

MINIMIZING THE RISK OF ORTHOPEDIC SURGICAL SITE INFECTIONS IN THE PEDIATRIC POPULATION: USING EVIDENCE TO INFORM PRACTICE

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Introduction

- Surgical site infections are some of the most common hospital-acquired infections and are associated with higher rates of morbidity and mortality for patients.
- Surgical site infections can increase length of hospital stay for patients and elevate healthcare costs.
- Surgical site infections account for the largest portion of healthcare associated infection costs nationally and inflict an estimated cost of \$20,785 per case.
- Research exploring surgical site infections in the pediatric orthopedic population is limited. Many interventions and assumed risks within the pediatric population are extrapolated from data



Background

- While the incidence rate of surgical site infection in the pediatric population is relatively low, 1.8%, it still is a source of preventable harm with the pediatric orthopedic population.
- In 2015 there were 56 million visits to physicians specializing in orthopedic surgery in the United States with 4% of these patients being 15 years old or younger.
- Outcomes within the pediatric orthopedic population can impact children's view on the healthcare setting as a whole for the rest of their life.
- The promotion of positive experiences within the healthcare setting for the pediatric population can create a trusting relationship that fosters further health promotion as the pediatric patient goes through growth and development and reaches adulthood.
- The pediatric orthopedic population's care is multifaceted. Dimensions that must be considered include proper implementation of family-centered care and effective communication that meets the child's developmental.



Methods

- A systematic review of the literature was conducted to identify risk factors associated with acquiring surgical site infections in pediatric patients undergoing orthopedic surgery.
- Additionally, identified in the search was interventions used within the pediatric orthopedic population to mitigate the risk of acquiring a surgical site infection.
- The database Cumulative Index of Nursing and Allied Health Literature (CINAHL) Plus with Full Text was used.
- A Boolean search was conducted using the key words, "pediatric" and orthopedic surgery" and "surgical site infections".
- The search was narrowed down to identify articles that were published between 2011 to 2021.
- 19 articles underwent full text review. 9 articles were relevant to the topic and met criteria to be included in this systematic review.



Results

Weight and Nutritional Status

- Weight and nutritional status play a role in predicting the incidences of a surgical site within the pediatric orthopedic population.
- The risk of developing surgical site infection is increased in children who are overweight or obese.
- The risk of developing a surgical site infection increased in children who are underweight and malnourished.

Prophylactic Antibiotic Selection

- Prophylactic antibiotic selection and dosing needs to be specific to both the possible pathogen and the patient. There are many challenges that can make this difficult to achieve.
- Staphylococcus aureus which is present on the skin in the normal flora is the most common causative agent in orthopedic surgical site infection development for the pediatric population
- To mitigate the risk of staphylococcus aureus risk cefazolin must be dosed adequately for the child's weight.
- Children who screened positive for MRSA must have adjustments in their antibiotic prophylactic regimen to include vancomycin.
- Longer operation time is associated with increase blood loss. Amount of blood loss matters because antibiotics are lost with the blood causing a decrease in the serum concentration within the body.

Bundle Approach to Interventions

- A bundle approach to interventions can help to reduce the rate of surgical site infections, however, strict compliance amongst staff, patients and their families can be difficult to ensure.
- Compliance plays a role in the bundles success.

Discussion

- Weight and nutritional status must be considered. Nutritional screening and weight based prophylactic antibiotics can help mitigate these risks.
- Antibiotic selection must be tailored to the individual patient and potential pathogens they may have.
- Screening for pathogens can help determine antibiotic selection.
- Antibiotic dosing must be adjusted to maintain therapeutic serum concentrations when a procedure has prolonged operating time.
- Bundled interventions can have a meaningful impact on decreasing pediatric orthopedic surgical site infections but there is a need for auditing and regular meetings to promote compliance.

Conclusion

- The research shows that meaningful reduction in surgical site infections within the pediatric population can be achieved, however, there are numerous challenges.
- There is still a need for more research within population to further identify associated risk factors and interventions.
- It is imperative that nurses and other medical staff members implement proper preventative measures to decrease the incidences of surgical site infections in order to promote safe, high quality patient care.
- Positive outcomes within this population can promote proper growth and development and foster further health promotion into adulthood.

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