2022 CAS Annual Meeting

Quality Improvement

(Abstracts and Case Report/Series)

Increasing Perioperative Cefazolin Utilization for Surgical Site Infection Prophylaxis in β-Lactam Allergic Patients: An Interrupted Time-Series Study

Authors:

Esmail, Tariq[1]; McIntyre, Mark[2]; Wong, David T.[1]; Nielson, Chantelle A.[4]; Gobin, Indira[5]; Lui, Philip[6]; Lavrencic, Natalia[4]; Jackson, Timothy[7]; Vaisman, Alon[8]

[1]*Department of Anesthesiology & Pain Management, University Health Network, University of Toronto, Toronto, Canada*

[2]*Antimicrobial Stewardship Program, Sinai Health System-University Health Network, Leslie Dan Faculty of Pharmacy, University of Toronto, Toronto, Canada*

[4]*Quality, Safety and Clinical Adoption Department, University Health Network, Toronto, Canada*

[5]*Perioperative Services, Toronto Western Hospital, Lawrence S. Bloomberg Faculty of Nursing, University of Toronto, Toronto, Canada*

[6]*Department of Pharmacy, University Health Network, Toronto, Canada*

[7]*Sprott Department of Surgery, University Health Network, University of Toronto, Toronto, Canada*

[8]*Department of Infectious Diseases & Infection Prevention and Control, University Health Network, University of Toronto, Toronto, Canada*

Introduction:

Surgical Site Infections (SSIs) account for more than 20% of healthcare-associated infections. SSIs are an important cause of perioperative morbidity and are associated with prolonged hospitalization and death [1]. Cefazolin, a cephalosporin, is the preferred SSI prophylaxis for most procedures. Historically, cefazolin was avoided in patients with a β-lactam allergy due to potential cross-reactivity, but recent evidence demonstrates that cefazolin can be administered safely in many of these patients [2,3]. This resulted in increased exposure to alternative antibiotics, which are associated with increased SSIs, toxicity, and cost [4]. Despite this evidence, an audit at our tertiary care institution in 2018 showed only 33% of patients presenting for a surgical procedure with a reported β-lactam allergy received perioperative cefazolin prophylaxis. Therefore, the aim of this quality improvement project was to increase the proportion of β-lactam allergic patients receiving cefazolin as prophylaxis for elective surgical procedures to 90% in 9 months.

Methods:

A multidisciplinary team used improvement science methods in applying diagnostics to the problem statement. Two root causes for this problem were identified (lack of standardization and knowledge gap) as being the largest contributors and were targeted for change interventions. The modified-ACCEPT (Allergy Clarification for Cefazolin Evidence-based Prescribing Tool) is a simple algorithm previously used [5] to identify low-risk β-lactam allergic patients who would be safe to receive cefazolin on the basis of history alone and without the need for pre-operative skin testing [5]. The algorithm was implemented in our Anesthesia led preadmission clinic and was administered by nurses and pharmacists prior to the date of surgery. Anesthesiologists received notification of the assessment in the electronic record prior to surgery. Adaptation of this standardized β-lactam allergy assessment tool occurred through multiple Plan-Do-Study-Act cycles before implementation. Concurrently, educational interventions (roadshow of knowledge dissemination to stakeholders and Town Hall forums for Q&A) were completed to close the knowledge gap and increase the understanding of the risk of

antimicrobial prophylaxis options. Run charts were used for the evaluation of process measures and statistical process control (p chart) was used to evaluate our outcome measure along with the Chi-square test.

Results:

Between January 2018 and December 2021, 13,164 patients underwent elective surgery. Of these, 1,328 patients had a reported β-lactam allergy (10.1%). Electronic baseline data showed a stable rate of cefazolin administration to β-Lactam allergic patients at 33% (UCL 57%, LCL 10%) between Jan 2018 and March 2019. Efforts between April 2019 and March 2021 in the form of educational rounds from local champions and trainees prior to formal quality project formation had shifted the system to a new baseline of 66% (UCL 94%, LCL 32%). From April 2021 to December 2021, after the modified-ACCEPT tool was introduced and the completion of educational sessions, there was a significant shift in the average to 88% (UCL 100%, LCL 72%). After interventions, the proportion of patients claiming to have a β-Lactam allergy receiving cefazolin increased from 33% (156 of 468 patients) to 72% (618 of 860 patients) (Chi = 159,7, $p<0.0001$).

