

Utility of Serum Neutrophil Gelatinase Associated-Lipocalin (NGAL) as a predictor of subclinical rejection and long-term renal allograft outcome

Ooi Shok Hoon¹, Ng Kok Peng¹, Seow Wei San¹, Lim Li Han²

¹ UMMC, ² Melaka Strait Medical Center

Objective

Kidney biopsy remains the gold standard for evaluating subclinical graft pathology but is not widely practiced due to the procedure's invasiveness. Therefore, our study aimed to assess serum NGAL as a potential biomarker in predicting subclinical rejection and the long-term outcome of graft function.

Methods

This study was an observational study involving kidney transplant recipients (KTRs) who had renal protocol biopsies performed between June 2012 and December 2013 at University Malaya Medical Center. Inclusion criteria were ≥ 18 years old with stable graft function. Serum NGAL (ng/ml) was measured on the same day of the graft biopsy.

Results

In our study, 46 KTRs were enrolled and 65 graft protocol biopsies were done. The study cohort comprised 30 (65.2%) males and 16 (34.8%) females, with a mean age of 50.5 ± 11.5 years.

The median serum NGAL level was 74 in renal allograft with normal histology, followed by 78 in borderline changes and significantly higher (169; $P=0.021$) in acute subclinical rejection.

Baseline NGAL level was positively correlated with serum creatinine at 2nd year ($r=0.455$) and 7th year ($r=0.415$), and an inverse correlation was found with eGFR at 2nd year ($r=-0.368$) and 7th year ($r=-0.333$) with a P value of 0.002, 0.010, 0.016 and 0.041 respectively.

At the 2nd year's graft outcome, NGAL was the sole independent predictor (OR 0.986, CI 0.975-0.997; $p=0.015$) of the allograft function with a cut-off value of 109.5 (sensitivity of 83% and specificity of 65%; $p=0.01$). At the 7th year graft outcome, serum NGAL and the number of hospitalizations were the predictors for the graft function. The NGAL of 106 has a sensitivity of 67% and specificity of 67%; ($p=0.01$) in predicting the graft function.

Conclusions

Serum NGAL is a useful biomarker in detecting subclinical rejection of the renal allograft. Baseline NGAL level may be used to predict short- and long-term renal allograft function.