

Adherence to surgical antibiotic prophylaxis remains a challenge despite multifaceted interventions

Luke R. Putnam, MD,^{a,b,d} Courtney M. Chang, BA,^{a,b} Nathan B. Rogers, BA,^{a,b} Jason M. Podolnick, BS,^{a,b} Shruti Sakhuja, BS,^{a,b} Maria Matuszcak, MD,^{b,d} Mary T. Austin, MD, MPH,^{a,b,d} Lillian S. Kao, MD, MS,^{a,c} Kevin P. Lally, MD, MS,^{a,b,d} and KuoJen Tsao, MD,^{a,b,d} Houston, TX

Background. Adherence to prophylactic antibiotics guidelines is challenging and poorly documented. We hypothesized that a multiphase, multifaceted quality improvement initiative would engage relevant stakeholders, address known barriers to adoption, and improve overall adherence.

Methods. From 2011 to 2014, a series of interventions were introduced in the pediatric operating rooms. After each interventional period, prospective assessments were performed to record the antibiotic type, dose, timing, and redosing according to the guidelines. Perioperative factors that may influence guideline adherence were analyzed. Spearman's rank correlation, analysis of variance, and χ^2 tests were performed.

Results. A total of 1,052 operations were observed, and 629 (60%) required prophylactic antibiotics. Adherence to all 4 guideline components remained unchanged (54–55%, $P = .38$). Redosing significantly improved (7–53%, $P = .02$), but correct type decreased (98–70%, $P < .01$). The percentage of cases in which only one antibiotic guideline component was missed remained unchanged (35–34%, $P = .46$). Adherence to guidelines was not significantly associated with American Society of Anesthesiologists class, surgical specialty, patient weight, anesthesia provider, or surgical wound class.

Conclusion. Despite multiple interventions to improve antibiotic prophylaxis, overall adherence did not improve. Most interventions were directed at the point of administration in the operating room; future implementation strategies should focus on the perioperative setting. (*Surgery* 2015;158:413-9.)

From the Center for Surgical Trials and Evidence-based Practice,^a Departments of Pediatric Surgery^b and Surgery^c at the University of Texas Medical School at Houston, and The Children's Memorial Hermann Hospital,^d Houston, TX

AS MANY AS 60% OF SURGICAL-SITE INFECTIONS (SSIs) are estimated to be preventable by the use of evidence-based guidelines such as preoperative, prophylactic antibiotics.¹⁻³ Recognizing this opportunity for improving patient care, the Centers for Medicare and Medicaid Services implemented the Surgical Care Improvement Project (SCIP) in 2006, which was designed to reduce morbidity and mortality 25% by the year 2010.⁴ A number of studies since 2006, however, have shown that

although adherence to SCIP measures may be an indicator of greater quality care, adherence alone is not sufficient to reduce SSIs.^{5,6}

Several studies have failed to identify an association with individual SCIP measures and SSI,⁶⁻⁸ yet evidence exists to suggest that aggregate measures of adherence are associated with improved outcomes.^{7,8} Stulberg et al⁷ examined an administrative database of more than 400,000 patients and identified an association between aggregate SCIP measure adherence and postoperative infections. Ingraham et al⁸ reported that when hospitals were divided into groups based on compliance with SCIP guidelines, low-complying hospitals had a greater risk of overall morbidity. Thus, a high rate of adherence to antibiotic prophylaxis guidelines is indicative of better evidence-based care and suggests greater quality care.

We demonstrated previously that adherence to all 4 components of the antibiotic guidelines within our institution—correct antibiotic type,

Presented at the 10th Annual Academic Surgical Congress in Las Vegas, NV, February 3–5, 2015.

Accepted for publication April 10, 2015.

Reprint requests: KuoJen Tsao, MD, Department of Pediatric Surgery, The University of Texas School of Medicine at Houston, 6431 Fannin St, Suite 5.254, Houston, TX 77030. E-mail: Kuojen.Tsao@uth.tmc.edu.

0039-6060/\$ - see front matter

© 2015 Elsevier Inc. All rights reserved.

