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QUESTION 5: Should routine cultures be taken in patients undergoing total joint arthroplasty (TJA) who had a previous open reduction and internal fixation (ORIF) of the same joint (e.g., prior acetabular fracture)?

RECOMMENDATION: Intraoperative cultures should be taken in patients undergoing TJA who have had a prior ORIF of the same joint.

LEVEL OF EVIDENCE: Limited

DELEGATE VOTE: Agree: 87%, Disagree: 11%, Abstain: 2% (Super Majority, Strong Consensus)

RATIONALE

TJA in patients with prior ORIF of the affected joint is a common procedure [1]. A subset of these patients undergoes TJA for resulting nonunion, early fixation failure and/or posttraumatic arthritis. TJA after ORIF is commonly referred as conversion arthroplasty and these have been associated with higher complication rates when compared to primary TJA [2–4]. Among those complications, periprosthetic joint infection (PJI) has been identified as one of the causes ranging from 1.6 to as high as 7% [5–7].

The increased risk of PJI in these patients is multifactorial [8]. Studies have identified that any prior surgery to the joint is a risk factor for PJI, both in knees and in hips [9]. Underlying infection has been postulated as one of the reasons ranging in incidence from 11 to 18% [2]. When evaluating TJA candidates with prior ORIF, some authors report that the measurement of preoperative erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) should be performed to identify infections [2]. They conclude that this is an effective method and that efforts should be made to identify and treat underlying infections prior to TJA to reduce the risk of subsequent PJI.

Systemic and local reactions to prior trauma as well as manipulation at the site of arthroplasty may also predispose these patients to infection. Moussa et al. identified positive cultures in 11 hardware cultures out of 21 patients undergoing hardware removal for reasons different from infection, none of these patients had signs of infection [10]. While none of these patients sustained a later infection, none had additional hardware or prosthesis implanted. Positive cultures in clean orthopaedic surgery can range up to 8.3% without correlation with postoperative infection [11]. Again, these patients did not undergo a subsequent TJA. In a different study, Ritter et al. saw that two positive intraoperative cultures at the time of TJA, in patients with prior surgery, develop PJI [12]. They failed to distinguish ORIF only patients and also included in this group failed aseptic TJA.

Performing routine cultures does not come without risk. Cultures are not an inexpensive tool, cost is around $25 U.S. per culture [11]. Depending on how it is collected, there can be different results in the bacterial growth. Chen et al. demonstrated that during the same knee arthroplasty surgery, if the samples are exposed in the operating room, there can be a contamination in the material leading to a false-positive result [13]. Even if there is a positive culture test, it doesn't necessarily indicate an infection.

While intraoperative cultures are not always positive in infected patients, two or more can correlate with a subsequent PJI. Current MusculoSkeletal Infection Society (MSIS) criteria for PJI diagnosis include intraoperative cultures both as major and minor criterion. Therefore, cultures should be included in the workup for possible infection prior to TJA. Literature is consistent in showing that these patients have an increased risk of subsequent PJI given they had a prior surgery on the affected joint.

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