

THE ROLE OF HIP ASPIRATION IN THE DIAGNOSIS OF TOTAL HIP ARTHROPLASTY INFECTION IN METAL ON METAL BEARINGS

James S. Melvin, MD¹ | Robert Cope² | Thomas K. Fehring, MD¹ | Susan M. Odum, PhD²

¹OrthoCarolina Hip and Knee Center, Charlotte, NC | ²OrthoCarolina Research Institute, Charlotte, NC

DISCLOSURE: Melvin: 4—Cadence; Cope: None; Fehring: 1—DePuy, A Johnson & Johnson Company, 2—DePuy, A Johnson & Johnson Company, 3B—DePuy, A Johnson & Johnson Company, 5—DePuy, A Johnson & Johnson Company, 9—AAHKS, Knee Society, Hip Society; Odum: 8—Journal of Arthroplasty, 9—AAHKS & AJRR
FDA APPROVAL: All products are FDA approved.

INTRODUCTION

The diagnosis of peri-prosthetic infection after total hip arthroplasty (THA) can be challenging. Patients often present with signs and symptoms similar to common aseptic modes of failure. Since currently there is no test that can definitely diagnose infection, the work up often involves synthesizing the patients presenting complaints with data from peripheral blood (CRP and ESR), synovial fluid analysis, microbiology, imaging and histopathologic analysis.

Synovial fluid analysis is an important aspect in the work up of the painful THA. Unfortunately, there is little data to guide the treating surgeon in the interpretation of these studies in dealing with MoM implants. With little current data to guide the interpretation of MOM synovial fluid analysis, we sought to investigate the performance of standard periprosthetic fluid cut-offs for infection in our population of MOM revisions.

METHODS

Between 2001 and 2012, 1409 consecutive revision THA's were reviewed. 51 patients met inclusion criteria of under-going pre-revision hip aspiration yielding a cell count prior to revision of MOM components.

Synovial cell count (SCC) was generated from an automated machine count, while differential was determined manually. Infection was defined as final histopathology consistent with infection. Standard synovial fluid cut-off's of SCC >3000 cells/uL and percentage of PMNs > 80%, in addition to serum CRP > 0.8 mg/dL and ESR > 22 mm/hr, defined a positive test for infection, respectively.

RESULTS

Table 1: Diagnostic Mean Laboratory Values

	Infected (n=4)	Uninfected (n=47)
Cell Count	61,936	2,634
% PMN	92.6%	53.4%
CRP	4.0	1.8
ESR	74	19.3

Table 2: Sensitivity and Specificity

	Sensitivity	Specificity	AUC
Cell count >3000	75%	87%	0.8
PMN > 80%	100%	78%	0.79
CRP > 0.8mg/dL	75%	48%	0.63
ESR > 22mm/hr	100%	68%	0.85

