

Preoperative Serum Inflammatory Markers Do Not Correlate Closely with Cultures in Tibia Nonunions

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Purpose: The accuracy of currently available preoperative inflammatory markers to diagnose septic tibia nonunions remains unclear. Further, controversy remains over obtaining cultures and the interpretation of a positive culture in a setting of low clinical suspicion of infection based on physical findings and negative markers. The purpose of this study is to evaluate the accuracy with which erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and white blood cell (WBC) count can predict positive cultures.

Methods: Patients from ten Level I trauma centers who sustained a diaphyseal tibia fracture (AO/OTA 42) that underwent nonunion repair were identified retrospectively. Patients were included if ESR, CRP, or WBC count laboratory results were obtained within 48 hours prior to nonunion repair. Patients were included only if they had intraoperative culture acquisition at the definitive nonunion surgery. Elevated serum inflammatory markers were defined according to institutional limits. Diagnostic accuracy testing and logistic regression analyses were performed.

Results: In a dataset of 191 tibia nonunions, 55 (29%) had no cultures taken at the time of definitive nonunion surgery. Of the 136 (71%) with cultures (96 open and 40 closed fractures), 43 (32%) had positive cultures at the time of nonunion repair. The ability of serum markers to predict a negative culture result showed sensitivities ranging from 40% (WBC count) to 53% (ESR). Elevated serum inflammatory markers were not associated with higher odds of positive cultures.

Conclusion: The results of this study demonstrate that serum ESR, CRP, and WBC count do not accurately predict culture results at the time of tibia nonunion repair. Surgeon variance in obtaining cultures in presumed low-risk nonunions is also demonstrated with almost 30% having no culture obtained. Further study is warranted on both the predictive value of serum markers and variance in culture acquisition.

POSTER ABSTRACTS

Table 1. Diagnostic Accuracy of Serum Inflammatory Markers			
	ESR	CRP	WBC
Sensitivity	53.2% (38.1% - 67.9%)	51.1% (36.1% - 65.9%)	40.4% (26.4% - 55.7%)
Specificity	74.2% (63.8% - 82.9%)	70.8% (60.2% - 79.9%)	70.8% (60.2% - 79.9%)
PPV	52.1% (37.2% - 66.7%)	48.0% (33.7% - 62.6%)	40.2% (27.7% - 57.9%)
NPV	75.0% (64.6% - 83.6%)	73.3% (62.6% - 82.2%)	69.2% (58.7% - 78.5%)
* Estimate (95% CI)			

The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice.