

IS THE PRESENCE OF BACTERIAL DNA A CAUSE OF ARTHROFIBROSIS: A DESCRIPTIVE ANALYSIS IN KNEE REPLACEMENT AND LIGAMENT RECONSTRUCTION

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1 INTRODUCTION & AIM

Arthrofibrosis (AF) is a significant complication following knee surgery, characterized by an exacerbated scar response that limits range of motion (ROM) and causes functional impairment. While low-grade infection is not a proven cause of AF in either total knee arthroplasty (TKA) or anterior cruciate ligament reconstruction (ACLR), emerging evidence suggests a potential association. The primary objective of this study is to evaluate the presence of bacterial DNA in the periarticular tissues of patients with AF using next-generation sequencing (NGS), and to assess whether functional ROM gain differs between patients with and without detectable bacterial DNA. We hypothesize that patients with AF had a higher rate of bacterial DNA.

2 METHODS

A prospective, longitudinal, descriptive, multicenter study was conducted including 42 consecutive patients with AF (28 post-TKA and 14 post-ACLR) who underwent arthroscopic arthrolysis. Patients with a prior diagnosis of infection (according to EBJIS criteria), articular fractures, technical errors (including poor implant or graft positioning), or cyclops lesions were excluded. During surgery, samples were obtained for standard microbiological study and histopathology, and an additional sample was allocated for 16S rRNA gene sequencing and shotgun metagenomics via NGS. Demographic, clinical, and surgical variables were recorded. The detection of bacterial DNA was compared between groups using Chi-square or Fisher's exact tests, with probability (p) values < 0.05 considered statistically significant.

3 RESULTS

NGS detected bacterial DNA in 14 cases (33.3%). Of these, 11 were post-TKA (39.3%) and three were post-ACLR (21.4%). In 10 of the 14 patients with detected bacterial DNA, standard cultures were negative; the remaining four cases had concordant positive conventional cultures (9.5%). The most frequently identified organisms included *Staphylococcus epidermidis*, *Cutibacterium acnes*, and *Staphylococcus saprophyticus*. The proportion of CoNS and *C. acnes* was different between ACLR and TKA (p<0.05). No significant differences were observed in preoperative ROM or functional gain between patients with or without the detection of bacterial DNA (median gain 25° vs. 28°, p=0.6).

4 CONCLUSIONS

A clinically relevant percentage of patients with AF following TKA and ACLR present with bacterial DNA, despite lacking a previously established diagnosis of infection. The presence of bacterial DNA did not affect ROM in this cohort.

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Low-grade infections as a potential contributor of arthrofibrosis following total knee arthroplasty

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Low-grade infections as a possible cause of arthrofibrosis after total knee arthroplasty

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