

# Paper #11

## Acute Postoperative Infections after Total Knee Arthroplasties: ESR, CRP, and Aspiration Thresholds

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**Introduction:** Diagnosing acute postoperative periprosthetic joint infections (PJIs) after primary total knee arthroplasties (TKAs) remains difficult. Published diagnostic thresholds for ESR, CRP, and synovial fluid analysis have not been replicated. We aimed to validate the optimal cutoffs for detecting acute postoperative PJIs in a large series of primary TKAs.

**Methods:** We retrospectively identified 27,066 primary TKAs performed between 2000-2019. Within 12 weeks, 171 knees (170 patients) had a synovial fluid aspiration. Patients were divided into two groups: evaluation <6 weeks or 6-12 weeks. The 2011 MSIS criteria for PJI diagnosed infection in 22 knees. Included knees had a mean 4.5 years follow-up after the index surgery. Mann-Whitney U tests compared medians; ROC analyses determined optimal thresholds.

**Results:** Within 6 weeks, CRP (101 mg/L vs. 35 mg/L;  $p=0.01$ ), synovial WBCs (58,295 cells/ $\mu$ L vs. 2121 cells/ $\mu$ L;  $p<0.001$ ), and synovial neutrophils (%PMNs) (91% vs. 71%  $p<0.001$ ) were significantly higher in infected TKAs. ESR did not differ between groups at <6 weeks. Between 6-12 weeks, CRP (85 mg/L vs. 6 mg/L;  $p<0.001$ ), ESR (33 mm/h vs. 15 mm/h;  $p=0.015$ ), synovial WBCs (62,247 cells/ $\mu$ L vs. 596 cells/ $\mu$ L;  $p<0.001$ ), and %PMNs (93% v. 54%;  $p<0.001$ ) were significantly higher in infected TKAs. Optimal thresholds at <6 weeks were: CRP  $\geq 81$  mg/L (sensitivity 80%, specificity 77%), synovial WBCs  $\geq 8515$  cells/ $\mu$ L (sensitivity 92%, specificity 90%), and %PMNs  $\geq 86\%$  (sensitivity 92%, specificity 72%). Between 6-12 weeks, thresholds were: CRP  $\geq 32$  mg/L (sensitivity 100%, specificity 93%), synovial WBCs  $\geq 7450$  cells/ $\mu$ L (sensitivity 80%, specificity 98%), and %PMNs  $\geq 84\%$  (sensitivity 80%, specificity 89%).

**Conclusions:** Acute PJI after TKA should be suspected within 6 weeks if CRP is  $\geq 81$  mg/L, synovial WBCs are  $\geq 8500$  cells/ $\mu$ L, and/or %PMNs  $\geq 86\%$ . Between 6-12 weeks, concerning thresholds include a CRP  $\geq 32$  mg/L, synovial WBC  $\geq 7450$ , and %PMNs  $\geq 84\%$ .

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