

Wound alpha defensin and early diagnosis of open long bone fracture related infection

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Introduction: Diagnosing fracture related infection (FRI) requires either purulent discharge from wound or positive culture reports. Cultures are time-intensive and may be falsely negative. This necessitates the need for accurate and rapid biomarker-based diagnosis. Taking forward a pilot study looking at multiple biomarkers for the diagnosis of FRI, this study was conducted to determine the accuracy of Alpha Defensin(AD) for the diagnosis of FRI in open long bone fractures.

Methods: This was a prospective cohort study on adult patients with long bone open fractures. Wound fluid levels of AD were evaluated on post-operative day 2 via sandwich ELISA, and patients were followed up for three weeks. Patients were categorized as cases (FRI) or controls (no FRI), on the basis of the consensus definition of FRI. Univariate and multivariable logistic regression analysis, along with receiver operating characteristic (ROC) analysis were performed.

Results: 153 patients with average age of 36.3 (SD \pm 14.6) years were included. AD levels showed a significant ($P=0.001$), 2.1-fold elevation in cases ($n = 63$, Mean = 28.8 $\mu\text{g/ml}$) as compared to controls ($n = 83$, mean = 13.5 $\mu\text{g/ml}$). The area under the curve for this estimate was 0.71. As per Youden's index, an AD value cut-off value of a value of 7.85 $\mu\text{g/ml}$ had a sensitivity of 71.4% and specificity of 68.7%. Multivariate logistic regression with multiple confounding factors revealed AD and Gustilo Anderson grade of open fracture as significant independent predictors of FRI.

Discussion: Wound AD levels are significantly elevated in patients with open fractures who develop FRI. This can be used as a tool for early diagnosis of FRI, at a time when frank pus/wound dehiscence hasn't developed. This can be done via development of ELISA based rapid

diagnostic kits based on our results. Further studies can look at the role of wound AD levels for guiding conversion osteosynthesis in open fractures.

Clinical Significance: Early diagnosis of FRI by rapid kits based on the our results, will go a long way in , managing cases and achieving better results through early intervention. This in turn, will reduce the durations of hospital stay, and development of osteomyelitis or non unions.

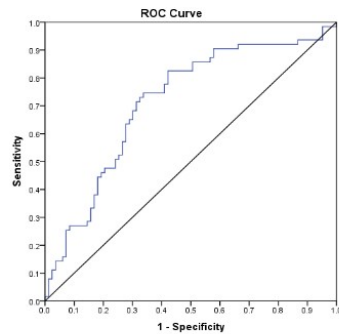


Figure 1 : ROC curve

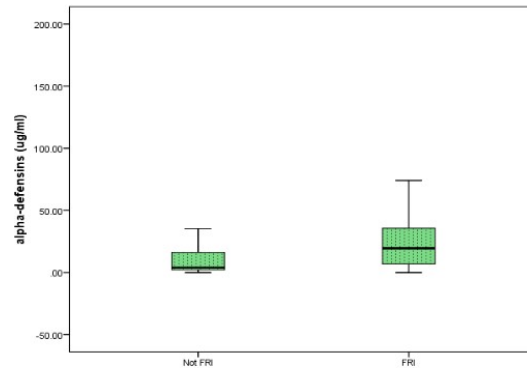


Figure 2: Alpha defensin values in the groups