

## 2.13 PERI-PROCEDURAL CARE

### Introduction

Pediatric hospitalists are increasingly involved in the peri-procedural care of patients having surgical interventions performed in the operating room or other procedure units, including interventional radiology. Rendering this care requires specific expertise, including skill in communication and collaboration with hospital staff, anesthesiologists, proceduralists, surgeons, and other subspecialists. While not all pediatric hospitalists care for patients in the peri-procedural period, pediatric hospitalists should be knowledgeable and skillful in the provision and coordination of peri-procedural care when local demands dictate.

### Knowledge

Pediatric hospitalists should be able to:

- Describe short- and long-term goals to optimize surgical outcomes, including attention to comorbidities, anemia, fluid management, anticoagulation, and pulmonary optimization.
- Describe the essential role of child life in patient and family understanding of procedures, preparation, and coping strategies.
- Define the American Society of Anesthesiology (ASA) Physical Status Classification System and the Mallampati score that predict difficulty of endotracheal intubation.
- Discuss commonly used anesthetic agents and their side effects such as propofol, ketamine, midazolam, dexmedetomidine, and fentanyl.
- Describe risk factors and mitigation strategies, dependent on type of surgery and patient population, for surgical site infection (SSI) prevention, including skin/hair preparation and bacterial surveillance screening.
- List venous thromboembolism (VTE) risk factors and prevention measures.
- Review how use of physical and occupational therapy to promote early mobilization post-procedure may reduce incidence of pressure ulcers and length of stay.
- Explain key principles of early multimodal pain management, including key neurological pathways, early treatment of pain, and patient variability in pain thresholds.
- Compare and contrast indications for and side effects of commonly used peri-procedural analgesia agents, including acetaminophen, nonsteroidal anti-inflammatory drugs, opioids, gamma-aminobutyric acid (GABA) agents, and anxiolytics.
- Describe nonpharmacologic approaches to pain reduction, including age-appropriate distraction, massage, and the use of child life specialists when available.
- Describe adjuvant approaches to decrease opioid use in the inpatient setting and at discharge, including limiting quantity of opioids prescribed.
- Discuss patient risk factors for pain that may be difficult to control, such as history of substance abuse and others.
- Review indications, dosing parameters, and safety concerns

for epidural and intravenous patient-controlled analgesia (PCA), including recommendations for basal and bolus rates, according to local context.

- Describe the different types, indications for use, natural course, and removal of temporary surgical tubes and drains, such as chest tubes, Penrose drains, closed suction drains (Jackson-Pratt, Blake, Hemovac), and others.
- Explain the basic function of the three-chamber collecting system used for chest tubes.
- Compare and contrast a suction chamber device with wall suction with a device on water seal.
- Discuss common techniques for wound care treatment, including different types of topical dressings and indications for negative pressure wound therapy.
- Describe the overall natural history of wound healing and strategies to hasten wound healing, including optimal nutrition, vitamin supplementation, and positioning.
- Review the consequences of post-procedural cytokine release, attending to potential impact on body temperature and blood inflammatory markers.
- Describe indications, contraindications, and complications for incision and drainage of cutaneous abscesses.
- Discuss appropriate empiric antibiotics for abscess management based on the local antibiogram and patient-specific factors.
- Explain the importance of antibiotic stewardship in selection of peri-procedural antibiotics.

### Skills

Pediatric hospitalists should be able to:

- Demonstrate proficiency in interpreting an anesthesiology record to identify intraoperative receipt of analgesia, fluids, and blood products.
- Identify post-extubation airway issues, including stridor, and provide management as necessary.
- Demonstrate effective management of peri-procedural fluids, antibiotics, and pediatric medication dosing.
- Develop a management plan for post-anesthesia nausea and vomiting.
- Identify and treat post-procedural aspiration pneumonitis when clinically evident.
- Assess signs and symptoms to appropriately advance post-procedure diet.
- Identify abnormal progression of feeding advancement and investigate and treat causes, including prolonged ileus, obstruction, and constipation.
- Assess pain using validated, age-appropriate, and developmentally appropriate pain scales, including adaptive scales for nonverbal patients.
- Apply risk criteria for initiation of mechanical and pharmacologic VTE prophylaxis in collaboration with hematologic, surgical, and nursing colleagues.
- Direct a cost-effective and evidence-based evaluation of post-procedural fever.
- Identify signs of inappropriate positioning or complications of surgical tubes and drains and provide initial management

in collaboration with the procedural team.

- Utilize optimal technique in assisting with chest tube removal, in collaboration with the procedural team per local context.
- Identify possible complications of chest tube removal and provide management, in collaboration with the procedural team per local context.
- Evaluate and accurately describe surgical wounds, pressure ulcers, and burns, including location, stage or tissue depth, and presence of exudate, necrotic tissue, or granulation tissue.
- Interpret common signs of surgical wound complications, such as infection and wound dehiscence.
- Assess fresh ostomy and fistula sites for integrity and identify concerning features that trigger timely surgical consultation.
- Diagnose superficial (early) post-procedural infection during index hospitalization, as well as deep (late) post-procedural infection for patients admitted with fever.
- Demonstrate proficiency in conducting a physical examination of skin and soft tissue infections to determine presence of cutaneous abscess and need for incision and drainage.
- Demonstrate proficiency in incision and drainage of simple cutaneous abscesses, including pre-procedural patient counseling, obtaining informed consent, and administering patient-appropriate analgesia, anxiolysis, and sedation.
- Engage surgical consultants efficiently when indicated, such as for assessment of complex abscesses, abscesses in high-risk locations, and others.
- Provide post-procedural management following abscess incision and drainage, including management of packing or surgical drains, wound care, and anticipatory guidance.

### Attitudes

Pediatric hospitalists should be able to:

- Recognize the importance of collaborating with patients, the family/caregivers, hospital staff, anesthesiologists, other subspecialists, and primary care providers, to ensure coordi-

nated hospital care for children during the peri-procedural period.

- Role model effective communication with patients and the family/caregivers using developmentally appropriate and family-centered language to ensure understanding and encourage participation in decision-making.
- Appreciate the importance of collaboration with nursing, child life, pain team, and/or psychology/psychiatry colleagues, to minimize patient anxiety and peri-procedural pain.
- Exemplify collaborative practice with wound care teams and available local resources, such as nursing, surgical subspecialists, dermatology, and burn units, to ensure optimal wound care during the hospitalization and a comprehensive wound care plan at time of discharge.

### Systems Organization and Improvement

In order to improve efficiency and quality within their organizations, pediatric hospitalists should:

- Lead, coordinate, or participate in the development and implementation of safe, cost-effective, evidence-based care pathways to standardize peri-procedural management.
- Lead, coordinate, or participate in development of standardized handoff systems for optimal transition of care between anesthesia, surgery, and pediatric hospital medicine.
- Work with hospital staff and surgical subspecialists to coordinate ongoing educational opportunities to improve the skill set of healthcare providers in peri-procedural care.

### References

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2. Rappaport DI, Rosenberg RE, Shaughnessy EE, et al. Pediatric hospitalist comanagement of surgical patients: Structural, quality, and financial considerations. *J Hosp Med.* 2014;9(11):737-742. <https://doi.org/10.1002/jhm.2266>.
3. Shaughnessy EE, Meier KA, Kelleher K. The Value of the pediatric hospitalist in surgical co-management. *Curr Treat Options Peds.* 2018;4(2):247-254.