



BACKGROUND & AIM

Septic arthritis is an orthopaedic emergency in which delayed diagnosis may result in irreversible cartilage damage, sepsis, and permanent morbidity. Despite this, the synovial white blood cell (sWBC) threshold of 50,000 cells/μL continues to be widely used as a major diagnostic trigger and, in many settings, as indirect support for urgent surgical washout. The reliability of this isolated threshold in real-world practice remains uncertain.

AIM: to evaluate the concordance between the sWBC >50,000 cells/μL threshold and the final diagnosis of septic arthritis in patients admitted with suspected native-joint infection.

METHODS

- Design: retrospective, single-centre pilot study
- Population: all consecutive adults admitted with suspected native-joint septic arthritis, November 2023 – May 2025
- Data source: institutional database — demographic, clinical, laboratory, synovial, microbiological and treatment variables
- Primary objective: concordance between sWBC >50,000 cells/μL and final diagnosis of septic arthritis
- Secondary objectives: concordance with microbiological confirmation and with surgical washout
- Statistics: sensitivity, specificity, PPV, NPV (final diagnosis as reference standard); exploratory ROC analysis for synovial leukocyte count

RESULTS

15 patients were included (median age 70 years; 14/15, 93.3% knee). Septic arthritis was the final diagnosis in 7/15 (46.7%), and 7/15 (46.7%) had a positive microbiological culture; 15/15 (100%) underwent surgical washout. sWBC was available in 12/15 (80.0%) cases — the 3 missing values included 2 patients ultimately diagnosed with septic arthritis.

TABLE 1 · COHORT (N = 15)

Variable	Value
Age, median	70 yo
Sex, M / F	10 / 5
Joint, knee / hip	14 / 1
Positive culture	7/15
Surgical washout	15/15
Final Dx: septic arthritis	7/15
Final Dx: microcrystalline	5/15
Final Dx: other	3/15

