

## **Polymicrobial PJI Failures: Reinfection or Persistence?**

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**INTRODUCTION:** The management of chronic hip and knee periprosthetic joint infection (PJI) involves surgical intervention and antibiotic treatment. This treatment is known to fail in about 30% of patients in the first two years after surgery. In case of reinfection, there is no conclusive data to determine if the infection is as a result of an organism that was present previously or a new organism. Data using next generation sequencing (NGS) suggest that PJI is caused by multiple organisms but is considered monomicrobial due to the limitation of culture in isolating all infective organisms. The purpose of this study was to determine whether failed two-stage exchanges were as a result of an organism that was originally detected by NGS or a new organism. To address this question, patients with polymicrobial PJI, as detected by culture were used as a model.

**METHODS:** A multicenter retrospective study including data from three different PJI referral centers was designed. Cases of polymicrobial PJI at the time of resection surgery (first stage) from 2000 to 2019 were included. Patients who failed at a later time point were defined and the microbiological data was scrutinized. Statistical analysis consisted of descriptive statistics.

**RESULTS:** A total of 83 polymicrobial PJI, treated with a two stage exchange, were included. Fifteen of 83 patients (18.07%) had cultures positive at reimplantation. Of these, 8 (53%) patients reported one of the organisms retrieved at the time of the resection despite a prolonged course of antibiotic treatment targeted towards that organism. Additionally, 24 out of total number of patients (28.91%) had an additional procedure between resection and reimplantation (i.e. spacer exchange or washout). A subgroup analysis of the 59 that did not have a third procedure in the two-stage exchange showed 11 (18%) had a positive culture at reimplantation. Of these, 7 (63%) were due to the same organisms cultured at resection.

### **DISCUSSION AND CONCLUSION:**

Culture-positive polymicrobial PJI is a good model to study multiple organisms in chronic PJI infections. In the present study, we report that most infections at the time of reimplantation, despite antimicrobial treatment, are represented by the persistence of an organism isolated at the time of the first surgery. Multiple surgeries, including spacer exchange and washout can reduce the bioburden in the joint, with unclear effect on the overall success rate.