

## **Subspecialty Rotation: Surgery, Pediatric**

### **Faculty:**

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**GOAL:** Anesthesia. Participate in the care and management of pediatric patients requiring general and local anesthesia.

Assist the anesthesiologist or surgeon in addressing issues related to pre-anesthesia evaluation, risk assessment and preparation.

Complete pre-op evaluation, including history, physical examination, laboratory testing, and pediatric assessment of anesthesia risk, and communicate concerns to anesthesiologist or surgeon.

Participate in deciding whether a child is appropriate for day surgery or inpatient surgery.

Assist in airway assessment as it relates to the anticipated anesthetic.

Refer for cardiovascular assessment as it relates to the anticipated anesthetic.

Participate in the pre-anesthesia management of children with the following conditions: recent upper respiratory infection, reactive airway disease, upper airway obstruction (croup, epiglottitis, airway foreign body), congenital heart disease, neonatal apnea, obstructive sleep apnea, diabetes, seizure disorder.

Recognize special anesthetic considerations for children with the following conditions: genetic disorders, musculoskeletal disorders and conditions requiring emergency surgery.

Manage issues related to the continuation of chronically administered medications.

Recognize the importance of and describe in general terms the principles of pre-anesthesia sedation.

Participate in educating families regarding principles related to NPO status and PO intake prior to induction of anesthesia.

Assist in the psychosocial preparation of the child and parents for anesthesia.

Recognize the importance of and describe in general terms the complication of malignant hyperthermia.

Understand the basic pharmacology of commonly used agents for local anesthesia and their side effects.

Demonstrate understanding of the following principles of post-anesthesia management:

1. Management of post-anesthesia nausea and vomiting
2. Post-surgical pain management (in-hospital, day surgery, home)
3. Re-establishment of PO intake after anesthesia
4. Discharge criteria
5. Adequate follow-up

Identify psychosocial barriers to obtaining adequate post-operative care (e.g., parental anxiety, cost, distance, school attendance)

Describe the role and general scope of practice of pediatric anesthesiologists; recognize situations where children should be cared for by anesthesiologists trained in the care of children; work effectively with these specialists in the care of children.

**GOAL: Sedation. Understand the principles of pediatric sedation and apply them in the appropriate setting.**

Participate in managing children in the outpatient setting who require sedation for diagnostic and/or therapeutic procedures performed outside of the operating room.

Discuss patient/procedural factors that increase risk of morbidity from sedation, scenarios requiring anesthesia consultation regarding sedation safety, and issues that drive a need for general anesthesia rather than sedation.

Understand the basic pharmacology of commonly used agents for sedation and their side effects.

Identify safe procedures for administering and monitoring sedatives and analgesics when general anesthesia is not used, e.g., for the following procedures commonly ordered by general pediatricians:

1. Magnetic resonance imaging
2. Computed tomography

3. Lumbar puncture
4. Wound management

Demonstrate familiarity with safe procedures for administering and monitoring sedatives and analgesics when general anesthesia is not used, e.g., for the following procedures ordered or performed by subspecialists:

1. Radiological procedures other than MRI, CT
2. Gastrointestinal endoscopy
3. Pulmonary endoscopy
4. Radiation therapy
5. Bone marrow aspiration
6. EEG

Explain current terminology for various levels of sedation, including terms used by hospital accreditation bodies and credentialing committees (e.g., "conscious sedation") and demonstrate that you understand your hospital's standards for safety for each type of sedation.

Recognize circumstances when optimal care of the child requires the services of an anesthesiologist.

**GOAL: Pain Management. Recognize and manage pain occurring with common pediatric conditions.**

Skillfully use tools to assess pain in infants and children.

Understand general principles of pharmacologic pain management.

1. Choice of analgesic agent (nonsteroidal anti-inflammatory, opioid)
2. Choice of administrative route
3. Dose escalation and weaning
4. Shifting between analgesics
5. Monitoring efficacy
6. Side effects

Recognize the utility of regional nerve blocks for post-surgical pain relief.

Recognize and explain the principles of:

1. Patient controlled analgesia (PCA)
2. Epidural infusion of analgesic medications
3. Patient-controlled epidural analgesia

Address issues surrounding the management of chronic pain.

