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QUESTION 2: Is there a minimum number of complex osteomyelitis procedures a surgeon should perform annually to ensure proper outcomes?

RECOMMENDATION: There is no literature supporting a minimum number of complex osteomyelitis procedures a surgeon should perform annually to ensure proper outcomes. Higher-volume referral centers, centers of excellence and multidisciplinary teams for the treatment of complex osteomyelitis may result in improved outcomes.

LEVEL OF EVIDENCE: Consensus

DELEGATE VOTE: Agree: 76%, Disagree: 14%, Abstain: 10% (Super Majority, Strong Consensus)

RATIONALE

In the literature reviewed, there is no evidence to answer the question. Osteomyelitis is a complex pathology, which needs years of follow-up to be able to demonstrate the sustained remission of the disease. Osteomyelitis has multiple etiologies: 19% hematogenous, 47% secondary to a contiguous focus and 34 % due to vascular insufficiency [1]. There is no evidence to establish the optimal duration of treatment and many studies do not present good-quality data and include a small number of patients [1,2]. Therefore, most of the recommendations for the treatment of osteomyelitis is based on expert opinions.

In joint arthroplasty, high-volume centers, multidisciplinary teams and centers of excellence have been shown to improve patient outcomes with respect to the treatment of prosthetic joint infections [3]. In trauma, there have been few studies looking at the benefit of high-volume centers for the treatment of complex osteomyelitis and septic nonunions. Bauer et al. retrospectively evaluated the results of a French referral center for complex bone infections. They had 55 patients over the course of 10 years who were treated for infected non-unions of the tibia or femur. They showed that 89% of patients with an infected tibial or femoral non-union treated by a team specialized in complex bone and joint infections using a standardized surgical protocol had bone union and healing of the infection in an average of nine months [4]. In a similar study, Bose et al. reported on 67 long bone infected non-unions over 6 years treated by a multidisciplinary team. They found that 59/67 (88%) went on to fracture union and eradication of their infection [5]. Lastly, Salvana et al. treated 82 patients over 7 years with chronic osteomyelitis with an integrated team approach and found successful union and limb salvage in 77 (94%) cases [6]. In these three studies, the centers treated on average 6-12 cases of complex osteomyelitis per year. At this time there is no data supporting a minimum number of cases of complex osteomyelitis a surgeon should perform annually to ensure good results, but having greater experience collectively at an institution or within a dedicated unit would presumably results in the greatest likelihood of a successful outcome in this difficult cohort of patients.

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QUESTION 3: Who are the essential members of the multidisciplinary team required to manage infected fractures and non-unions?

RECOMMENDATION: The essential members of the multidisciplinary team managing infected fractures and non-unions require expertise in bone reconstruction, soft tissue reconstruction, microbiology, antibiotic treatment and advanced imaging. It is important to note that the exact members of the group and other specialists required will eventually depend on patient needs and local preferences.

LEVEL OF EVIDENCE: Consensus

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

RATIONALE

There is increasing evidence that teamwork and collaboration among healthcare workers are essential to improving patient outcomes [1,2]. Therefore, it is important to implement a multidisciplinary approach in treatment algorithms of fracture-related infec-