

Differences in the Micro-Organism Profile of Periprosthetic Joint Infection in Different Age Groups

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INTRODUCTION:

Periprosthetic joint infection (PJI) is a devastating complication after total joint arthroplasty (TJA). Treatment involves further surgery, intravenous antibiotics, prolonged rehabilitation, and ultimately lower expected function. As arthroplasty outcomes and techniques improve, a wider range of patients are undergoing arthroplasty than before, including both younger (e.g., < 60 years old) and older (e.g., > 80 years old) patients. This diverse group of patients is likely to have different risk profiles and susceptibility to developing PJI, including different causative organisms. Thus, our objective was to analyze the differences in causative infectious organisms between different age groups.

METHODS: This study was a retrospective cohort study conducted at a high-volume arthroplasty center specializing in treating PJIs. All cases of PJI were collected by collecting de-identified data from the institutional database. Demographic variables, including age, joint, sex, and body mass index (BMI) were collected. Patients were divided into 5 age categories: <50 years old, 50 to <60 years old, 60 to <70 years old, 70 to <80 years old, and >80 years old. Causative organisms and the rates of resistant and polymicrobial organisms were compared across these age groups.

RESULTS:

A total of 2,393 cases of PJI were identified, including 54.8% males and 45.2% females. In total, 60.7% of PJIs occurred in hips, and 39.2% in knees. Mean age was 67.9 years old. Patients between 60 and 70 years were most likely to have polymicrobial infections (44.9%), while patients over 80 years old were least likely to do so (30.0%). *Staphylococcus* species were the most common causative organism across all age groups (range 32.9% to 43.8%). Patients over 80 years old had significantly higher rates of infection with *Streptococcus* species (6.2%, $p < 0.05$), *Enterococcus* species (5.2%, $p < 0.05$), and Gram-positive species (3.8%, $p < 0.05$). Patients over 80 years old also had the highest rates of Methicillin-Resistant *Staphylococcus Aureus* (MRSA) infection (9.3%).

DISCUSSION AND CONCLUSION: Older patients (> 80 years old) with a PJI are more likely to have infection with non-*Staphylococcus* species, including *Streptococcus*, *Enterococcus*, and Gram-positive species. Patients over 80 years old also had the highest rates of MRSA infection. Interestingly, these patients were least likely to have polymicrobial infections, which may be a combined effect of their dampened immune response to infection, as well as their higher likelihood of having high virulence organisms isolated from the joint.