



## University of Illinois Metropolitan Group Hospitals Program in General Surgery

**Rotation Title:** Anesthesia – St. Francis Hospital

**Level of Training:** PGY I

**Faculty:**

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**Rotation Description:**

This rotation serves as an introduction to anesthesia to first year surgical residents. It is one month in duration and takes place at St. Francis Hospital in Evanston, Illinois. The intern will be introduced to various topics of anesthesia including the preoperative evaluation of patients, the intra operative care of patients, and the postoperative care of surgical patients as they relate to the field of anesthesia. In addition, the intern will have opportunity to participate in the pain clinic with Dr. Rao on Wednesday afternoons. During the month, the resident will take part in the General Surgery call rotation.

## **ASSESSMENT:**

Monitoring of the accomplishment of the stated objectives will be performed using the following methods:

1. 360 degree evaluation: End of rotation evaluation of resident performance to assess the Resident's demonstration of Core Competencies with respect to the stated objectives by faculty, nursing staff, and patients using multiple tools.
2. Written Examination: Performance on the annual ABSITE examination on the anesthesia section.

## **Surgical Skills Advancement:**

The resident will exhibit surgical performance skills based on the following guidelines:

1. Utilize the simulation lab for improvement and experience with anesthesia procedures, offering the opportunity for advancement along the skills lab curriculum outlined in the simulation OSAT.
2. By the end of the rotation, have completed (per necessity) the OSAT/OSCA for the following procedures:
  - Anesthesia OSAT
  - Intubation OSCA

## **COMPETENCY BASED LEARNING OBJECTIVES**

### **Patient Care**

1. Perform a complete preoperative history and physical examination with emphasis on elements related to anesthesia patients.
2. Check the laboratory evaluation and any other diagnostic studies including chest x ray, EKG, as appropriate.
3. Be proficient in the preoperative preparation of patients for surgery and immediate postoperative care.
4. Understand the basic pathophysiology and principles of anesthesia.
5. Demonstrate the ability to effectively set priorities and coordinate care of sick patients.
6. Physical Examination: exhibit proficiency in performing a systematic physical exam of the entire body with emphasis on positive findings as well as pertinent negative findings particularly as they relate to intubation anatomy.

### **Curriculum/Goals**

1. Manage the airway in adults and children, employing

appropriate:

- a. Physical maneuvers
- b. Oral/nasal support devices
- c. Suctioning techniques to maintain clear airway
2. Perform nasal and oral intubation.
3. Recognize the stages of general anesthesia and their implications, particularly in regard to airway management.
4. Recognize and treat the signs and symptoms of complications due to anesthetic agents such as:
  - a. Cardiovascular collapse
  - b. Acute metabolic disturbance
  - c. Malignant hyperthermia
5. Perform preoperative assessment of patients.
6. Recognize risks and side effects of drugs used for pain control.
7. Manage postoperative complications of anesthesia.

## **ANESTHESIA FOR THE ELDERLY PATIENT**

Demonstrate an understanding of the physiological alterations of the aging process and the potential impact on anesthetic administration.

Recognize and manage postoperative altered mental status in the elderly.

1. Summarize how the physiology of aging interacts with the effects of anesthesia, with particular attention to:

- a. How high sympathetic tone, loss of beta receptor responsiveness, and volume sensitivity to both hypovolemia and hypervolemia make blood pressure inherently unstable.
- b. How increased chest wall stiffness, increased lung compliance and increased brain sensitivity to sedative/analgesics increase the likelihood of hypoxia, atelectasis and pneumonia.
2. Summarize the pharmacokinetic and pharmacodynamic principles underlying the effective use of anesthetic agents, particularly how aging often leads to increased sensitivity and prolonged duration of drug effects.
3. Understand how the anesthesiologist approaches patient evaluation and the optimization of patient condition in preparation for surgery.
4. Recognize those issues important to an elderly patient when faced with the decision to have surgery, and be able to determine when mental impairment does or does not preclude the patient from providing informed consent.
5. Understand how elderly patients are predisposed to hypothermia and how hypothermia adversely affects the risk of infection and cardiac function.
6. Be familiar with the causes, diagnosis and management of postoperative delirium.
7. Explain the principles and techniques of preemptive analgesia,

including nonsteroidal analgesics and peripheral nerve and field blocks.

