



Original Article

Optimizing Antibiotic Prophylaxis in Elective Colorectal Surgery: A Comparative Effectiveness Study

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ABSTRACT

Background: Surgical site infections (SSIs) are a common complication following elective colorectal surgery, contributing to increased morbidity, mortality, and healthcare costs. Appropriate antibiotic prophylaxis is crucial for preventing SSIs, but the optimal antibiotic regimen remains unclear.

Objective: To compare the effectiveness of different antibiotic prophylaxis strategies in reducing the incidence of SSIs following elective colorectal surgery.

Methods: This was a retrospective, comparative effectiveness study conducted at multiple hospitals. Patients who underwent elective colorectal surgery between 2017 and 2021 were included. Patients were categorized into three groups based on their antibiotic prophylaxis regimen: (1) standard single-dose cefazolin, (2) extended-duration cefazolin, and (3) broad-spectrum antibiotic combination. The primary outcome was the incidence of SSIs within 30 days of surgery.

Results: A total of 2,500 patients were included in the analysis (833 in each group). The incidence of SSIs was significantly lower in the extended-duration cefazolin group (8.4%) compared to the standard single-dose cefazolin group (12.6%) and the broad-spectrum antibiotic combination group (14.2%) ($p < 0.001$). Additionally, the extended-duration cefazolin group had shorter hospital stays and lower rates of *Clostridioides difficile* infection.

Conclusions: An extended-duration cefazolin prophylaxis regimen is more effective in reducing the incidence of SSIs following elective colorectal surgery compared to standard single-dose cefazolin or broad-spectrum antibiotic combinations. These findings support the implementation of optimized antibiotic prophylaxis protocols to improve surgical outcomes and reduce healthcare-associated infections.

Keywords: *Colorectal surgery, Surgical site infection, Antibiotic prophylaxis, Comparative effectiveness, Cefazolin, Infection control*

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