Rx? What would you do if initial Rx were ineffective?
6. **Postop sepsis:** On POD#2, pt is extubated. Later that day, he becomes febrile, hypotensive, and tachycardic. DDx? If he were experiencing sepsis from an anastomotic leak, how Rx? Antibiotics? Which? Why? Pressors? Which? Why? Inotropes? Which? Why? ScvO₂ is 55%. How would this finding impact your management?

C. ADDITIONAL TOPICS

1. **Regional anesthesia:** An otherwise healthy 42 y.o. woman is having a right rotator cuff repair under interscalene block with 0.5% bupivacaine. 15 min after the block is completed, the pt c/o difficulty taking a deep breath. DDx? Evaluation? CXR reveals an elevated right hemidiaphragm. What could be the cause of the elevated hemidiaphragm? Is this expected or a complication? Why? Is it safe to proceed with surgery? How would you decide? Does the choice of local anesthetic agent play a role in this complication? How? What, if any, Rx should be offered to the pt? 10% pneumothorax is noted. Would you Rx the pneumothorax? How? Why? What would you tell the pt?
2. **Neuroanesthesia:** A 45 y.o. woman undergoes craniotomy for resection of parietal glioma. She receives an opiate and isoflurane to maintain GA. Surgeon comments that the dura is "tight." Potential causes? How would you Rx? Diuretic? Mannitol? Furosemide? Why? Concerns with too much diuresis? K⁺ 3.1 mEq/L. Replace K⁺? Why? How much would you give? Is hyperventilation to reduce ICP appropriate in the setting of hypokalemia? Target CO₂?

3. **Aortic stenosis:** An 88 y.o., 45-kg woman with a history of COPD and aortic stenosis presents with painful rectal prolapse that requires repair via the perineal approach in the “jackknife” position. Would the severity of her COPD affect anesthetic choice and/or choice of intraoperative position? Explain. Aortic valve area is 1.2 cm^2 and she has no cardiac symptoms. GA vs. Reg Anesth? Why? Options for Reg Anesth? After procedure begun, patient reports sharp lower abdominal pain. What are your Rx options? Which would you choose? Why?

Practice Exam 6, Session 2

A 17 y.o., G1P0, 105-kg, 5'2" woman at 37 weeks of gestation is admitted to your labor and delivery suite with painful contractions and vaginal bleeding. She has sickle cell disease. She has received blood transfusions 3 times during this pregnancy. She has a placenta previa by previous ultrasound. A cesarean delivery is planned. She has a markedly receding mandible and last ate 1 hour ago. BP 94/60; HR 110; RR 22; T 37°C; Hgb 7.5 g/dL; platelets 92,000/mm³.

A. PREOPERATIVE EVALUATION

1. **Consent:** Can a 17 y.o. pregnant patient legally sign a consent for anesthesia and surgery? If you were unsure, how would you determine? Is it acceptable to waive the consent due to the urgent nature of the procedure? Why/why not? If the pt asked that her mother sign the consent, would that be acceptable? Why/why not?
2. **Volume status:** How would you assess the pt's volume status? Why? Does pregnancy affect usual signs of hypovolemia? How about pain/anxiety? How would you determine if the pt should undergo an exchange transfusion? Would it matter if she had sickle cell trait versus sickle cell disease in terms of whether she should undergo exchange transfusion? Why?
3. **Difficult airway evaluation:** The pt has never undergone GA. How would you evaluate her airway for intubation? Assume her airway is Mallampati 4. She has a 2-fingerbreadth thyromental distance. Her neck circumference is 50 cm. What would these pieces of information suggest about the likelihood that she will be difficult to intubate? How would you determine whether she is likely to be difficult to mask ventilate?
4. **IV access and monitoring:** What type of IV access would you place for the cesarean delivery? What hemodynamic monitoring would you use? Is an arterial catheter necessary? Why/why not?