Discussion:

Through the implementation of the modified-ACCEPT tool and educational efforts to close the knowledge gap, prophylactic usage of cefazolin increased from 33% to 88%. The strength of this project is the wide-scale applicability and the ease of expansion to additional patient populations. Additionally, the intervention was interdisciplinary, timely, avoided costly skin testing, and readily teachable. Limitations include lower patient volumes due to the COVID-19 pandemic, implementation at a single-site only, and limited involvement of trainees. Next steps include continuous monitoring and education for sustained improvement and inclusion of other hospital sites.

References:

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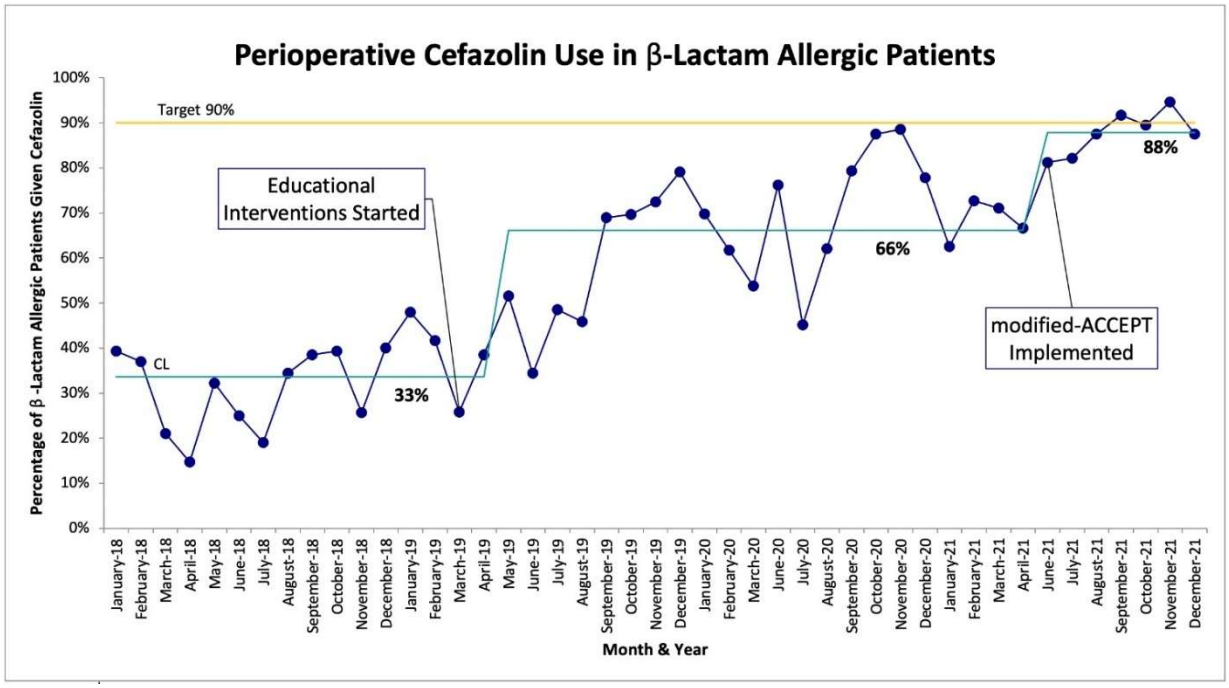
Figure 1:


Perioperative Cefazolin Use in β-Lactam Allergic Patients
Percentage of β -Lactam Allergic Patients Given Cefazolin
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Target 90%
Educational Interventions Started
CL
33%
66%
88%
modified-ACCEPT Implemented
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Month & Year