Figure 1: Cell Count

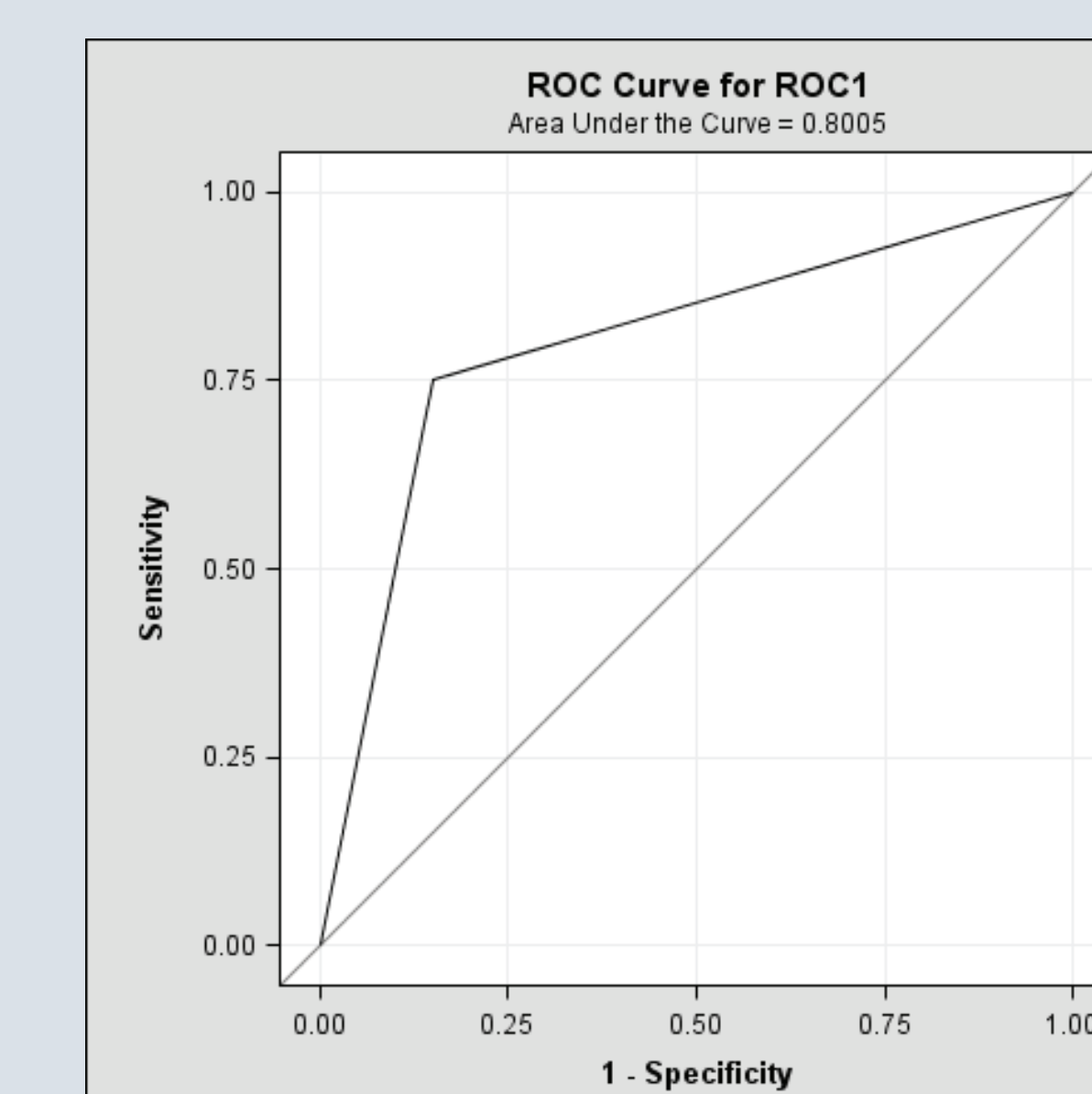


Figure 2: % PMN

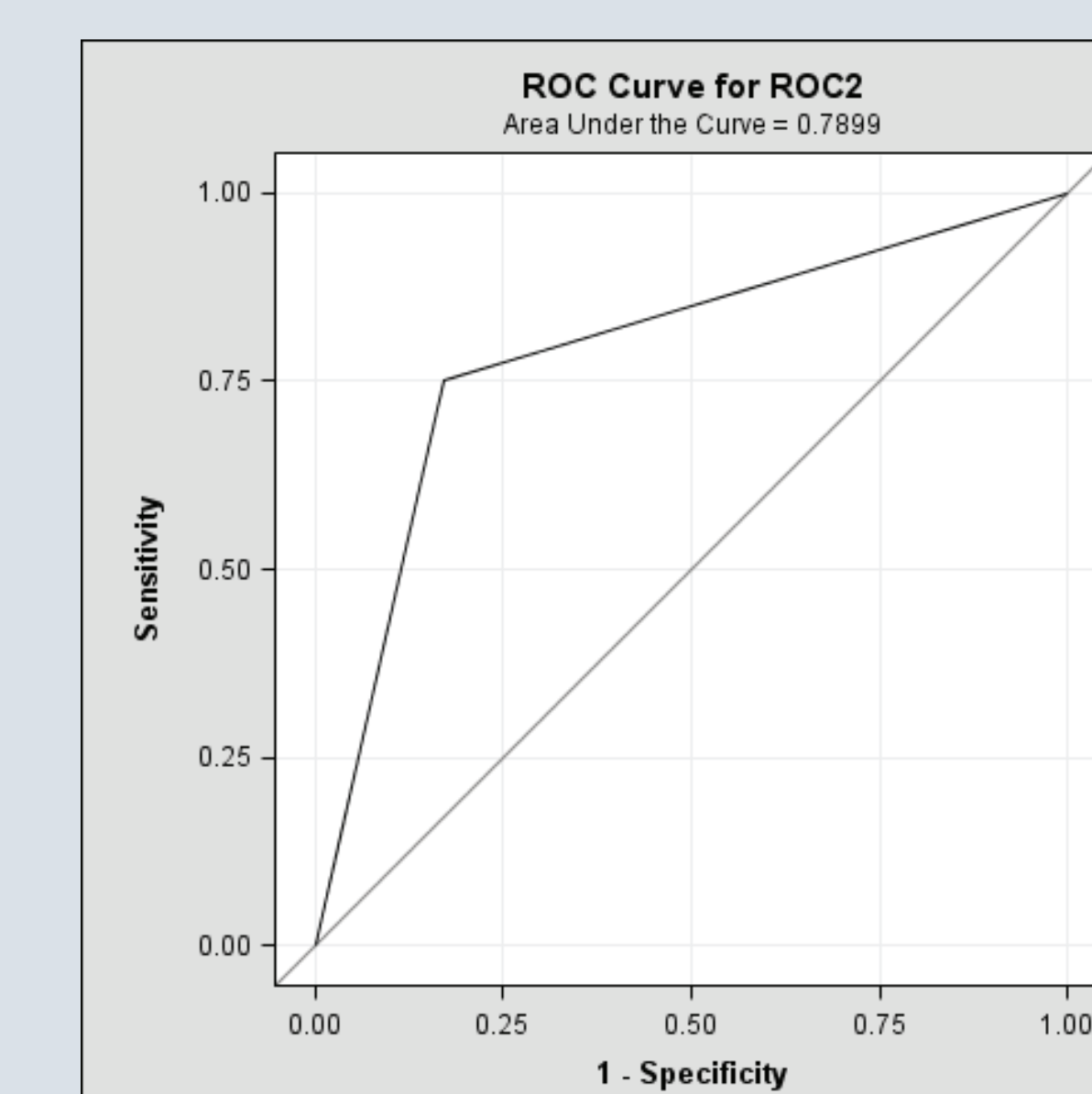


Figure 3: ESR

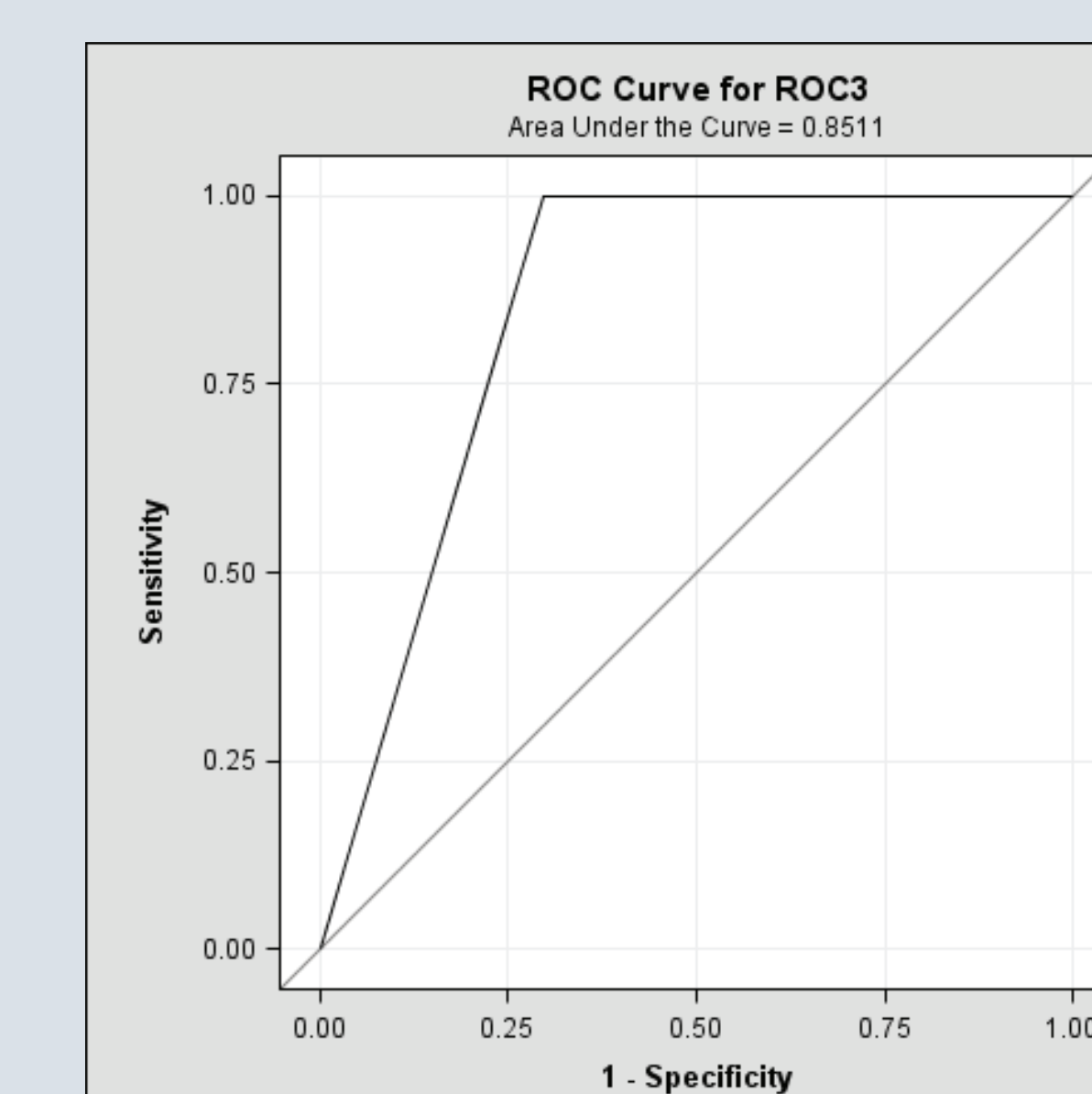
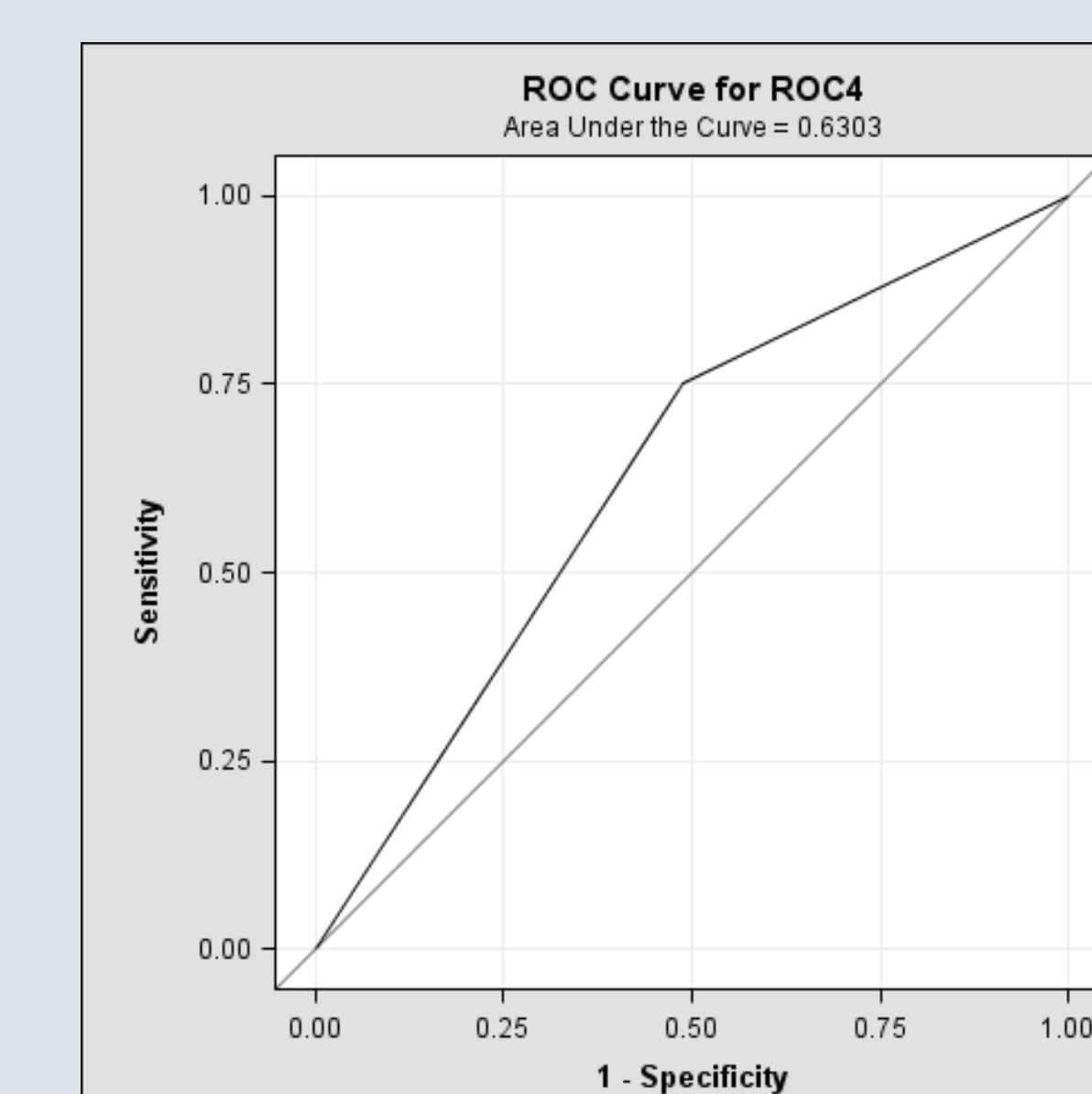


Figure 4: CRP



The accuracy of a diagnostic test is measured by the area under the curve (AUC) statistic. An AUC of .5 indicates that a test will correctly diagnose 50% of the time and an AUC of 1 indicates a perfect test. ESR, Cell count and % PMN were all accurate tests with probability values ≥ 0.79 of a correct diagnosis. CRP was well below the AUC of 0.80 threshold of a quality diagnostic test.

DISCUSSION & CONCLUSION

Our data suggest that standard cut-offs of >3000 cell/uL for synovial fluid cell count and neutrophil percentage >80%, can aid in the diagnosis of infection in MOM articulations. These cut-off values, traditionally employed in metal on polyethylene bearings, perform similarly when dealing with MoM bearings. It does not appear that synovial fluid from failed MoM bearings lead to an artificial elevation in the *automated* cell count or manual percent of PMNs. **Synovial fluid analysis is a useful tool in the diagnosis of periprosthetic infection even when dealing with a MoM bearing.**