<http://dx.doi.org/10.1016/j.surg.2015.04.013>

weight-based dosing, preincisional timing, and redosing when appropriate—occurred in less than half of all pediatric operations.⁹ Furthermore, we identified several provider- and organizational-level barriers to guideline adherence, including poor awareness and knowledge of the guidelines, unclear roles, and a lack of standardized processes to ensure proper antibiotic administration. To address these shortcomings, we applied interventions based on an implementation framework¹⁰ that was shown previously to improve adherence to the surgical safety checklist within the same local setting.¹¹ This conceptual framework comprises 3 necessary components for implementation and dissemination: (1) behavioral change among both providers and the delivery system, (2) engagement of stakeholders and their organizations, and (3) iterative changes.¹⁰ We hypothesized that targeted interventions based on this framework would increase overall adherence to antibiotic prophylaxis guidelines.

METHODS

Context. Children's Memorial Hermann Hospital (CMHH) is an academic, 278-bed children's hospital within the tertiary Memorial Hermann Hospital–Texas Medical Center. CMHH is 1 of 11 hospitals in the Memorial Hermann Hospital system. Twelve different pediatric specialties were observed during the study period in 1 of 8 pediatric operating rooms (ORs). For each case, a minimum of attending surgeon, anesthesiologist (attending or trainee), scrub technologist, and circulating nurse was present. Institutional Review Board approval was obtained (HSC-MS-14-0230).

Antibiotic prophylaxis guidelines. The pediatric surgery and infectious disease departments at CMHH instituted antibiotic prophylaxis guidelines for all pediatric operations in 2009, which were modified from adult SCIP measures (Table I).¹² The guidelines were disseminated through educational materials and outreach to all surgeons, anesthesiologists, and perioperative staff. Guideline adherence for cases in which antibiotics were indicated entailed: antibiotic choice, dose (weight based $\pm 10\%$), timing, and redosing (Table II).

Interventions. The pediatric OR safety council implemented 3 cycles of targeted interventions to address identified barriers to guideline adoption. These intervention cycles were implemented during 3 time periods separated by a year (Fig 1).

Intervention cycle #1 took place in 2012 and consisted of 2 parts. The first was to modify the preincisional checklist to confirm the 4 components of correct antibiotic administration. Before

this modification, the checklist contained a single checkpoint verifying that prophylactic antibiotics were given. Introducing the new, stakeholder-derived, preincisional checklist was part of a larger effort to increase adherence to the checklist as well as to tailor the checklist to the natural flow of the pediatric OR.¹¹

The second part of the intervention was to create a computerized physician order entry (CPOE) module. This made it possible for surgeons to order preoperative prophylactic antibiotics for inpatients at any time before their operation. The purpose of the CPOE was 2-fold: (1) to allow the pharmacy to prepare the correct antibiotic and dose ahead of time, avoiding the frequent last minute decision amongst providers in the operating room; and (2) to deliver the antibiotic ahead of time to the patient chart, which would accompany the patient to the OR. A multidisciplinary subcommittee of the OR safety council was tasked with creating the order set. This committee was composed of surgeons and anesthesiologists who represented the groups most likely to use the order set. The committee reached out to infectious disease specialists as well as to the hospital's information technology team, which led to the creation of a simple, user-friendly order set that incorporated the evidence-based antibiotic algorithm (Table I). However, there was no administrative effort to disseminate the new CPOE option, to provide formal education on how to properly place the orders, or to monitor its use after implementation.

Intervention cycle #2 also entailed 2 parts. The first was to assign the role of antibiotic prophylaxis administration to the anesthesiology team because the anesthesia attending or resident is with the patient during the time when antibiotics should be given. The choice of antibiotic, however, was confirmed with the surgical attending. Additionally, during the preincisional phase of the checklist, the antibiotic checkpoint is directed towards the anesthesia providers. Anesthesia leaders on the safety council disseminated the new role information to the rest of the department, and a surgeon on the safety council gave a presentation on prophylactic antibiotics at an anesthesia Grand Rounds.

The second part of the intervention entailed printing easy-to-use antibiotic guidelines, attaching them to all anesthesia carts, and distributing them to all anesthesia providers. This component aimed to assist the anesthesia team in choosing the correct antibiotic, dose, timing, and need for redosing.

Download English Version:

<https://daneshyari.com/en/article/4307010>

Download Persian Version:

<https://daneshyari.com/article/4307010>

[Daneshyari.com](https://daneshyari.com)