1. Recognize the common scenarios associated with chronic pain.
2. Describe general principles about treatment for chronic pain syndromes, including approaches using pharmacology, behavioral/psychosocial, complementary or alternative therapies.
3. Recognize non-pharmacological treatment alternatives for chronic pain syndromes, including complementary and alternative methods.
4. Use behavioral and supportive care for pain management in acute situations.
5. Use psychosocial adjuncts for treatment of chronic pain syndromes in a variety of situations, such as neonatal intensive care treatments, sickle cell anemia, headache.
6. Consider special issues in the treatment of pain occurring in association with burns, terminal illness and emergency procedures.

Address issues surrounding common pain problems (e.g., circumcisions, immunizations, phlebotomy, otitis media, pharyngitis, teething).

**GOAL: Normal Vs. Abnormal (Surgery). Differentiate normal conditions from pathologic ones requiring surgical intervention.**

Counsel parents regarding the natural history of uncomplicated umbilical hernia.

Distinguish inguinal hernia from hydrocele and describe when it is appropriate for the pediatrician to observe and follow, and when to refer for evaluation.

Distinguish acute abdominal pain related to transient events like constipation, musculoskeletal pain or gastroenteritis from pain that is likely to come from a serious surgical condition.

Interpret clinical and laboratory tests to identify conditions that require surgical intervention, including:

1. Blood studies (CBC, ESR, Electrolytes, BUN, Creatinine, LFTs, amylase, lipase)

2. Occult blood in gastric fluid and stool
3. Cultures (blood, stool, wound, urine, fluid from body cavities and abscesses)
4. Radiographic studies (KUB and upright abdominal films, barium enema, UGI and small bowel follow through)

**GOAL: Undifferentiated Signs and Symptoms (Surgery). Evaluate and appropriately treat or refer signs and symptoms that may require surgery.**

Create a strategy to determine if the following presenting signs and symptoms are caused by a surgical condition, provide initial evaluation or treatment, and refer appropriately:

1. Acute abdominal pain
2. Acute scrotum
3. Vomiting, especially bilious or bloody
4. Inguinal swelling or mass
5. Abdominal mass
6. Bloody stools
- 7.

**GOAL: Common Conditions Not Referred (Surgery). Diagnose and manage common conditions that generally do not require surgical referral.**

Diagnose, manage, and counsel patients and parents about the following conditions that generally do not require surgical evaluation:

1. Umbilical hernia
2. Retractable testes
3. Resolving hydrocele
4. Transient lymphadenopathy
5. Minor lacerations

**Conditions Generally Referred (Surgery). Diagnose, provide initial stabilization, and refer appropriately conditions that usually require surgical evaluation.**

Recognize, stabilize and initiate management and surgical referral for the following conditions:

1. Intussusception

2. Tumor
3. Trauma (e.g., blunt abdominal trauma)
4. Burns
5. Failure to thrive or gastroesophageal reflux requiring gastrostomy tube or Nissen fundoplication
6. Central venous access
7. Atypical mycobacterial adenitis
8. Acute lymphadenitis
9. Prenatal diagnosis of surgical condition: Congenital diaphragmatic hernia, Hirschsprung's, Atresia or stenosis of gastrointestinal tract, CCAM (cystic adenomatoid malformation), abdominal wall defects (gastroschisis and omphalocele), lymphatic malformations (cystic hygroma) of the neck, esophageal anomalies, sacrococcygeal teratomas
10. Caustic strictures of esophagus
11. Pleural effusion or empyema
12. Hypertrophic pyloric stenosis
13. Meconium ileus
14. Meckel's diverticulum
15. Malrotation, volvulus
16. Ascites
17. Premature infant with short bowel syndrome following necrotizing enterocolitis
18. Neck masses (thyroglossal duct cyst, branchial cleft cyst, cystic hygromas)
19. Anorectal anomalies (imperforate anus)
20. Chest wall defects: pectus excavatum and carinatum
21. Intersex and ambiguous genitalia
22. Lymphangiomas
23. Dysphagia, achalasia
24. Abdominal mass: Wilms Tumor, Neuroblastoma
25. Ovarian mass: teratomas, etc.

26. GI bleeding
27. Intestinal obstruction
28. Undescended testis
29. Ganglion cysts
30. Inflammatory bowel disease
31. Polyposis syndromes
32. Appendicitis
33. Biliary atresia
34. Gall bladder disease
35. Portal hypertension
36. Pancreatitis
37. Vascular anomalies

Identify the role and general scope of practice of pediatric surgeons; recognize situations where children benefit from the skills of surgeons with specialized training in the care of infants and children; and work effectively with these professionals in the care of children's surgical conditions.

