

## MEDICAL KNOWLEDGE

### Goals

- Residents must demonstrate knowledge about established and evolving biomedical, clinical, and cognate (e.g. epidemiological and social-behavioral) sciences and the application of this knowledge to patient care. Residents are expected to:
  - Demonstrate an investigatory and analytic thinking approach to clinical situations
  - Know and apply the basic and clinically supportive sciences which are appropriate to their discipline

### Objectives

#### CA-1

- Physiology
  - Identify anesthetic-induced changes in physiology
  - Discuss the impact of surgical procedures on patient physiology
  - Describe pathophysiology of common intraoperative events (e.g. hypotension, hypoxia, tachycardia, low urine output)
- Pharmacology
  - Compare and contrast differences in the pharmacology of various agents within each anesthetic drug class
  - Choose proper doses of all common agents: intravenous induction agents, opioids, inhalational agents, neuromuscular blocking and reversal agents, pressors, beta blockers, vasodilators
- Preoperative Evaluation
  - Explain the indications for preoperative laboratory testing
  - Identify risk factors and perioperative considerations with common medical problems in adults (e.g. CAD, COPD, GERD, DM, RAD, Obesity)
  - Perform complete preanesthetic evaluation including highlighting areas having a strong impact on anesthetic care
- Intraoperative Management
  - Recognize indications for invasive monitoring
  - Recognize indications for endotracheal intubation, and implement the ASA practice guidelines for the management of the difficult airway
  - Discusses appropriate fluid management choices for the perioperative setting
  - Describe the anatomy of the brachial plexus, lumbar plexus, sciatic nerve, epidural space, and subarachnoid space
  - Explain the physiology and indications/contraindications of neuraxial anesthesia and peripheral nerve blocks
- Postoperative Care

- o Identify risk factors for postoperative nausea, and describe methods of prevention
- o Discuss possible etiologies of postoperative hypoventilation
- o Describe the mechanism of acute pain transmission and common peri-operative treatment modalities
- Apply evidence-based medicine to clinical situations
- Acknowledge limits of competency and act accordingly
- Discuss key points from each chapter of the Barash text
- Completes each rotation with an evaluation of satisfactory or better

## CA-2

- Physiology
  - o Discuss the impact of surgical procedures on patient physiology
  - o Explain anesthetic-induced changes in physiology and anesthetic implications of common medical problems in adults
  - o Explain the physiologic changes of pregnancy and the impact on perioperative/peripartum management
  - o Describe the physiologic differences of infants and children and the impact on perioperative management
- Pharmacology
  - o Choose among alternative anesthetic plans and among alternative anesthetic agents using an understanding of pathophysiology and pharmacology
  - o Create a treatment plan using varieties of agents within each anesthetic drug class
  - o Choose and defend choices for proper doses of all common agents: intravenous induction agents, opioids, inhalational agents, neuromuscular blocking agents, pressors, beta blockers, vasodilators
- Preoperative Evaluation
  - o Explain risk factors and perioperative considerations with common medical problems in adults (e.g. CAD, COPD, GERD, DM, RAD, Obesity)
  - o Compare and contrast preoperative laboratory tests for suitability with specific cases
- Intraoperative Management
  - o Explain and defend reasoning for endotracheal intubation, while implementing the ASA practice guidelines for mgmt of the difficult airway
  - o Compare and contrast indications for invasive monitoring
  - o Synthesize the information obtained from invasive monitors
  - o Compare and contrast fluid management options
  - o Explain and defend treatment of intraoperative events (e.g. hypotension, hypoxia, tachycardia, low urine output) back to originating pathophysiology
  - o Identify key anatomical landmarks of the brachial plexus, lumbar

- plexus, sciatic nerve, epidural space, and subarachnoid space
  - o Explain and defend decisions to perform neuraxial anesthesia and peripheral nerve blocks
  - o Explain pulmonary physiology and issues related in treating hypoxemia during one-lung ventilation
  - o Describe the physiologic changes of cardio pulmonary bypass and the impact on perioperative/anesthetic management
- Postoperative and Pain Management
  - o Discuss pathophysiologic and surgical issues requiring perioperative critical care
  - o Explains the dynamics of complex acute pain mgmt and peri-operative treatment modalities
  - o Compare and contrast common peri-operative treatment modalities related to the mechanism of acute pain transmission
  - o Explains the mechanism of chronic pain transmission and common treatment modalities
- Apply evidence-based medicine to clinical situations
- Synthesize relevant articles in recent literature
- Acknowledge limits of competency and act accordingly
- Explain key points from each chapter of the Barash text
- Completes each rotation with an evaluation of satisfactory or better

### CA-3

- Physiology
  - o Debate multiple viewpoints impact of surgical procedures on patient physiology
  - o Debate alternative anesthetic plans and alternative anesthetic agents using an understanding of pathophysiology and pharmacology
  - o Evaluate and provide a critique of perioperative/peripartum management plans for OB patients based on the physiologic changes
  - o Evaluate and provide a critique of perioperative management plans for infants and children based on physiologic differences
- Pharmacology
  - o Debate in the pharmacology of various agents within each anesthetic drug class
  - o Debate and defend choices for proper doses of intravenous induction agents, opioids, inhalational agents, neuromuscular blocking agents, pressors, beta-blockers, vasodilators
- Preoperative Evaluation
  - o Create and revise anesthetic plans based on risk factors and peri-operative considerations with all co-morbid conditions identified in preoperative examination
  - o Select and defend choices of preoperative laboratory tests and consultations and suitability with specific cases
  - o Understands principles of all major anesthetic subspecialties

(ambulatory, cardiac, critical care, neuro, obstetric, acute and chronic pain, pediatrics, regional, trauma, VT) in depth

- Intraoperative Management
  - o Evaluate need and use of endotracheal intubation, following the ASA practice guidelines for mgmt of the difficult airway
  - o Plan and defend plan for invasive monitoring
  - o Evaluate and create an action plan based on the information obtained from invasive monitors
  - o Revise anesthetic plan based on information from non-anesthetic monitors used commonly in the perioperative period (e.g. evoked potentials, fetal heart rate)
  - o Debates the benefits of fluid management options including the risk and benefits of peri-operative transfusion
  - o Debate and defend a variety of treatments for intraoperative events e.g. hypotension, hypoxia, tachycardia, back to originating pathophysiology
  - o Analyze and explain reasoning the risk benefits of performing neuraxial anesthesia and peripheral nerve blocks
  - o Locates anatomical landmarks of the brachial plexus, lumbar plexus, sciatic nerve, epidural space, and subarachnoid space to facilitate anesthetic
  - o Debate and defend choices in multiple approaches to regional blockade of each region of the upper extremity, lower extremity, and neuraxis, and is able to defend multiple approaches
  - o Evaluate and provide a critique of perioperative management plans for cardio pulmonary bypass based on physiologic changes
  - o Explain and defend multiple methods for treating hypoxemia during one-lung ventilation, including basic physiology in the defense
- Postoperative and Pain Management
  - o Debate pathophysiologic and surgical issues requiring perioperative critical care
  - o Debate multiple treatment modalities and choose one, for complex patients related to the mechanism of acute pain transmission
  - o Debate multiple treatment modalities and choose one, for complex chronic pain patients
- Integrate evidence-based medicine in clinical situations
- Evaluate and debate articles in recent literature
- Debate key points from each chapter of the Barash text
- Completes each rotation with an evaluation of satisfactory or better