PATIENT FLOW · sWBC THRESHOLD

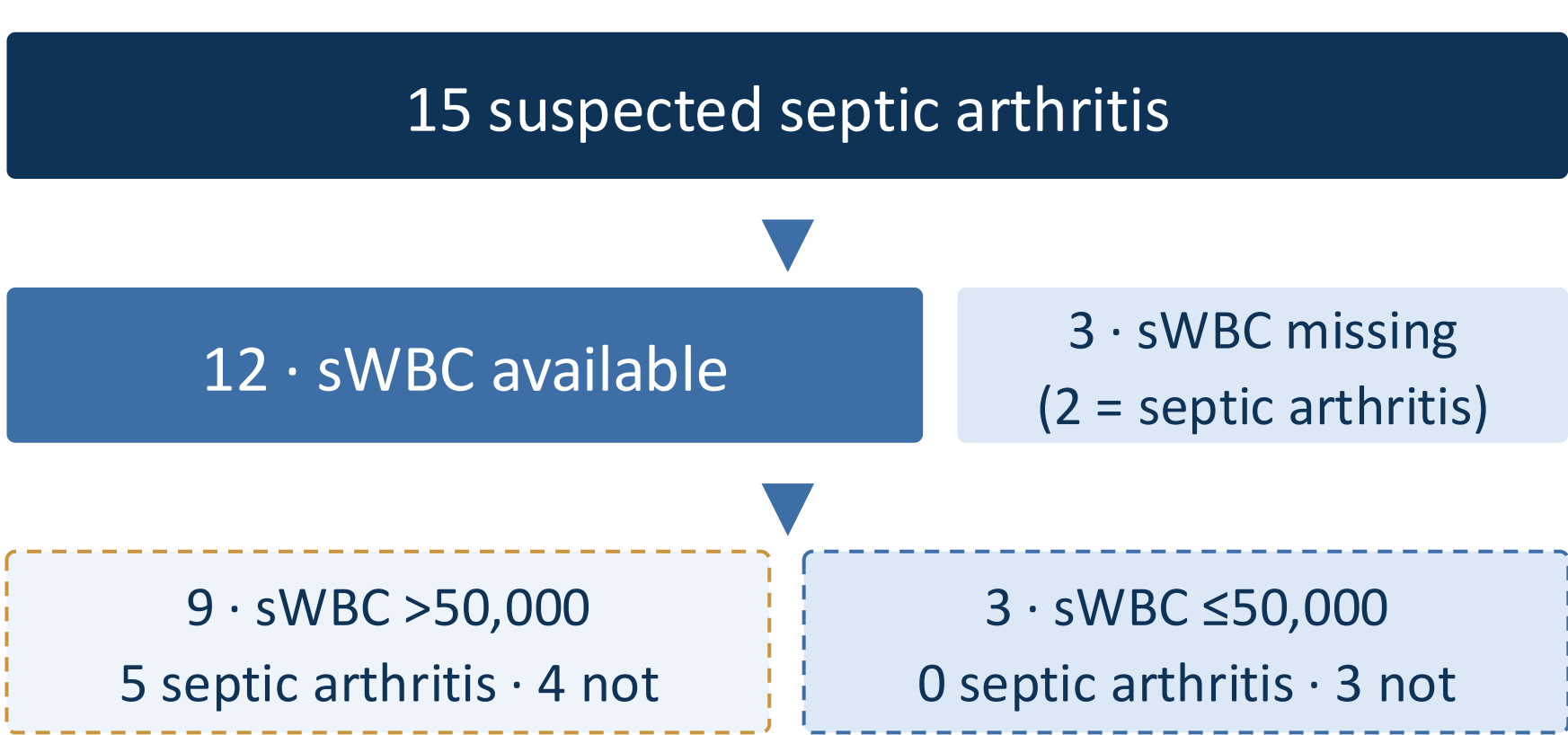
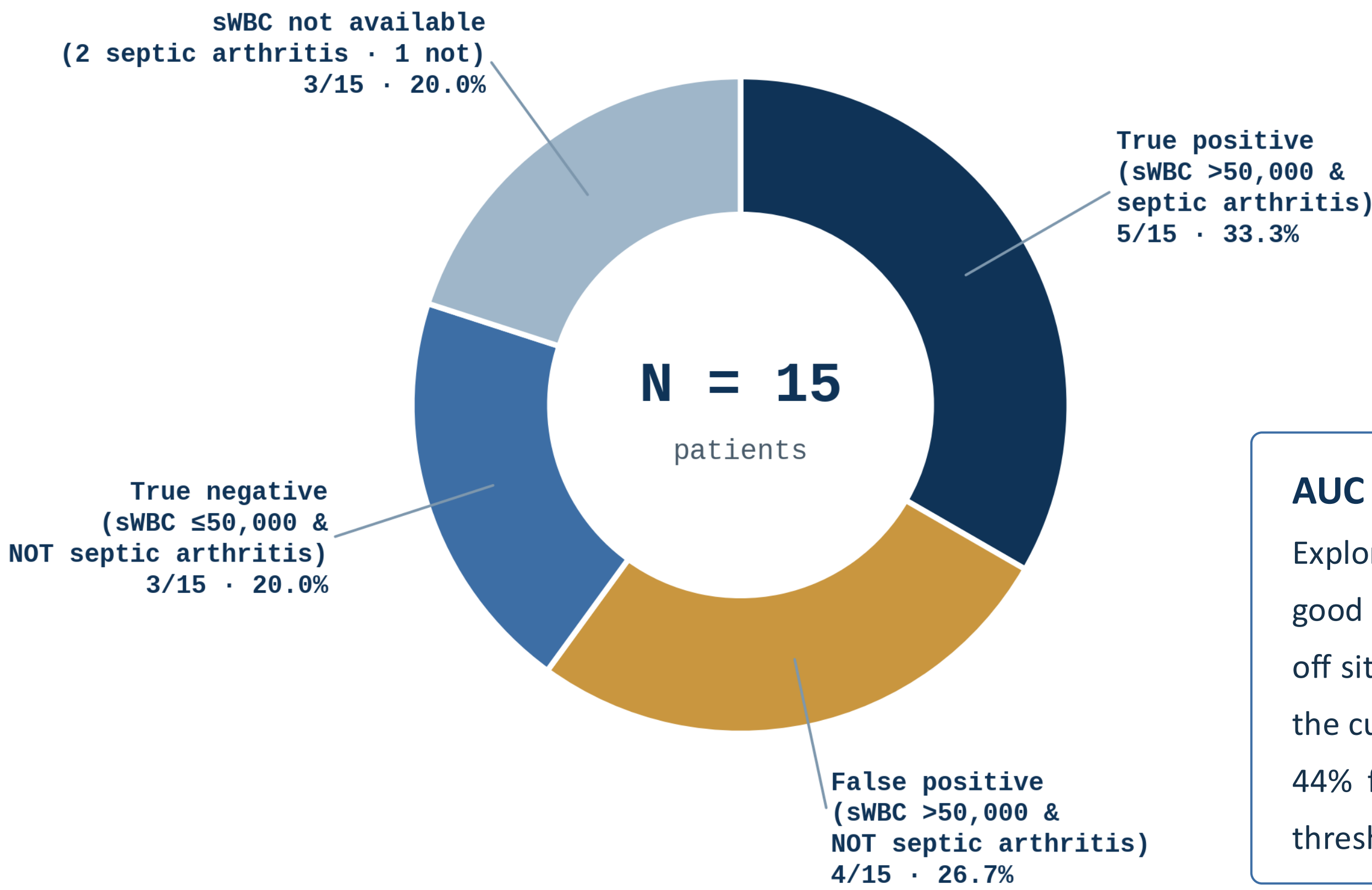


