Selected Best Practices and Suggestions for Improvement

PDI 08: Perioperative Hemorrhage or Hematoma

Why focus on perioperative hemorrhage and hematoma in children?

- Postoperative hemorrhage or hematoma can complicate surgery in children, just as in adults. It is a concerning complication of tonsillectomy with or without adenoidectomy, which is one of the most common surgical procedures performed in children.[1]
- Rates of postoperative hemorrhage or hematoma have been reported to range from 1.3 to 2.7 per 1,000 pediatric discharges.[2,3]
- Postoperative hemorrhage and hematoma lead to a significantly higher length of stay (6-7 days, depending on the study) and excess charges (anywhere from about $75,000 to $111,000) in children with this complication, even after controlling for a number of other risk factors.[2,4]

Recommended Practice	Details of Recommended Practice
Risk Factor Determination	Determine which factors place pediatric patient at an increased risk of bleeding during the postoperative period.
Management of Blood Loss	Proper management of blood loss, including frequent dressing checks, is key to management of postoperative hemorrhage and hematoma in the pediatric population.[5]
Medication Management	Determine if and when discontinuation of antiplatelet/anticoagulant medication prior to the procedure or surgery is appropriate.[5] Avoid medications that could increase the risk of postoperative bleeding.

Best Processes/Systems of Care

Introduction: Essential First Steps

- Engage key preoperative/perioperative/procedure personnel, including nurses, physicians and other providers, and surgical technicians, and representatives from the quality improvement department to develop evidence-based protocols for care of the pediatric patient preoperatively, intraoperatively, and postoperatively to prevent postoperative hemorrhage or hematoma.
- The above team:
    - Identifies the purpose, goals, and scope and defines the target population for this guideline.
    - Analyzes problems with guideline compliance, identifies opportunities for improvement, and communicates best practices to frontline teams.
    - Monitors measures that would indicate if changes are leading to improvement, identifies process and outcome metrics, and tracks performance using these metrics.
    - Determines appropriate facility resources for effective and permanent adoption of practices.

Recommended Practice: Risk Factor Determination

- The following factors may place pediatric patients at an increased risk for postoperative bleeding following some selected pediatric surgeries[6,7]:
    - In cardiac surgery:
        - Preoperative body weight
        - Presence of cyanotic heart disease
        - Time required for wound closure
    - In tonsillectomy patients:
        - Patients age 11 and older
        - History of chronic tonsillitis
        - Excessive intraoperative blood loss
        - Elevated postoperative mean arterial pressure

Recommended Practice: Management of Blood Loss

- Interventions include applying pressure to the site and being prepared to return the pediatric patient to the operating room:
    - Consider developing a standard set of criteria or early warning signs (see below) that are appropriate for pediatric patients and can be used to trigger notification of the responsible surgeon of possible postoperative bleeding.
    - Incorporate all components of the criteria/early warning signs into a tool designed to provide standardized documentation of all pertinent details of the event. This tool will provide the data to track patient characteristics, processes, and outcomes for continuous quality improvement.
    - Establish a policy to empower nurses to rapidly escalate up the chain of authority to reach the responsible surgeon (limit time to 5-minute wait after initial page before moving to notify next higher level of authority).
    - Provide educational sessions to all clinical staff who care for children on the pilot units (nurses, residents, attending physicians, respiratory therapists, patient care technicians, certified nursing assistants, etc.) in the use of the early warning sign criteria, required documentation, and policy for rapid escalation up the chain of authority to notify responsible surgeon.
- Common early warning signs of hemorrhage can include but are not limited to[5]:
    - Restlessness and anxiety.
    - Frank bleeding and bruising.
    - Tachycardia.
    - Diminished cardiac output and dropping central venous pressure.
    - Reductions in urine output.
    - Swelling and discoloration of the extremities.

Recommended Practice: Medication Management

- Develop a process and protocol for determining if discontinuation of antiplatelet/anticoagulant medications prior to procedure or surgery is appropriate.[5]
    - Practice recommendation should be selected based on individual patient risk factors and current evidence-based guidelines for a particular surgery.
    - Work with caregivers to obtain a thorough history of medication use prior to surgery. The history must specifically address the use of over-the-counter and prescribed medications.
        - Document this information in the patient's medical record so that it is available to all care providers.

- Ketorolac use should be avoided during the postoperative period of a tonsillectomy due to higher rates of hemorrhage. Consider using other nonsteroidal anti-inflammatory drugs for the postoperative treatment of pain instead.[8]

Educational Recommendation

- Plan and provide education on protocols to physicians and other providers, nursing, and all other staff involved in operative cases, procedural cases, and care of pediatric patients postoperatively. Education should occur upon hire, annually, and when this protocol is added to job responsibilities.

Effectiveness of Action Items

- Track compliance with elements of the established protocol by using checklists, appropriate documentation, etc.
- Evaluate effectiveness of new processes, determine gaps, modify processes as needed, and reimplement practices.
- Mandate that all personnel follow the protocols and practices developed by the team to prevent postoperative hemorrhage and hematoma and develop a plan of action for staff in noncompliance.
- Provide feedback to all stakeholders (physicians and other providers, nursing, and ancillary staff; senior medical staff; and executive medical and administrative leadership) on level of compliance with process.
- Conduct surveillance and determine prevalence of postoperative hemorrhage to evaluate outcomes of new process.
- Monitor and evaluate performance regularly to sustain improvements achieved (e.g., Clinicians who perform tonsillectomy should determine their rate of primary and secondary post-tonsillectomy hemorrhage at least annually).[8]

Additional Resources

Systems/Processes

- The Merck Manual for Health Care Professionals: Postoperative Care http://www.merckmanuals.com/professional/special-subjects/care-of-the-surgical-patient/postoperative-care

- WHO Surgical Care at the District Hospital 2003: Postoperative Care, World Health Organization
  http://www.who.int/surgery/publications/Postoperativecare.pdf
- Anticoagulant Toolkit: Reducing Adverse Drug Events, Institute for Healthcare Improvement
  http://www.ihi.org/knowledge/Pages/Tools/AnticoagulantToolkitReducingADEs.aspx

Policies/Protocols

- Recommended Curriculum Guidelines for Family Medicine Residents: Care of the Surgical Patient, American Academy of Family Physicians
  http://www.aafp.org/dam/AAFP/documents/medical_education_residency/program_directors/Reprint259_Surgical.pdf
- Periprocedural and Regional Anesthesia Management With Antithrombotic Therapy: Adult—Inpatient and Ambulatory, Clinical Practice Guideline, UW Health
  http://www.uwhealth.org/files/uwhealth/docs/anticoagulation/Periprocedural_Anticoagulation_Guideline.pdf

Tools

- Postoperative Handover (ITCAS Checklist 3)
  http://www.imperial.ac.uk/media/imperial-college/medicine/surgery-cancer/pstrc/postoperativehandoveritcaschecklist3.pdf

Staff Required

- Physicians and other providers (pediatricians, neonatologists, pediatric surgeons)
- Nursing and nursing assistants
- Respiratory therapists
- Transfusion medicine service

Communication

- Systemwide education on policy/protocol of monitoring postoperative pediatric patients

Authority/Accountability

- Senior leadership mandating protocol for all providers
- Providers involved in postoperative care held accountable for following protocol

References

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5. Dagi TF. The management of postoperative bleeding. Surg Clin N Am 2005;85(6):1191-1213.
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7. Myssiorek D, Alvi A. Post-tonsillectomy hemorrhage: an assessment of risk factors. Int J Pediatr Otorhinolaryngol 1996 Sep;37(1):35-43.
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