8. Analyze and compare the hemodynamic effects, benefits, risk and contraindications for the following advanced techniques of postoperative pain control:
  - a. Epidural infusions of local anesthetics and/or opioids
  - b. Continuous nerve blocks
  - c. Intrapleural and extrapleural catheters

## **Medical Knowledge**

1. Demonstrate an understanding of the pathophysiology of pain and its management.
2. Demonstrate an understanding of the pharmacology and principles of local, regional, and general anesthesia in analgesia.
3. Demonstrate the ability to use these principles in the management of surgical patients.
4. Recognize the condition of malignant hyperthermia and its treatment.
5. Demonstrate an understanding of intraoperative fluid therapy.
6. Demonstrate an understanding of preanesthesia evaluation.
7. Demonstrate an understanding of patient positioning and possible nerve related injuries as well as systemic effects caused by change in patient positioning.
8. Demonstrate an understanding and recognition of the level of sedation of the patient.
9. Demonstrate knowledge of the pertinent anatomy as related to general anesthesia, nerve blockades, spinal, and epidural anesthesia.
10. Demonstrate an understanding of the different types of airways (endotracheal, nasotracheal, LMA) and recognize their indications as well as the advantages and disadvantages.
11. Understand the role of the surgeon in choosing and administering anesthesia for procedures such as esophagogastroduodenoscopy, colonoscopy, and bronchoscopy.
12. Demonstrate proper technique and ability to perform: bag-mask ventilation, intubation, extubation, arterial line placement, central line placement.
13. Demonstrate ability to determine ASA class.
14. Demonstrate an understanding of cardiac risk stratification for surgical procedures.
15. Demonstrate an understanding of appropriate preoperative labs (CBC, CMP, PT/INR, PTT, beta-HCG, CXR, EKG) and the length of time and conditions in which these labs are valid.
16. Demonstrate the ability to discuss the risks and benefits of anesthesia with the patient.
17. Demonstrate the ability to formulate an anesthesia plan.
18. Demonstrate an understanding of intraoperative monitoring of blood pressure, ETCO<sub>2</sub>, respiratory rate, oxygen saturation, heart rate, urine output, and overall fluid status.
19. Demonstrate an understanding of postoperative care including complications and pain.
20. Demonstrate an understanding of PCA management, choice of opioids, and equianalgesic doses of opioids.
21. Demonstrate knowledge of the dose, onset, duration, metabolism, side effects, and indications of inhalational agents, induction agents, reversal agents, muscle relaxants (depolarizing, nondepolarizing), local anesthetics, opioids, and benzodiazepines.
22. Choice of Miller blade (straight), or Mac blade (curved) vs Flipper blade or Glidescope for difficult intubations.

## Performance Goals in Medical Knowledge

1. Discuss the rationale governing the use of local, regional and general anesthesia, during daily one on one conversation with the attendings, before, during and after each case, including the following concepts:

- a. Careful cardiovascular, respiratory and neurologic monitoring as the mainstay of safe anesthesia.
- b. No specific anesthetic is inherently safer than any other; as such risk assessment must be considered in each case.
- c. Regional anesthesia may provide some advantages, including:
  - (1) Decreased blood loss.
  - (2) Improved perioperative graft patency in vascular Reconstruction.
  - (3) Reduced incidence of venous thrombosis.
- d. Combined regional and general techniques may improve outcomes in selected patient populations:
  - (1) Significant cardiovascular disease and major abdominal or thoracic surgery.
  - (2) Severe pulmonary disease and major abdominal or thoracic surgery.
- e. Preemptive analgesia, such as the use of epidural anesthesia enhances perioperative comfort.

