Prevention

1.1. PREVENTION: TOTAL ANKLE ARTHROPLASTY-SPECIFIC

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QUESTION 1: What are the important risk factors that predispose a patient to infection after total ankle arthroplasty (TAA)?

RECOMMENDATION: There is evidence indicating that the following risk factors may predispose a patient to an infection after a TAA: inflammatory arthritis, prior ankle surgery, body mass index (BMI) < 19 and peripheral vascular disease. Meanwhile, there is conflicting evidence (which may be due to patient selection bias) indicating that the following risk factors may predispose a patient to infection after a TAA: obesity (BMI > 30), tobacco use, diabetes, duration of surgery, age < 65 years, hypothyroidism, low preoperative American Orthopaedic Foot and Ankle Society (AOFAS) hindfoot score and chronic lung disease.

LEVEL OF EVIDENCE: Limited

DELEGATE VOTE: Agree: 100%, Disagree: 0%, Abstain: 0% (Unanimous, Strongest Consensus)

RATIONALE:

The purpose of TAA is to eliminate pain while restoring some functional range of motion. One of the dreaded complications of TAA is a periprosthetic joint infection (PJI). The reported rate of this complication ranges between 0-8.9% [1–4]. Appropriate patient selection could be facilitated by understanding the preoperative risk factors for PJI.

Inflammatory arthritis is one of the patient characteristics that have been identified by two separate studies as a risk factor for PJI. In a retrospective comparative series, Raikin et al. followed 106 patients who had undergone a TAA and identified nine patients who necessitated a return to the operating room for an irrigation and debridement and/or removal of their hardware [5]. The authors concluded that an underlying diagnosis of inflammatory arthritis was a significant risk factor leading to the complications studied. Of note, patients with inflammatory arthritis showed a 14.03-times increased risk of requiring reoperation. Althoff et al. reached a similar conclusion in a database comparative study [6]. The authors used a national insurance database to select 6,977 TAA patients and assess which factors correlated with an increased risk of PJI within the first 6 postoperative months. Several risk factors were highlighted, one of which was a diagnosis of inflammatory arthritis.

A history of prior ankle surgery has been identified as a risk factor for PJI. Patton et al. retrospectively reviewed the cases of 966 patients who had a TAA and found 29 instances of postoperative infection [7]. Prior surgery of the ankle was found to correlate with an increased risk of PJI. In a comparative cohort study, Kessler et al. evaluated 26 demographically matched patients who developed PJI, the authors concluded that prior ankle surgery increased the risk of infection [1].

Age < 65 years (odds ratio (OR) 1.61), a BMI < 19 (OR 2.67), peripheral vascular disease (OR 2.46), chronic lung disease (OR 1.51) and hypothyroidism (OR 1.32) were all determined to be a risk factor for PJI following TAA in a single study [6]. Low preoperative AOFAS hindfoot scores were also identified as a risk factor by a single study [1]. These findings, however, have not been corroborated by other publications.

There is conflicting evidence in the literature regarding the role of obesity in TAA. A single database study identified a BMI > 30 as a risk factor for developing PJI [6]. This, however, is contradicted by two separate retrospective comparative series. Schipper et al. assessed the outcomes between 49 obese patients and 48 non-obese patients following TAA [8]. While the authors noted that there was decreased survivorship of the implant in the obese patient population, there was no increased risk of infection. Similar findings were noted in a large case series comparing patient-related factors between TAAs that developed infection and those that did not [7].

Whether tobacco use is a risk factor for PJI is not clear based on the current literature. The database publication by Althoff et al. concluded that smoking increases the risk of a PJI (OR 1.59) [6]. Lampley et al. compared the postoperative outcomes between nonsmokers (n = 359), former smokers (n = 249) and current smokers (n = 34) [9]. The authors concluded that while the active smokers had an increased rate of PJI, this did not reach statistical significance. Patton et al. however, concluded in their large case series that there was no association between tobacco use and postoperative infection following TAA [7].

The current literature is divided on the issue of whether diabetes is considered a risk factor for PJI [6–8,10]. The publications by Althoff et al. [6] and Patton et al. [7] both conclude that diabetic patients are at increased risk of infection. Further, Schipper et al. reached a similar conclusion that diabetes was an independent risk factor [9]. However, Gross et al. assessed the complication rate between 50 diabetic patients and a control group and concluded that diabetes did not increase the risk of infection [10]. Additionally, the length of the operative procedure is a risk factor that has shown some variance in the literature. Kessler et al. reported that the duration of the surgery was significantly longer (119 minutes) in the infected group, compared to the age and sex-matched control group (84 minutes) [1]. In contrast, Patton et al. found no difference in operative times between patients who developed a PJI and those who did not [7].

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QUESTION 2: Does intra-articular injection of the ankle with corticosteroids increase the risk of subsequent periprosthetic joint infection (PJI) following total ankle arthroplasty (TAA)? If so, how long after a prior intra-articular injection can TAA be safely performed?

RECOMMENDATION: Every intra-articular injection of the ankle is an invasive procedure associated with potential healthcare-associated infections, including periprosthetic joint infection (PJI) following TAA. Based on the limited current literature, the ideal timing for elective TAA after corticosteroid injection for the symptomatic native ankle joint is unknown. The consensus workgroup recommends that at least three months pass after corticosteroid injection and prior to performing TAA.

LEVEL OF EVIDENCE: Limited

DELEGATE VOTE: Agree: 92%, Disagree: 8%, Abstain: 0% (Super Majority, Strong Consensus)

RATIONALE

Intra-articular steroid injections may transiently relieve the pain of osteoarthritis of the ankle and are widely used for its treatment. At the same time, every injection is an invasive procedure and might be associated with health-care-associated infections, including PJI following TAA. Seror et al. noted that the risk of septic arthritis after an intra-articular steroid injection is 1 in 70,000 [1]. For native ankle joints, one study found a 3.9% infection risk when using intraoperative steroids versus a 1.8% infection risk when performing arthroscopy without steroids [2]. However, this study was not related to TAA, and many other studies in native ankle joint arthritis deny a relationship with steroid injections.

The available literature investigating the effect of intra-articular corticosteroid injections on postoperative PJI are all in hip and knee arthroplasty patients. Some studies find no relationship between corticosteroid injections and infection [3–6], while others find an increased risk of deep infection following intra-articular injection [7–11]. Studies that find a positive correlation also suggest that timing may be an important factor, and that injections more closely preceding surgery may lead to an even higher risk of infection.

Unfortunately, there are no published data in regards to the risk of PJI after steroid injection in the setting of TAA. The data from hip and knee arthroplasty may not be applicable to TAA, and further studies are warranted.

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