

Antibiotic Resistance after Extended Oral Antibiotic Prophylaxis for Periprosthetic Joint Infection

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INTRODUCTION: Infection remains one of the most challenging and costly complications following total joint arthroplasty (TJA). The standard of care for the treatment of periprosthetic joint infection (PJI) remains two-stage revision. Recently, it has become more common to prescribe a course of extended oral antibiotic prophylaxis (EOAP) for patients following reimplantation to prevent infection recurrence. However, the possibility remains that such antibiotic prophylaxis has the potential to increase antibiotic resistance in microorganisms that cause reinfection in failure of two-stage revision. The aim of this study was to establish the rate at which the organism isolated after two-stage revision failure is the same as the original causative organism as well as the rate at which new antibiotic resistance develops with reinfection.

METHODS:

A cohort of patients that underwent two-stage revision for primary total hip (THA) or knee (TKA) arthroplasty were retrospectively reviewed. Primary endpoints include 1) the rate at which reinfection is found to be caused by the same pathogen isolated from the initial PJI requiring two-stage revision; 2) the rate of development of new antibiotic resistance when reinfection was caused by the same pathogen as the initial PJI; and 3) the rate of resistance to the prophylactic antibiotic administered to patients that received EOAP.

RESULTS: A total of 44 patients were included in this retrospective review (20 THA, 24 TKA). Ten patients received no antibiotic prophylaxis and 34 patients received antibiotic prophylaxis. Of these 34 patients, four received the 90-day oral antibiotic prophylaxis protocol outlined by Frank et al. (2017). Among the remaining 30 patients receiving antibiotic prophylaxis, there was wide variability with respect to the mode, duration, and specific antibiotic administered. In the control group not receiving prophylactic antibiotics, seven had infection with a pathogen other than the one isolated from their initial PJI. Three of these seven isolates were found to be pan-sensitive. Of the three patients that had reinfection with the same pathogen, one pathogen (33.3%) had emergence of new resistance between original isolation and isolation following two-stage revision failure. Of the 34 patients receiving EOAP, 18 had infection with a novel pathogen, two of which were found to be pan-sensitive. Sixteen patients had infection with the same pathogen. Of these 16 patients, six (37.5%) had emergence of new resistance. In total, nine of the 34 patients receiving EOAP (26.5%) developed resistance to the prophylactic antibiotic including one of four patients (25.0%) receiving the Frank et al. protocol and eight of 30 patients (26.7%) receiving an alternative form of EOAP.

DISCUSSION AND CONCLUSION: EOAP use at the time of reimplantation during two-stage revision arthroplasty results in fewer cases of reinfection with a novel pathogen. Further, EOAP does not seem to correlate with increased emergence of antibiotic resistance. Although the risk of antibiotic resistance to prophylactic antibiotics in EOAP does exist, implantation of a standardized protocol such as the one proposed by Frank et al. (2017) does not appear to increase risk for antibiotic resistance compared to prior common practice with regard to EOAP.