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Diagnosis of Early Postoperative TKA Infection Using Synovial Fluid Analysis

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Objective: We evaluated the diagnostic performance of four common laboratory tests: the synovial white blood cell count, differential, C-reactive protein, and erythrocyte sedimentation rate to detect infection in the first 6 weeks after primary TKA.

Study Design: We reviewed 11,964 primary TKAs and identified 146 that had a knee aspiration within 6 weeks of surgery. Infection was diagnosed in 19 of the 146 knees by positive cultures or gross purulence. We compared demographic information, time from surgery, and the laboratory test values between infected and noninfected knees to determine if any could identify infection early postoperatively. Receiver operating characteristic curves were constructed to determine optimal cutoff values for each of the test parameters.

Results: Synovial white blood cell count (92,600 versus 4200 cells/μL), percentage of polymorphonuclear cells (89.6% versus 76.9%), and C-reactive protein (171 versus 88 mg/L) were higher in the infected group. The optimal synovial white blood cell cutoff was 27,800 cells/μL (sensitivity, 84%; specificity, 99%; positive predictive value, 94%; negative predictive value, 98%) for diagnosing infection. The optimal cutoff for the differential was 89% polymorphonuclear cells and for C-reactive protein 95 mg/L.

Conclusions: With a cutoff of 27,800 cells/μL, synovial white blood cell count predicted infection within 6 weeks after primary TKA with a positive predicted value of 94% and a negative predictive value of 98%. The use of standard cutoff values for this parameter (~3000 cells/lL) would have led to unnecessary reoperations.

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