

QUESTION 2: In patients with prior septic arthritis, what strategies should be undertaken to minimize the risk of subsequent surgical site infection/periprosthetic joint infection (SSI/PJI)?

RECOMMENDATION: Prior to elective arthroplasty, infection in the joint with prior septic arthritis needs to be ruled out using appropriate diagnostic tests. In the presence of an active infection, two-stage joint arthroplasty is recommended.

Single-stage joint arthroplasty may be considered when all diagnostic tests are normal and there is no active soft tissue involvement (such as a sinus tract or abscess).

Single-stage arthroplasty is a reasonable treatment strategy in patients with septic arthritis caused by *Mycobacterium tuberculosis* (TB), where anti-tuberculous medications have been commenced and in the absence of a sinus tract or extensive soft tissue involvement.

Antibiotics (no more than 5% by weight), targeted towards the prior organism, if known, should be added to cement during arthroplasty.

LEVEL OF EVIDENCE: Consensus

DELEGATE VOTE: Agree: 88%, Disagree: 7%, Abstain: 5% (Super Majority, Strong Consensus)

RATIONALE

Systemic or active infection is an absolute contraindication to arthroplasty when an infected joint is the source of sepsis [1]. It is important to identify if a patient has an active or quiescent infection in the joint [2]. Some inflammatory serum markers are commonly measured, such as white blood cells, erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) in the evaluation of patients with septic arthritis [3]. Furthermore, joints should be considered for aspiration when patients have elevated serum inflammatory markers. A high white cell count is specific for diagnosing septic arthritis, but sensitivity is low, especially using the cutoff value of $50.0 \times 10^3/\mu\text{L}$, which is the most commonly published value [4]. Bone biopsy may be of diagnostic value, in light of evidence of a quiescent intracellular *Staphylococcus aureus* [5].

Joint arthroplasty for septic arthritis has long been considered a high-risk procedure [6]. Pre-existing osteomyelitis is suggested to be more important than septic arthritis [7]. No high-quality randomized trials have assessed the effectivenesses of different treatment strategies. The majority of the published literature are case series without controls. Treatment strategies are based largely on opinion and experience with infected arthroplasties. However, the reported experience of the majority of reporting groups is similar.

Staged hip arthroplasty has been performed successfully in acute septic arthritis [8]. In one case series of 18 patients, 11 underwent two-stage hip arthroplasty, and 7 underwent single-stage hip arthroplasty. There was no recurrence of infection at a mean of 70 months follow-up [2]. In a series of 53 hip and knee arthroplasties, Bauer et al. compared acute septic arthritis treated with two-stage joint arthroplasty and quiescent “cured” septic arthritis treated with single-stage joint arthroplasty. They reported a cure rate of 87% with two-stage joint arthroplasty in active septic arthritis and 95% survivorship with single-stage surgery in cured septic arthritis. They did not identify any additional risk factors for recurrence of infection [9]. However, a further case series from 2008 reported a reinfection rate of 14% with a total complication rate of 36% [10].

Huang et al. described their case series of 14 patients with septic arthritis of the hip treated with a two-stage revision. The mean interval between stages was 12 weeks. The second stage procedure was performed with cementless implants. There were no recurrences at a mean of 42 months [8]. Romano et al. used a preformed spacer in a two-stage strategy with a mean interval of 22 weeks before implantation of cementless implants. They report a 95% survivorship with one failure due to infection at a mean follow-up of 56 months [11]. A Korean group reported on a series of nine patients at a mean follow-up of 42 months. One patient required a repeat first stage and another patient developed infection after the second stage [12].

Lee et al. reported on a series of 20 consecutive knee arthroplasties performed in patients who had a history of quiescent septic arthritis. They identified one postoperative infection at 3.5 years and recommended a single-stage revision after a judicious infection workup [13]. Nazarian et al. proposed a two-stage strategy for septic knee arthritis following their studying examining 14 patients which resulted in complete eradication of infection at a mean follow-up of 4.5 years. The interval between stages was three months [14].

The use of a spacer has been advocated as a temporizing measure due to its ability to elute antibiotics, but also to improve function between stages [15,16]. Fleck et al. reported on 14 patients who underwent two-stage hip arthroplasty, though four patients did not undergo the second stage with two reporting good function from their spacer [17].

Single-stage hip arthroplasty has been promoted for quiescent or cured infection. One series of 19 hips reported good function with no recurrence of infection using this technique. The authors recommended a thorough infection workup to ensure no evidence of active infection [18].

Two-stage joint arthroplasty has been advocated by some case series, though not randomized controlled trials [19]. In TB infection, single-stage arthroplasty appears to be a safe option [18]. However, the authors recommend prolonged anti-tuberculous medications. A series of Charnley hips from 2001 with the longest follow-up at 28 years found that 5 recurrences occurred out of 60 patients, with the failure of the acetabular component being the most common cause for revision [20]. There is a risk of postoperative infection in those patients with the untreated disease or those on corticosteroids [21]. Where sinus tracts exist, or extensive bony destruction with multiple abscesses predominate, a two-stage strategy may be recommended [22,23].

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