Using Quality Improvement Methods To Improve Antibiotic Prophylaxis in Pediatric Otolaryngology

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ABSTRACT

Objective: Evidence based utilization of antibiotic guidelines has been shown to reduce perioperative infections in major surgical procedures. Unfortunately, adherence to guidelines is variable, and standardization of surgical practice has been difficult to achieve. Quality improvement methodology can be used to achieve significant improvements in guideline adherence. The objective of this study is to standardize antibiotic prophylaxis for major pediatric otolaryngologic procedures using quality improvement methodology.

Study Design: A Prospective quality improvement study of antibiotic guideline adherence for children undergoing major pediatric otolaryngologic procedures at a tertiary children’s hospital.

Methods: All children undergoing major pediatric otolaryngologic procedures between June 2014 and February 2015 were prospectively included for evaluation. Institutional review board approval was obtained. A literature review was performed to establish antibiotic prophylaxis guidelines. An intervention model using a rapid cycle Plan-Do-Study-Act (PDSA) framework was utilized to develop interventions and methods to monitor adherence. Children were divided into pre and post intervention groups and compared for adherence to prophylactic antibiotic protocols.

Results: Using PDSA cycles seven interventions were identified for implementation: 1) Daily pre-briefs 2) Case pre-briefs 3) Modified surgical request forms 4) Antibiotic prophylaxis indication cards 5) Electronic medical record (EMR) case based antibiotic indications 6) EMR antibiotic prophylaxis order sets 7) Weekly surgeon adherence notification. 423 procedures were performed during the study. Pre-intervention baseline antibiotic guideline adherence was 58% (21%), Airway surgery (15%) and Neck procedures (21%)

OBJECTIVE

To standardize the surgical antibiotic prophylaxis for major pediatric otolaryngologic procedures using quality improvement methodology.

BACKGROUND

Surgical site infections (SSI) are the second most common hospital acquired infection with an estimated 500,000 cases per year1,2. The use of antibiotic prophylaxis, combined with meticulous anti-septic technique, has been shown to reduce wound infection incidence3,4. In order to encourage standardization, prophylaxis guidelines have been developed and implemented for major surgical procedures5-7. In addition, specific clinical guidelines have been published to address the use of prophylactic antibiotics in otolaryngology procedures8-9. Adherence to prophylaxis guidelines has been shown to reduce the rate of SSI by up to 50%10. Despite dedicated efforts, obtaining high levels of guideline adherence remains a challenge. The objective of our study was to standardize and improve the surgical antibiotic prophylaxis for major pediatric otolaryngologic procedures using quality improvement methodology.

METHODS

All children undergoing major pediatric otolaryngologic procedures between June 2014 and February 2015 were prospectively included for evaluation. Institutional review board approval was obtained prior to data collection. A literature review was performed to establish antibiotic prophylaxis guidelines (APG).8-9,11-21. Expert consensus was utilized when no definitive recommendations were available. An intervention model using a rapid cycle Plan-Do-Study-Act (PDSA) framework was utilized to develop interventions and methods to monitor adherence. Key drivers were identified and diagrammed to further refine interventions (Figure 1). Children were divided into pre and post intervention groups and compared for adherence to prophylactic antibiotic protocols.

RESULTS

Utilizing the PDSA framework seven interventions were identified for implementation: 1) Daily operating room pre-briefs 2) Case specific pre-briefs 3) Modified email surgical request forms 4) Antibiotic prophylaxis indication cards 5) Electronic medical record (EMR) case based antibiotic indications 6) EMR antibiotic prophylaxis order sets 7) Weekly surgeon adherence notification. A control chart was created to track time point adherence and statistically confirm improvements. (Figure 3)

423 procedures were performed during the study. Procedures were classified as ear procedures, cochlear implant, sinus surgery, airway surgery and neck surgery. Types of procedures included were: Ear procedures (43%), Cochlear implant (10%), Sinus surgery (21%), Airway surgery (15%) and Neck procedures (11%).

CONCLUSIONS

1) PDSA interventions can be successfully developed, implemented and employed to achieve high rates of adherence and standardization.
2) Standardized evidence based antibiotic prophylaxis is achievable in a large pediatric otolaryngology practice.
3) Future work will center on reduction and simplification of interventions for broad application.

REFERENCES