B. INTRAOPERATIVE MANAGEMENT

1. **Regional vs. GA:** Assuming there is time and the pt is stable, would you recommend regional or GA? Why? Assume pt requests regional. What is your plan for airway mgmt if there is a complication (block too high, seizure)? What would you do to minimize risk of such complications (epidural vs. single-shot spinal vs. continuous spinal)?
2. **Anesthesia induction & maintenance:** Assume fetal distress develops and OB indicates cesarean delivery should be performed emergently. There is not enough time for regional anesthetic. How would you secure the airway? RSI? Awake fiberoptic? Assume you are unable to intubate. Could the cesarean delivery be performed using an LMA? OB suggests delivery must occur immediately despite inability to intubate. What would you do?
3. **Blood loss/hypotension:** Assume pt intubated using Fastrach LMA. After delivery, massive hemorrhage develops and BP falls to 70/30; HR 120. What fluids would you use for resuscitation? Why? What would be your criteria for transfusion with packed red blood cells? For FFP? Platelets? OB notes coagulopathy. Ddx? Would you obtain laboratory data before Rx? If so, which tests would you perform? Why? If DIC were suspected, are there specific interventions you would make? Cryoprecipitate administration? Tranexamic acid? Activated Factor VII? Other?
4. **Neonatal resuscitation:** A colleague cares for mother while you attend to the neonate who is flaccid, blue, and has a HR of 80. How would you resuscitate the child? Despite endotracheal intubation and ventilation with oxygen, the HR falls to 50. Start chest compressions? Administer drugs? If so, which and via what route? If endotracheal route, how would you adjust the dosage?
5. **Postop ventilation:** Pt is transferred to the ICU postop. She is intubated and sedated. What ventilator mode would you choose? Assist-control? SIMV? Pressure control? Pressure support? Why? Would you add PEEP? Why? How much? What medication(s) would you use for sedation? Propofol? Dexmedetomidine? Midazolam? Why?
6. **TRALI:** SpO₂ falls to 90% with FiO₂ 1.0 after 4 hours in the ICU. CXR demonstrates diffuse bilateral pulmonary edema. Ultrasound examination reveals robust left ventricle contractility. Inferior vena cava diameter is 1 cm with more than 50% respirophasic variation. Ddx? How would you Rx the pulmonary edema? Diuretics? PEEP? Respiratory therapist recommends airway pressure release ventilation (APRV). What are the advantages/disadvantages of APRV?

C. ADDITIONAL TOPICS

1. **Venous air embolus:** A 42 y.o. man is undergoing resection of a large glioblastoma under GA using isoflurane, remifentanyl, and rocuronium. After the surgeon lifts the bone flap, ETCO₂ decreases from 31 to 20 mmHg. Ddx? Rx? BP decreases to 70/30 as you are initiating therapy. How would you raise BP? Assume resuscitation from VAE is successful and BP returns to near baseline. Should the surgery be cancelled? Why/why not?
2. **Anesthesia for radiation therapy:** A 10 y.o. boy with a mediastinal mass requires radiation therapy. The procedure is expected to take 45 min. He is sitting comfortably in bed preop. Room air SpO₂ 97%. The radiation oncologist requests

IV sedation. Would you agree to IV sedation? How would you interpret the CXR? <Examiner: instruct candidate to scroll down to visual aid.> Based on the CXR findings, what are your biggest concerns with regard to anesthetic management of this pt? How would the CXR findings impact your anesthetic plan? Would you request CT scan for further evaluation? Why?

3. **Malignant hyperthermia:** During preop evaluation, a 21 y.o. man scheduled for elective lumbar laminectomy states that he was told he had trismus associated with a GA when he was 5 y.o. What, if any, w/u is indicated? CK value? Genetic testing? What kind of testing? Is preop prophylactic dantrolene indicated? What precautions would you take for this pt? Would you advise his family members to undergo any testing? What type of testing?

Practice Exam 6, Session 2, continued

Visual Aid for Additional Topic 2