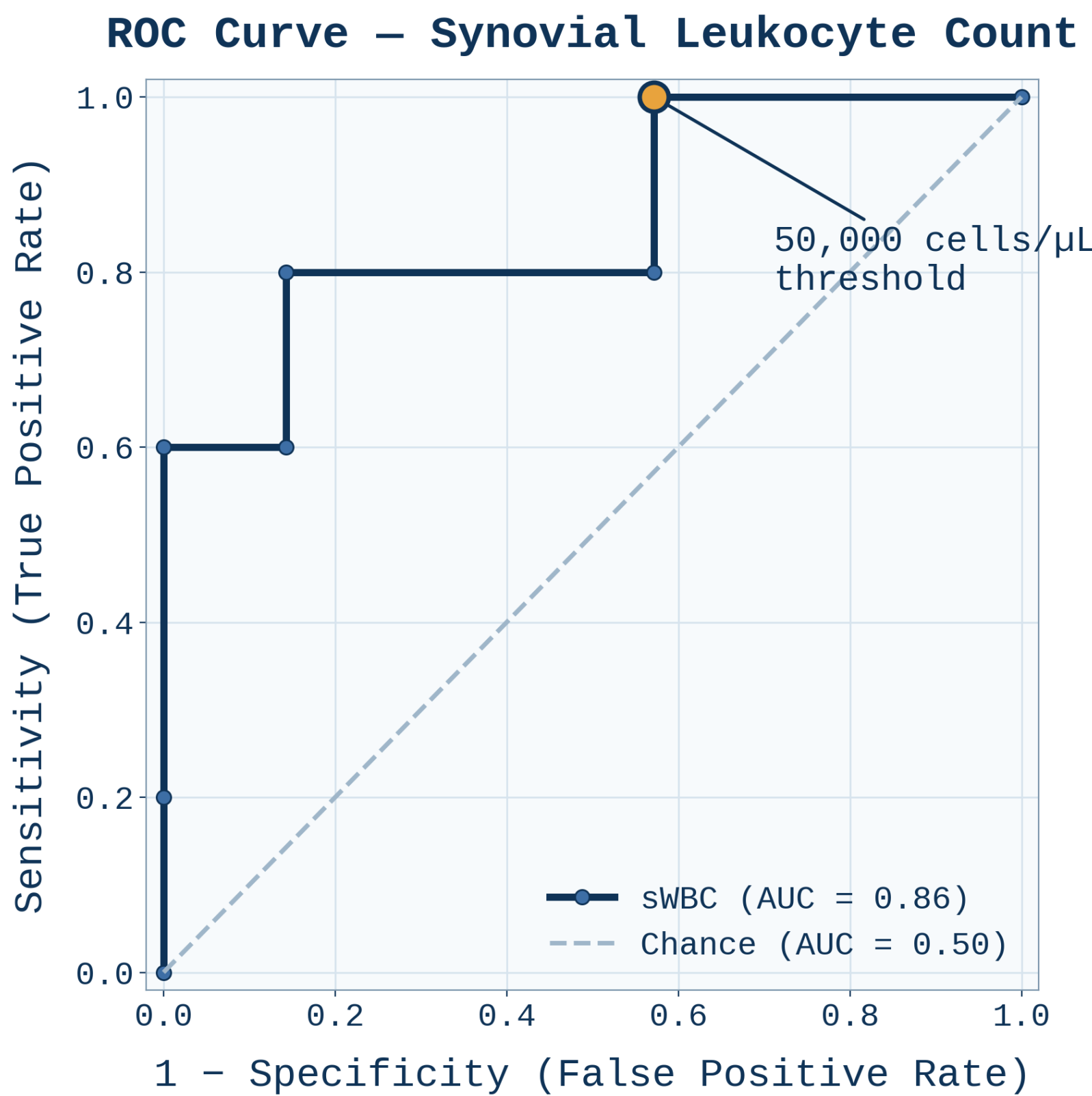
TABLE 2 · DIAGNOSTIC PERFORMANCE (>50,000 cells/μL)

Metric	Value
Sensitivity	100% (5/5)
Specificity	42.9% (3/7)
Positive predictive value	55.6% (5/9)
Negative predictive value	100% (3/3)
False-positive cases	4/9 (44.4%)
ROC — AUC	0.86



AUC = 0.86

Exploratory ROC analysis (n = 12 with available sWBC) shows good overall discrimination, but the fixed 50,000 cells/μL cut-off sits at a point of high sensitivity and modest specificity — the curve corner at (1–spec 0.57, sens 1.00) — explaining the 44% false-positive burden observed among patients above threshold.



In this real-world pilot cohort, the sWBC >50,000 cells/μL threshold performed poorly as a stand-alone rule for suspected septic arthritis.

Although highly sensitive when available, its low specificity, high false-positive burden, and missing measurements in clinically relevant cases challenge its usefulness as an isolated trigger for operative decision-making. These findings support moving beyond single-parameter thresholds toward combined clinical–laboratory prediction models for suspected septic arthritis.