

Synovial Fluid Leukocyte Analysis in Periprosthetic Joint Infection of Unicompartmental Knee Arthroplasty: A Multicentre Retrospective Study

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INTRODUCTION:

There are no validated criteria for the diagnosis of periprosthetic joint infection (PJI) in unicompartmental knee arthroplasty (UKA). Particularly, the threshold of synovial fluid leukocyte count for detecting PJI is unknown. This study aims to evaluate appropriate diagnostic thresholds for synovial fluid leukocyte count and polymorphonuclear cells (PMN) percentage for the diagnosis of PJI in patients with failed UKAs

METHODS:

We conducted a multicentre, retrospective cohort study including 5 university-affiliated medical centers and identified 239 patients who underwent septic or aseptic revision of an UKA. Of these, 30 (13%) had a revision for PJI and 209 (87%) had a non-PJI revision. PJI was diagnosed according to EBJIS criteria. Preoperative synovial fluid leukocyte count, synovial polymorphonuclear cell percentage (PMN), serum C-reactive protein (CRP), and white blood cell (WBC) count were evaluated. Receiver operating characteristic curves and Youden's index were used to assess diagnostic performance and the optimal cut-off for the parameters.

RESULTS:

Comparing the values of patients with PJI and no PJI, the median synovial leukocyte count (11399/L vs 429/L, $p < 0.001$) and synovial PMN percentage (82% vs 28%, $p < 0.001$) were significantly higher in the PJI group. The optimal cut-offs for diagnosing PJI were 2318/L for synovial fluid leukocyte count (AUC 0.93; sensitivity 83%, specificity 95%) and 64% for PMN percentage (AUC 0.90; sensitivity 76%, specificity 95%). CRP (cut-off 9mg/L; AUC 0.85) and WBC count (cut-off 8G/L; AUC 0.71), showed lower diagnostic accuracy.

DISCUSSION AND CONCLUSION:

This study establishes diagnostic thresholds for PJI specific to UKA, which align with the EBJIS PJI criteria for TKA. Synovial biomarkers, particularly synovial fluid leukocyte count and PMN percentage, demonstrated superior diagnostic performance compared to serum CRP and WBC. These findings underscore the need for tailored diagnostic criteria to improve the accuracy of PJI diagnosis and optimize patient outcomes in UKA revision.