Unsuspected Positive Intraoperative Cultures in Aseptic Revision Knee Arthroplasty – Prevalence, Management, and Infection-Free Survivorship

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INTRODUCTION:

The purpose of this study was to evaluate the management and outcomes of aseptic revision total knee arthroplasty (arTKA) with unsuspected positive cultures (UPCs) compared to those with sterile cultures.

METHODS:

The institutional database at a single tertiary center was retrospectively reviewed for arTKA from January 2013 to October 2023. Patients who met Musculoskeletal Infection Society (MSIS) criteria for periprosthetic infection (PJI) based on available preoperative infectious workup, received antibiotic spacers, or who did not have at least 1 year follow-up were excluded. Patients were stratified based on intraoperative cultures into 4 cohorts: sterile cultures, 1 UPC, ≥2 UPCs with different organisms, and ≥2 UPCs with the same organism. Univariable analysis was used to compare these groups. Kaplan-Meyer survivorship analysis assessed infection-free survival at 5 years and Cox proportional hazards regression was used to evaluate factors that influence infection-free survival.

RESULTS:

A total of 691 arTKAs at mean follow-up of 4.2 years were included in the study. Of these, 49 (7.1%) had 1 UPC with a new organism and 10 (1.4%) had ≥2 UPCs of the same organism and 2 (0.2%) had ≥2 UPCs with different organisms. Postoperative antibiotics were prescribed to 114 (16.5%) patients — 13 (26.5%) with 1 UPC, 6 (60.0%) with ≥2 UPCs of the same organism and 0 (0.0%) of patients with ≥2UPCs of different organisms. There were no differences in infection-free survival at 5 years between patients with sterile cultures and 1 UPC (96% versus 89%; $P = 0.39$) nor between sterile cultures and ≥2 UPCs of different organisms (96% versus 100%; $P < 0.72$). However, patients with ≥2 UPCs of the same organism had significantly worse infection-free survival at 5 years compared to patients with sterile cultures (58% versus 96%; $P < 0.001$). Cox proportional hazards regression suggested that when adjusting for covariates an American Society of Anesthesiologist (ASA) classification of ≥3 (hazard ratio [HR] = 3.1; $P = 0.007$), ≥2 UPCs of the same organism (HR = 11.0; $P < 0.001$), 1 UPC (HR = 4.2; $P = 0.018$), and arTKA with hinge constructs (HR = 4.1; $P = 0.008$) were associated with increased risk of re-revision for PJI.

DISCUSSION AND CONCLUSION:

Patients with 1 UPC or ≥2 UPCs with different organisms had similar infection-free survival at 5 years as patients with sterile cultures. However, patients with ≥2 UPCs of the same organism had significantly worse infection-free survival at five years. Overall, 1 UPC or ≥2 UPCs of the same organism at time of arTKA may suggest the patient is at higher risk of re-revision for PJI. More studies are needed to determine what interventions can be implemented to mitigate this risk.