Abstract

BACKGROUND

Inflammatory biomarkers are central to diagnosing periprosthetic joint infection (PJI), yet their prognostic value for outcomes after debridement, antibiotics, and implant retention (DAIR) remains uncertain. The present study evaluates whether commonly obtained serum and synovial inflammatory biomarkers are associated with DAIR outcomes following hip or knee arthroplasty PJI.

METHODS

A retrospective cohort analysis was performed on primary total knee and hip arthroplasty PJIs treated with DAIR from 2007–2024. The primary outcome was DAIR failure defined by the MSIS Outcome Reporting Tool (ORT); the secondary outcome was reoperation. Preoperative biomarkers included erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), synovial white blood cell (WBC) count, and synovial polymorphonuclear neutrophil percentage (PMN%). Associations with outcomes were assessed using logistic regression, including a prespecified multivariable model incorporating all four biomarkers simultaneously. Discrimination was evaluated using area under the receiver operating characteristic curve (AUC).

RESULTS

Among 142 DAIR procedures, 77 (54.2%) were MSIS ORT successes and 65 (45.8%) failures. Baseline CRP, ESR, synovial WBC count, and synovial PMN% did not differ between success and failure groups (all $P \geq 0.306$). In the prespecified multivariable biomarker model, no biomarker was independently associated with DAIR failure: CRP (OR 0.99; $P = 0.143$), ESR (OR 1.02; $P = 0.098$), synovial WBC (OR 1.00; $P = 0.948$), or synovial PMN% (OR 0.99; $P = 0.583$). Results were similar for reoperation (all $P \geq 0.143$). Model discrimination was limited (AUC 0.63 for DAIR failure; 0.66 for reoperation).

CONCLUSIONS

Preoperative ESR, CRP, synovial WBC count, and synovial PMN% were not independently associated with DAIR failure or reoperation in prespecified multivariable analyses of hip and knee PJI. These findings suggest that routinely used inflammatory biomarkers, while central to PJI diagnosis, have limited utility for preoperative prognostic stratification when selecting DAIR and counseling patients.