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QUESTION 2: What is the diagnostic "algorithm" for infected total ankle arthroplasty (TAA)?

RECOMMENDATION: Patients who present with clinical symptoms and signs of periprosthetic ankle infection (pain, erythema, warmth, sinus tract, abscess around the wound) and sinus tracts communicating with the ankle/subtalar joint are likely to have TAA infection.

In the absence of a sinus tract, elevated inflammatory markers (erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP)) should prompt ankle joint aspiration for cell count, differential and culture. The joint aspiration is to be repeated.

If the same organism is identified in at least two cultures of synovial fluid, the patient is diagnosed to have an infection. If the repeat aspiration is negative, further investigation is warranted.

In patients not requiring surgical intervention for other reasons, nuclear imaging should be considered for diagnosis. If an operation is indicated, histologic examination (> 5 neutrophils/high-power field) or synovial fluid analysis is conducted to confirm infection.

LEVEL OF EVIDENCE: Limited

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

RATIONALE

Diagnosis of infected TAA is mainly guided by the periprosthetic joint infection (PJI) diagnostic criteria developed from the MusculoSkeletal Infection Society (MSIS) and the International Consensus Meeting [1–3]. Although the current PJI diagnostic criteria were developed based on hip and knee patients, the majority of the infected TAA clinical studies have employed the same or a variation of the MSIS criteria [3–9]. The major diagnostic criteria include (1) presence of a sinus tract which communicates with the joint or (2) two positive cultures isolating the same pathogen from the periprosthetic tissue or synovial fluid samples [1–3]. Minor criteria include elevation of inflammatory markers (CRP, ESR), elevated synovial fluid white blood cell (WBC) count or change on leukocyte esterase test strip, elevated synovial fluid polymorphonuclear cells, positive histologic analysis of periprosthetic tissue and single positive culture [1–3]. The above diagnostic algorithm was also recommended by the same authors [1–3].

Systematic literature reviews and meta-analyses have shown a 0 to 4.6% occurrence of deep infection after TAA [10,11]. Myerson et al. reported a 3.1% infection rate after TAA [6]. Their criteria for diagnosis was based on clinical findings of swelling, inflammation, drainage or persistent wound problem which prompted the protocol of joint aspiration for culture and microscopy. Synovial fluid analysis and lab analysis of inflammatory markers (CRP, ESR, WBC count) were tested to confirm infection. Patton et al. utilized similar criteria and reported a 3.2% rate of ankle PJI [7]. Usuelli et al. employed the same diagnostic criteria suggested by the MSIS and reported a 3.7% deep infection rate in the anterior approach group compared to a 1.4% deep infection rate in lateral approach group [9].

However, some authors have raised the possibility that the current MSIS guideline for diagnosis and treatment of hip and knee PJI may be different from the ankle joint, given the relatively thinner soft tissue envelope and limited number of patients who underwent successful joint-preserving revision ankle arthroplasty [3,5]. Moreover, no clinical study has validated utilization of the current hip and knee PJI diagnostic criteria for ankle PJI. Therefore, a high-quality clinical investigation is needed to validate the current criteria and algorithm for diagnosis and treatment of the ankle PJI.

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