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Neutrophil Gelatinase-Associated Lipocalin as Early Predictor for Acute Kidney Injury in Septic Patients

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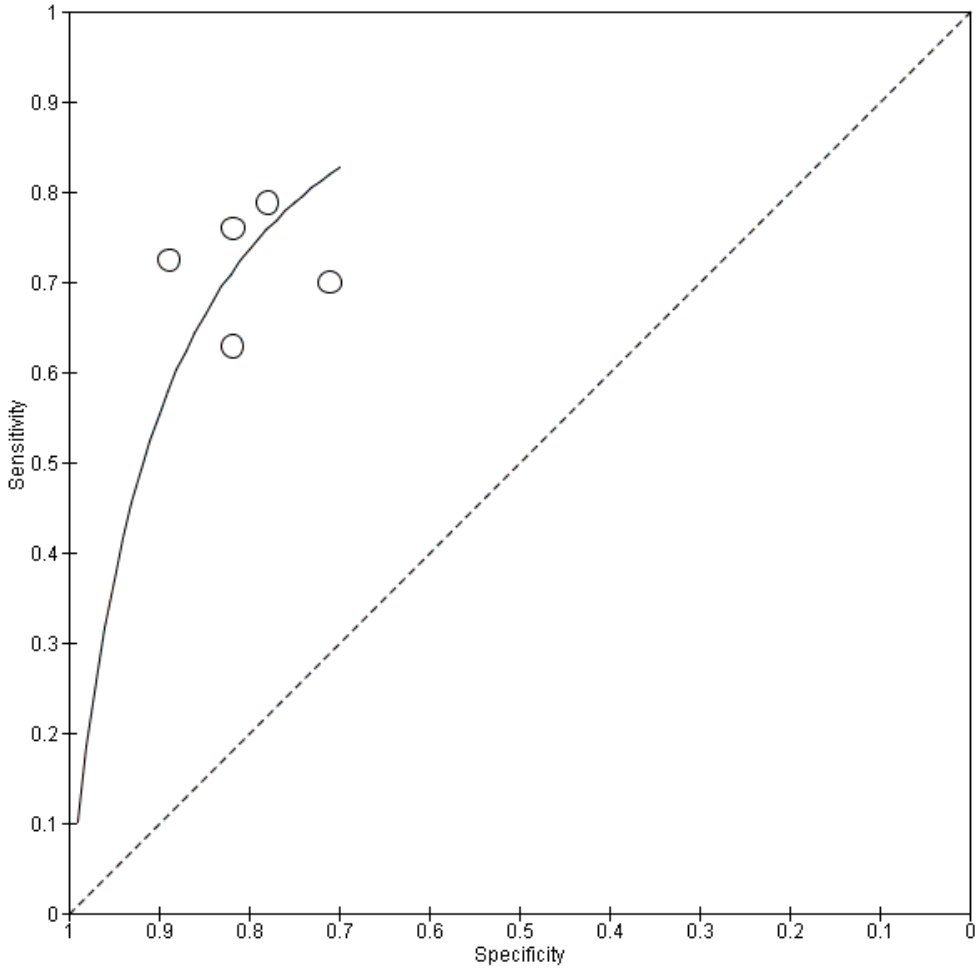
Objectives : This study aims to assess NGAL predictive performance for AKI in septic patients within the first 24 hours of sepsis onset.
Methods : A systematic literature search was conducted in PubMed, Embase, Cochrane Library, and Scopus for studies evaluating NGAL and serum creatinine levels within the first 24 hours of sepsis onset for AKI prediction. Pooled sensitivity, specificity, and area under the receiver operating characteristic curve (AUC-ROC) were calculated using a bivariate fixed-effects model. Heterogeneity was assessed using I^2 statistics. The primary outcome was the ability of NGAL to predict AKI within the first 24 hours of sepsis onset.
Results : A total of 5 studies with 875 patients met the inclusion criteria. NGAL levels measured within the first 24 hours of sepsis onset demonstrated a better ability to distinguish between AKI and non-AKI patient groups ($Z = 11.31$ [$P < 0.00001$]) compared to serum creatinine ($Z = 5.14$ [$P < 0.00001$]). The pooled sensitivity and specificity of NGAL in predicting AKI respectively were 0.718 (95% CI: 0.674 – 0.762) and 0.752 (95% CI: 0.711 – 0.793). The overall AUC for NGAL was 0.760 (95% CI: 0.732 – 0.788), meanwhile AUC for serum creatinine was not reported in this study. However, significant heterogeneity was observed in this study ($I2 = 99\%$) due to variations in each study population and methodology, although no publication bias was detected.
Conclusions : NGAL shows significant ability to predict AKI in septic patients within 24 hours of sepsis onset. However, due to substantial heterogeneity and limited number of studies investigating the predictive value of NGAL in predicting AKI among septic patients, the findings of this study are not yet widely applicable. Further research with a larger population is necessary to establish a definitive conclusion.

SROC plot.png


Sensitivity
Specificity
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0