2. Summarize the essential elements of the pre anesthesia assessment including:

- a. Targeted history and physical examination (review of systems, emphasizing cardiovascular and pulmonary disease)
  - (1) Effects of chronic medication (anticoagulants, insulin and antiarrhythmics).
  - (2) Effects of preoperative medications (narcotics, anxiolytics and atropine).
  - (3) Effects of postoperative medications (including antihypertensives and antiemetics).
  - (4) Timing of last po intake (liquids and solids).
  - (5) Tobacco, alcohol, and drug use.
  - (6) Previous history of adverse effects of anesthesia.
  - (7) Family history of adverse effects of anesthesia.
  - (8) Pain level
- b. Anatomic and physiologic variables germane to anesthetic success.
  - (1) Airway anatomy, including the Mallampati classification.
    - (a) Class 1: Visualization of all oro-and hypopharyngeal structures.
    - (b) Class 2: Anterior and posterior tonsillar pillars are obscured by tongue.
    - (c) Class 3: Soft palate and base of uvula are

Visible.

(d) Class 4: Only the soft palate is visualized.

(e) Increasing Mallampati score is associated with reduced likelihood of successful direct laryngoscopic intubation.

(2) Skeletal deformities

(3) Neuromuscular disease

(4) Dentition

c. American Society of Anesthesiology class and physical status:

(1) Class 1: normal, healthy patient.

(2) Class 2: Patient with mild systemic disease that results in no functional limitation (HTN, DM, morbid obesity, extremes of age).

(3) Class 3: Patient with severe systemic disease that results in functional limitation (uncontrolled HTN, DM with vascular complications, angina, prior MI, activity-limiting pulmonary disease).

(4) Class 4: Patient with severe systemic disease that is a constant threat to life (CHF, unstable angina, advanced pulmonary, renal, or hepatic dysfunction).

(5) Class 5: Patient is moribund who is not expected to survive without the operation (ruptured AAA, PE, head injury with increased ICP).

(6) Class 6: Brain-dead patient whose organs are being removed for donation.

(7) Emergency: Any patient in whom an emergency operation is required.

3. Outline the major characteristics of the pharmacokinetics and pharmacodynamics of anesthesia agents - local, volatile, opioid considering:

a. Lipid solubility

b. Protein binding

c. Partition coefficients

4. Summarize the use and monitoring of drugs for sedation and analgesia to include:

a. minimum anesthetic monitoring (pulse oximetry, electrocardiogram, blood pressure).

b. advantages of scheduled postoperative analgesia versus intermittent dosing.

c. Indications for patient-controlled analgesia (PCA).

d. Importance of periodic assessment to determine:

(1) Level of consciousness

(2) Pulmonary status in sedated patients

5. Summarize the principles of administration and compare effectiveness of the various methods of anesthesia.

6. Describe the potential benefits of regional and local anesthesia including:

a. Respiratory depression

b. Diminished systemic effects (liver and renal toxicity)

c. Direct cardiac depression

7. Outline the potential complications associated with the use of regional anesthesia including:

a. Spinal anesthetics (headache, cerebrospinal fluid leak, meningitis)

b. Regional nerve blocks (perineural hematomas)

8. Discuss the indications for the use of muscle relaxants.

9. Analyze anesthetic monitoring techniques to include:

a. Swan-Ganz catheters

- b. Arterial lines
  - c. Transvenous pacemakers
  - d. End-tidal carbon dioxide monitoring
  - e. Temperature monitoring
  - f. Transesophageal echocardiography
10. Describe the techniques and potential complications of managing an airway, including endotracheal and nasotracheal intubation.
  11. Describe and explain the most common immediate postoperative anesthetic issues:
    - a. Airway stability
    - b. Ventilation and oxygenation
    - c. Pain control
    - d. Nausea and vomiting
    - e. Temperature regulation
    - f. Hemodynamic stability
  12. Analyze therapeutic options for patients with chronic pain.
  13. Recognize the condition of malignant hypothermia and its management:
    - a. Incidence in general population (1:10,000)
    - b. Autosomal dominant inheritance with variable penetrance
    - c. Pathophysiology of defective sarcoplasmic reticulum and secondary diminished reuptake of myoplasmic calcium leading to increased anaerobic metabolism of skeletal muscle.
    - d. Induction medications including inhaled anesthetics, depolarizing and, nondepolarizing muscle relaxants.
    - e. First sign is increased ETCO<sub>2</sub>
    - f. Signs: fever, tachycardia, skeletal muscle rigidity, acidosis, hyperkalemia.
    - g. Therapy includes the discontinuance of anesthetic agents, dantrolene administration (**IV 1 mg/kg by continuous rapid push; evaluate and repeat as needed until cumulative total dose is up to 10 mg/kg**), use of cooling blankets, HCO<sub>3</sub> administration, glucose administration, supportive care, and fluid resuscitation with proper physiologic monitoring.