**GOAL: Pre-operative and Post-operative Evaluation (Surgery). Collaborate with surgeons in the pre-operative and post-operative evaluation and management of pediatric patients, differentiating between adult and pediatric surgeons.**

Refer patients needing surgical intervention to the appropriate pediatric surgical subspecialist, if available in your locale.

Evaluate patients pre-operatively to provide medical clearance for surgery.

1. Obtain history of prior surgery and anesthesia.
2. Identify bleeding tendencies.
3. Assess oral cavity for loose teeth if endotracheal intubation is anticipated.
4. Manage any chronic respiratory conditions (e.g., asthma) that may have an impact on surgery and recovery.

Participate in the post-operative follow-up of surgical patients.

1. Monitor fluid and electrolyte status.
2. Observe for fever and recognize different causes of fever

and their appropriate evaluation.

3. Recognize and manage common post-operative complications (bleeding, stridor, infections, wound dehiscence).
4. Manage post-operative pain.
5. Assess discharge and follow-up plans.
6. Recognize psychosocial stresses of surgery on families and anticipate potential barriers to adequate post-op care.

Function as a pediatric consultant to surgical colleagues in the diagnosis and management of pediatric patients.

**GOAL: Trauma (Surgery). Evaluate, stabilize, manage and refer as necessary patients presenting with trauma.**

Counsel families regarding strategies to prevent traumatic injuries in childhood.

Evaluate patients presenting with simple or multiple trauma by performing a primary and secondary survey.

Manage mild trauma (e.g., mild closed head trauma or extremity soft tissue injury).

Stabilize and refer patients with multiple trauma.

1. Obtain venous access when possible.
2. Be prepared to intubate in managing the airway.
3. Splint suspected fractures.
4. Stabilize the cervical spine.
5. Fluid resuscitate when indicated, utilizing the appropriate product (colloid vs. blood products).
6. Order appropriate laboratory testing (e.g., type and cross match).
7. Monitor condition carefully until surgical evaluation can be performed.

Describe the main differences between a level 1, 2 and 3 trauma center, including specialists available at the site and type of pediatric patients served.

**GOAL: Appendicitis. Recognize, diagnose, manage and refer patients with appendicitis.**

Recognize common and unusual presenting signs and symptoms

indicating appendicitis, and diagnose by eliciting the appropriate history and physical examination findings.

When the diagnosis is not certain, recognize situations warranting inpatient admission for medical observation and repeated surgical consultation during course of illness.

Use imaging studies appropriately in the diagnosis of appendicitis.

Obtain laboratory tests suitable for evaluation of appendicitis and also in anticipation of surgical intervention.

Discuss potential surgical intervention with patients and families.

**GOAL: Therapeutic and Technical Procedures (Surgery). Acquire recommended proficiency in the use and performance of common surgical procedures.**

Order or perform, collect proper specimens, and interpret results or response to the following clinical studies and procedures used in surgery:

1. Incision and drainage of simple abscess, including paronychia
2. Management of first and second degree burns
3. Gastric suction and lavage
4. Placement of gastric tube (orogastric or nasogastric)
5. Gastrostomy tube replacement
6. Reduction of simple hernia
7. Central line use and care
8. Drainage of subungual hematoma
9. Suture of simple lacerations
10. Needle thoracentesis
11. Simple wound care
12. Acute stabilization of a patient with a major burn
13. Neonatal paracentesis

## **Procedures**

**GOAL: Technical and therapeutic procedures.** Describe the following procedures, including how they work and when they should be used; competently perform those commonly used by the pediatrician in practice.

Abscess: I & D of superficial abscesses

Abscess: aspiration

Anesthesia/analgesia: conscious sedation

Anesthesia/analgesia: digital blocks

Anesthesia/analgesia: local/topical

Anesthesia/analgesia: pain management

Burn: management of 1st & 2nd degree

Burn: acute stabilization of major burn

Central line: use/care

Chest tube placement

Foreign body removal (simple): subcutaneous

Gastric lavage

Gastric tube placement (OG/NG)

Gastrostomy tube replacement

Inguinal hernia: simple reduction

Sterile technique

Subungual hematoma: drainage

Thoracentesis

Wound care and suturing of lacerations

## **Source**

Kittredge, D., Baldwin, C. D., Bar-on, M. E., Beach, P. S., Trimm, R. F. (Eds.). (2004). APA Educational Guidelines for Pediatric Residency. Ambulatory Pediatric Association Website. Available online: [www.ambpeds.org/egweb](http://www.ambpeds.org/egweb). [Accessed 03/03/2005]. Project to develop this website was funded by the Josiah Macy, Jr. Foundation 2002-2005.