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QUESTION 4: Should patients undergoing outpatient total joint arthroplasty (TJA) receive additional postoperative prophylactic antibiotics?

RECOMMENDATION: Despite the current guidelines from the Centers for Disease Control and Prevention (CDC) advocating for a single dose of perioperative antibiotics, the studies utilized to form these guidelines are underpowered and primarily in specialties outside orthopaedics. The limited evidence suggests that a single perioperative dose of antibiotics, compared to multiple doses, does not increase the rates of subsequent surgical site infections/periprosthetic joint infections (SSIs/PJIs). A randomized prospective study in patients undergoing elective arthroplasty is underway, which should help answer this question definitively.

LEVEL OF EVIDENCE: Limited

DELEGATE VOTE: Agree: 94%, Disagree: 4%, Abstain: 2% (Super Majority, Strong Consensus)

RATIONALE

Administration of prophylactic antibiotics during TJA surgery has been demonstrated to be an important step in the prevention of SSIs and PJIs. During the early years of arthroplasty, prophylactic antibiotics for a few days postoperatively was routine. Over the last decade or so, there has been a movement towards reducing the amount of prophylactic antibiotics administered to TJA patients. Currently, antibiotics are administered to patients undergoing primary TJA for a period of 24 hours. The number of doses of antibiotics that need to be administered to TJA patients is not known.

In recent years, and with the increase in popularity of outpatient TJA, many patients undergoing primary TJA may only receive a single dose of antibiotics. It is not known if a single dose of antibiotics may predispose these patients to higher incidences of SSIs/PJIs. Recent guidelines for prevention of SSIs issued by the World Health Organization (WHO) and the CDC recommend against the administration of additional postoperative antibiotics [1–3]. The recommendation by these organizations is in an antibiotic stewardship practice intended to limit liberal use of antibiotics that can result in the emergence of antimicrobial resistance and also expose patients to adverse effects associated with administration of prolonged antibiotics [2,4,5]. Although the CDC Guidelines issued this statement as a strong recommendation with high quality evidence, there is limited literature in arthroplasty to support this recommendation.

A systematic review and meta-analysis by Thornley et al. has examined the issue of number of doses of antibiotic prophylaxis following TJA. The analyses revealed that the incidence of infections was 3.1% (63/2055) in patients receiving multiple doses of antibiotics compared to an infection rate of 2.3% (45/1981) in patients receiving a single dose of antibiotics [6]. They concluded that postoperative antibiotics did not have additional benefits in reducing the rate of infections. The authors of the systematic review did acknowledge that the quality of evidence related to this subject in TJA is low. Of the four available randomized controlled trials, three include teicoplanin which is currently unavailable in the United States [7–9]. Furthermore, studies are usually underpowered with one randomized trial enrolling only 196 patients when comparing a single dose of cefuroxime to 24 hours of prophylaxis [10]. In addition, Wymenga et al. compared a cohort of patients who received a single preoperative dose of cefuroxime to a cohort who received 3 total doses in 3,013 patients and found no significant differences in infections between the two groups [11]. However, the authors recognized that their sample size was too small to detect a difference given the infrequency of PJI and recommended continuing the use of postoperative prophylaxis until larger studies could be performed [11]. Additionally, in a national registry study, Engsaeseter et al. demonstrated higher revision rates in patients receiving a single dose of antibiotics compared to four doses given on the day of surgery [12].

Lastly, a retrospective study by Tan et al. demonstrated no difference in the 90-day or 1-year PJIs in 4,523 outpatient TJA patients that received a single dose of antibiotics compared to 16,159 patients that received 24 hours of antibiotics, regardless of the patient's preoperative risk of PJIs [13].

When comparing infection rates between outpatient and inpatient total joint arthroplasty, the majority of the literature demonstrates no difference in the rate of postoperative infection. In a large retrospective review of the PearlDiver Database, Arshi et al. found that patients who underwent outpatient TKA demonstrated an increased risk of prosthesis explantation (adjusted odds ratio (OR) 1.35, 95% confidence interval (CI): 1.07-1.72) as well as irrigation and debridement (adjusted OR 1.50, 95% CI: 1.29-1.77) compared to inpatients [14]. Despite these findings, multiple large national database studies have demonstrated no difference in postoperative infection between outpatient and inpatient TJAs [15–18].

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QUESTION 5: Does extended prophylactic antibiotics therapy for patients undergoing aseptic revision help reduce the risk of subsequent surgical site infections/periprosthetic joint infections (SSIs/PJIs)?

RECOMMENDATION: In the absence of concrete evidence, we recommend the use of routine antibiotic prophylaxis (maximum 24 hours) for patients undergoing revision arthroplasty as long as the infection has been properly ruled out prior to surgery.

LEVEL OF EVIDENCE: Limited

DELEGATE VOTE: Agree: 81%, Disagree: 15%, Abstain: 4% (Super Majority, Strong Consensus)

RATIONALE

Infections are a common cause of failures post aseptic revisions, occurring after 5 to 9% for total knee arthroplasties (TKAs), and 1.35 to 17.3% for total hip arthroplasties (THAs) [1–6]. One of the modalities used to prevent SSIs and/or PJIs after arthroplasty is administration of prophylactic antibiotic therapy [7–9]. Considering the high rate of SSIs and PJIs after revision arthroplasties, one can argue that extended prophylaxis for longer than 24 hours may be indicated in these types of surgeries. Several studies conducted in primary TKA and THA, indicate no difference in the rate of SSI in patients who received prophylaxis for 24 hours and in those who received it for longer than 24 hours [10–14].

A comprehensive literature search was performed to identify studies evaluating the potential role of extended antibiotic prophylactic therapy following aseptic revision arthroplasty. A single retrospective study conducted by Claret et al. on 341 patients undergoing revision arthroplasty was identified [15]. The authors compared the rate of PJI after changing their local protocol from administering teicoplanin and ceftazidim before surgical incision to doing so again two hours after as an antibiotic prophylaxis (2007–2010) prolonging this regimen until the fifth day after revision surgery (2010–2013). Several criteria concerning inflammatory markers, imaging and synovial fluid analysis were performed to