Carpet-bombing the colon is bad

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The important article by Kirkwood and colleagues¹ in this issue of the *Journal* analyzes the “incidence and severity of *Clostridium difficile* infections” from data found in the Cardiothoracic Surgical Trials Network. The frustrating observation is that the incidence of *C difficile* is increasing, and the subtext question is this: Is this our fault? We have all had patients with deep sternal wound infections, and we will mount almost any measure to avoid this dread complication. Unlike a hole poked in the undersurface of the transverse arch during a redo, the pain of a deep sternal wound infection can linger and punish for weeks. So we blast the patient with antibiotics.

The consensus recommendation for antibiotic prophylaxis surrounding cardiac surgery is to infuse second- or third-generation cephalosporins 30 to 60 minutes before the skin incision and for 24 to 48 hours after the operation.² Now, my high school science teacher told me several unbelievable things about my gastrointestinal tract: (1) that the inside of my colon is outside my body; (2) that there are 10 times more bacteria in my colon than cells in my body; and (3) that with a doubling time of around 20 minutes, the progeny of a single *Escherichia coli* with an unlimited food supply could assume the mass of the earth within 24 hours. So, inside us all, Malthusian population control is very healthy. When a surgeon disrupts this natural war of the hundreds of bacterial species fighting for survival, we are not yet very good at exclusively targeting the bacterial terrorists. Many bacterial species favorably compete with the bad guys and even help us digest. Indeed, fecal microbiota transplantation (sharing stool with a friend) is a safe, inexpensive, and effective cure for *C difficile* in more than 90% of cases.³

Interestingly, in the study of Kirkwood and colleagues,¹ the percentages of patients with and without *C difficile* did not differ in receiving first-generation cephalosporins

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Central Message

There are good bugs and bad bugs—and watch out for the bad ones after discharge!

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(46% vs 36%), second-generation cephalosporins (26% vs 43.7%), and “other” agents, presumably vancomycin, specific for *C difficile* (28% vs 20.3%). The specific antibiotic regimen that was used—the duration, however, did.

Our preoperative antibiotic prophylaxis is still at the stage of indiscriminately carpet-bombing the colon. The article by Kirkwood and colleagues¹ confirms several counterintuitive surgical observations: (1) unlike the single-dose antibiotic prophylaxis recommended for general surgical procedures, 24 to 48 hours of antibiotic coverage appears superior in cardiac patients; (2) “bigger” (further prolongation of antibiotic coverage) is not better; (3) indeed, extended antibiotic coverage is bad; (4) hyperglycemia just feeds the pathogenic bacteria; and (5) surprisingly, approximately half of the cases of *C difficile* were seen after discharge—so keep watching.

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