### **Practice-Based and Lifelong Learning**

1. Develop a personal program of self-study and professional growth with guidance from the teaching staff.
2. Utilize current literature resources to obtain up-to-date information on anesthesia and practice evidence-based medicine.
3. Participate in teaching and organization of educational weekly conferences.
4. Participate in activities of the Department of Anesthesia including all teaching conferences
5. Participate in the Department Morbidity & Mortality conference and utilize information to further improve patient care.
6. Topic of the day in the computerized lifelong learning portfolio.

### **Professionalism:**

1. Practice compassionate patient care maintaining the highest moral and ethical values with a professional attitude.
2. Demonstrate understanding of the needs and feelings of others, including the patient's family members, allied health care personnel (nurses, clerical staff, etc.), fellow residents, and medical students.
3. Communicate and collaborate effectively within a team of health care providers.
4. Demonstrate respect, compassion and integrity in the care of oncologic and general surgery patients on a daily basis
5. Demonstrate mature and educated approach to ethical issues commonly encountered
6. Show sensitivity to patients' culture, age, gender and disabilities
7. Recognize and appropriately handle sensitive cases of abuse
8. Be self-aware and have knowledge of professional limits by practicing on-going medical education and self-improvement.
9. Be an accountable professional in their actions, decisions and interactions with others.

### **Interpersonal and Communication Skills**

1. Assess risk surrounding the stress of proposed surgery relative to the benefit, with the perspective of physiologic reserve of the patient. Be able to adjust the scope of proposed surgery accordingly and communicating this information to patients and their families.
2. Appropriately select medications and adjust dosages for the elderly patient.
3. Recognize postoperative delirium and be able to diagnose and treat reversible causes.
4. Perform common field and nerve blocks for postoperative analgesia.
5. Establish effective dialogue with anesthesia, internal medicine, and surgical colleagues for comprehensive care of complicated patients.

### **Systems-Based Practice**

1. During this rotation the residents have a wide exposure to the pain service with Dr Rao and Dr. Bathla. This becomes an interdisciplinary interaction with trauma, obstetrics, pediatrics, and outpatient clinic.
2. Understand how health care organization affects surgical practice and anesthesia.
3. Demonstrate cost effective health care.
4. Be able to discuss the influence of local and national political health care systems and their effects on the practice and feasibility of general surgery and anesthesia.
5. Follow established practices, procedures, and policies of the Department of Anesthesia and integrated and affiliated hospitals.

### **READING MATERIALS:**

Educational materials which will function as guides for resident education during this course include but are not limited to:

1. The SCORE General Surgery Resident Curriculum Portal accessed at <https://portal.surgicalcore.org/home>
2. Schwartz's Principles of Surgery

3. Anesthesia books and literature available on The Surgical Core Curriculum accessed via Access Surgery through the University of Illinois-Chicago at [www.uic.edu](http://www.uic.edu)
4. Anesthesia library of resources

### **OUTCOMES:**

Outcomes for the various goals and procedures in this curriculum will be assessed by the following standards:

1. Superior: the resident exhibits conceptual understanding beyond that which is described in this bulletin, and practice performance which is at a standard for a resident of a more advanced PGY year.
2. Above average: the resident has shown understanding and performance that is above what is expected for the rotation.
3. Competent: the resident exhibits conceptual understanding and practice based performance standards that are required for advancement for general surgical practice for the appropriate PGY year, for advancing towards general surgical practice.
4. In Need of Remediation: the resident has failed to grasp the basic concepts and practices necessary to pass this rotation.

\*Daily Surgery AM Report is a dedicated time for learning and education. Residents rotating on Anesthesia are expected to attend when their clinical obligations on the rotation permit.