

of periprosthetic hip infections. The results showed that combined leukocyte and bone marrow scintigraphy was the most specific imaging technique for diagnosing periprosthetic hip infections. Fluorodeoxyglucose PET has an appropriate accuracy in confirming or excluding periprosthetic hip infection, but may not yet be the preferred imaging modality because of its limited availability and relatively higher cost [27].

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QUESTION 5: Is there a benefit for the engagement of a multidisciplinary team for the management of patients with periprosthetic joint infections (PJIs)?

RECOMMENDATION: The treatment of PJIs takes a multidisciplinary approach, with interactions between the orthopaedic surgeon, anesthesiologist, infectious disease specialist, medical microbiologist, plastic surgeon and ancillary service teams. It is demonstrated that centers with experience in the treatment of PJIs, or those adopting standardized protocols, have improved outcomes with lower complications. Until further research demonstrates otherwise, patients with PJIs should be cared for in centers that use a multidisciplinary approach and have experience in the management of PJIs.

LEVEL OF EVIDENCE: Limited

DELEGATE VOTE: Agree: 98%, Disagree: 1%, Abstain: 1% (Unanimous, Strongest Consensus)

RATIONALE

Although there are a number of reports on the advantages of multidisciplinary or interdisciplinary teams (MDT/IDT) in prevention of PJIs, there is limited data on its impacts on the outcomes of PJIs. To date, no study has evaluated MDT/IDT interventions in a random-

ized manner and no meaningful systematic collection of data can be found.

Nevertheless, when PJIs occur, at least in specialist centers in developed countries, a number of medical, surgical and allied health

professionals are involved in management, including orthopaedics, infection disease, microbiology, outpatient parenteral antimicrobial therapy (OPAT), anesthesiology and internal medicine. Furthermore, ancillary services such as nutrition, physical therapy, pharmacy, nursing and care coordination (including physical rehabilitation, counselling, peer support, improved information) are very helpful [1].

The Oxford Bone Infection Unit (OBIU) in England and Oregon Health and Science University (OHSU) in the United States have described models of MDT/IDT care of orthopaedic infections, including PJIs, that have been developed and successfully implemented. Outputs from these centers suggest that MDT/IDT and OPAT services can improve PJI management, not only with regards to diagnosis, treatment and addressing comorbidities, but also with regards to readmissions and overall reduction of hospitalization [2,3].

A small-scale study reported five-year outcomes of a two-stage approach for infected total hip arthroplasties of a single surgeon at a tertiary center. This study prospectively highlighted the vital role of the MDT in managing 125 patients. No patients were lost to follow-up. The authors reported excellent control of infections in a series of complex patients and infections using a two-stage revision protocol supported by a multidisciplinary approach. However, there was an unexplained high rate of mortality in these patients, as 19 patients died during the study period, representing a one-year mortality of 0.8% and an overall mortality of 15.2% at five years [4].

Another study evaluated algorithm-based therapy for patients with PJIs, with emphases on establishing MDT/IDT discussions and therapy optimizations. The study included 147 consecutive patients (with proven PJIs of the hip or knee) who were treated with a pro forma approach with an average follow-up of 29 months. Patients were treated surgically with either debridement and retention or two-stage exchange (with or without spacer). Interdisciplinary case discussions were held to adjust antibiotic and supportive therapies. The authors then evaluated the infection-free survival of all patients treated and recorded changes in therapy regime and associated complications. Although causative microorganisms were identified in 73.5% of the cases, antibiotic therapy had to be adjusted in 42% of cases based on discussions with infection specialists. A total of 71.4% and 5.4% cases were either definitely or probably free of infection, respectively. Among the study cohort, 3.4% died as a result of PJI and sepsis. Those at risk of treatment failure were cases with a septic or pre-septic status prior to the start of treatment, patients with germs rated as “difficult to treat,” or polymicrobial infections, highlighting the importance of an IDT approach and its impact on success in these cases [5].

Furthermore, managing PJIs in the context of biofilms is challenging. The formation of biofilms is highly dependent on numerous factors, including the implant material, the culture media and condition, preconditioning of bacteria, the bacterial species, strain and colony morphologies (e.g., normal, small colony variants, mucoid phenotypes) and the method of evaluation. Studies on animal PJI models differ in animal types and strains, the inoculum size, and the bacterial species and strain. Therefore, animal models may not be generalized to patient management. Clinical PJI studies often lack

standardization in antibiotic prophylaxis and information on the time and mechanism of bacterial colonization. Infection caused by virulent or pyogenic bacteria such as *Staphylococcus aureus* induces clinical symptoms much earlier than bacteria with low virulence.

Patients receiving orthopaedic interventions, including arthroplasty, report a negative mental outlook, functional and activity limitations, pain and loss of independence [6]. After a range of hospital admissions, individualized discharge strategies may lower the risks of readmissions and improve patients satisfactions [7]. Past medical history, clinical examination, laboratory investigations, conventional and specialized imaging, joint aspiration, microbiological and histological examinations help diagnose PJIs and are indispensable before planning and providing the appropriate therapy. Differentiation between aseptic and septic prosthetic loosening is difficult. Management of PJIs is expensive, complicated, and has a high morbidity [1]. These patients should have their definitive care by a specialist MDT/IDT. MDT/IDT management would allow us to determine the extent of unmet needs for patients with PJIs and to evaluate existing support interventions for patients with PJIs and develop appropriate care pathways.

Based on the above search, we believe there is a gap in the available literature for systematic review or conclusion regarding this question. Further systematic studies are needed to determine the design, implementation and evaluation of MDT/IDT in the management of patients undergoing treatment for PJIs.

Literature Search

A literature search from BNI, CINAHL, Embase, HMIC and Medline was performed for (“multidisciplinary team*” OR interdisciplinary OR MDT) AND ((prosth* OR arthroplast*)) AND infection*). This search was conducted from inception till 10th January 2018 and 22 articles were found.

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