

G78: Can oral antimicrobials be used for the treatment of implant-associated infection?

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Response/Recommendation: Yes, appropriately chosen oral antimicrobials can be effective for treatment of implant-associated infections.

Level of Evidence: Moderate

Delegate Vote:

Rationale

Historically, intravenous (IV) antibiotics have been considered standard for treatment of orthopedic infections, but this practice is not grounded in robust evidence.¹ The 2019 OVIVA multicenter randomized controlled trial (RCT) demonstrated the non-inferiority of early transition to oral antibiotics compared to prolonged IV therapy for bone and joint infections, including over 200 patients treated with debridement and retention of the infected orthopedic implant (DAIR).² This study also showed advantages of oral antibiotic therapy in terms of lower cost, reduced hospital length-of-stay, and fewer complications.² Subsequent retrospective studies have indicated that adopting the practice of treating orthopedic infections with oral antibiotics does not lead to inferior outcomes compared to IV antibiotic treatment.³⁻⁵

Further support comes from data generated by additional randomized trials. A small RCT of patients undergoing DAIR for periprosthetic joint infection (PJI) found similar outcomes between groups switched to oral therapy at two versus six weeks.⁶ Other modern RCTs evaluating antibiotic duration in PJI included early oral switch protocols and reported high cure rates.^{7,8} While most data come from PJI, a recent RCT in fracture-related infections also demonstrated non-inferiority of oral versus IV antibiotic therapy in the modified intention-to-treat analysis.⁹ There is likewise a recent RCT in the pediatric population demonstrating non-inferiority of using only oral therapy to treat bone and joint infections, although this study excluded children with orthopedic implants.¹⁰

Observational studies have consistently associated oral antibiotics—particularly rifampin in combination with fluoroquinolones—with better outcomes following DAIR for PJI.¹¹

Observational studies of using oral antibiotics for PJI regardless of surgical approach have also shown good outcomes, with levofloxacin plus rifampin being the most common oral regimen.¹²⁻¹⁵ In a systematic review and meta-analysis of IV antibiotic duration and PJI outcomes, earlier switch to oral agents was associated with treatment success.¹⁶ Outside of PJI, a small study of staphylococcal implant infection of the long bones or spine treated with levofloxacin plus rifampin showed modest outcomes at six months (18 of 25 patients cured).¹⁷

The main concern with using oral antibiotics is bioavailability, namely if the antibiotics reach therapeutic levels in the bloodstream when taken by mouth. Studies using oral antibiotics to treat orthopedic infections therefore focus on antibiotics with good oral bioavailability, such as quinolones, rifampin, linezolid, trimethoprim-sulfamethoxazole, amoxicillin, clindamycin, and doxycycline. There is much less data about oral cephalosporins, particularly in the adult population. Another area of concern is patients with obesity, including those who have had

bariatric surgery. The best dosing of oral antibiotics in these populations is unclear, as both obesity and bariatric surgery can affect the absorption and metabolism of antibiotics.¹⁸ From the limited data available, quinolones and linezolid appear to be least affected by obesity and bariatric surgery.¹⁸ Additional advances in therapeutic drug monitoring will be helpful to optimize dosing of oral antibiotics in all patients.

Overall, data support the use of oral therapy for implant-associated infections when the antimicrobial regimen is carefully selected based on pathogen susceptibility, bioavailability, and patient factors. Future research should focus on therapeutic drug monitoring to optimize dosage, and determining the optimum duration of antibiotic therapy for orthopedic infections.

The use of oral antibiotics for prevention of PJI, for extended treatment after an initial prolonged IV course, and for “suppression” of suspected chronic infection is discussed in questions HK83, HK84, HK100, and HK102 and therefore is not addressed here.

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