

## The Effect of Crystal Arthropathy on the Diagnostic Criteria of Native Septic Arthritis

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**Purpose:** Distinguishing between septic arthritis and crystal arthropathy flares can be challenging. The purpose of this study was to determine how the presence of synovial crystals affects the diagnostic criteria of septic arthritis.

**Methods:** A retrospective review identified patients undergoing joint aspirations to rule out native septic arthritis. Differences between septic arthritis presenting with and without synovial crystals were analyzed. A receiver operating characteristic curve was plotted for laboratory markers to determine the area under the curve (AUC), or diagnostic accuracy, for septic arthritis and to evaluate thresholds that maximized sensitivity and specificity.

**Results:** There were 302 joint aspirations in 267 patients. Septic arthritis was diagnosed in 17.9% (54/302). Patients with synovial crystals were less likely to have septic arthritis (4.2% [5/119] vs 26.8% [49/183],  $P < 0.0001$ ). Septic arthritis in patients with no synovial crystals was associated with fever and a higher synovial white blood cell (WBC) count, synovial polymorphonuclear cell percentage (PMN%), serum WBC, and C-reactive protein (CRP) ( $P < 0.05$ ). Septic arthritis in patients with synovial crystals was only associated with inability to bear weight and a higher synovial WBC and CRP ( $P < 0.05$ ). Synovial PMN% was considered nondiagnostic of septic arthritis (AUC 0.56) in patients with crystals while synovial WBC and CRP had acceptable (0.76) and excellent (0.83) diagnostic utility, respectively. The WBC and CRP value thresholds that maximized sensitivity and specificity for septic arthritis were greater in patients with crystals (21,600 vs 17,954 cells/ $\mu$ L and 125 vs 69 mg/L, respectively).

**Conclusion:** The presence of synovial crystals reduced the likelihood of septic arthritis and altered the laboratory diagnostic criteria. PMN% was nondiagnostic in the setting of synovial crystals.