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소아요로계 감염환자에서 급성 신우신염의 예측인자로서의 NGAL, procalcitonin, CRP 측정값의 비교연구

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Plasma Neutrophil Gelatinase-associated Lipocalin, Procalcitonin and C-reactive Protein as the Predictor of Acute Pyelonephritis in Children with Urinary Tract Infection

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Background: Acute pyelonephritis (APN) is common but serious infection in children. Many biomarkers have been studied for an effective predictor of APN because of non-specific clinical features.

Materials and Methods: The 138 patients (59 APN, 79 lower urinary tract infection (UTI)) were enrolled for their first symptomatic UTI from Feb. 2014 to Feb. 2015. Plasma levels of neutrophil gelatinase-associated lipocalin (NGAL), procalcitonin and C-reactvie protein (CRP) were measured at admittance and analyzed. Laboratory, clinical, and imaging results were reviewed.

Results: Plasma NGAL, procalcitonin and CRP were higher in the APN group than in the lower UTI group ($p<0.001$). NGAL levels were strongly correlated with the serum levels of leukocytes, C-reactive protein, and procalcitonin ($p<0.05$). Receiver operating characteristic (ROC) analysis showed NGAL (area under curve(AUC) 0.893, $p<0.0001$), procalcitonin (AUC 0.855, $p<0.0001$) and CRP (AUC 0.879, $p<0.0001$) had good diagnostic profiles for identifying APN. However, the AUC differences were not significant. Also, using the best cut-off values (NGAL 117 ng/mL, procalcitonin 0.173 ng/mL, CRP 2.78 mg/dL), odds ratios for APN were all highly increased after adjusting for age and gender, except WBC counts (NGAL 41.17, procalcitonin 22.83, CRP 25.27 vs. WBC 4.22). Plasma NGAL, procalcitonin and CRP also could be good predictive value for presence of vesico-urinary reflux. (AUC of NGAL, procalcitonin, CRP: 0.798, 0.756, 0.845). However, these biomarkers were not strongly correlated with hydronephrosis.

Conclusion: Plasma NGAL, procalcitonin and CRP are sensitive predictor for identifying APN and presence of VUR, but not for the hydronephrosis.

Key Words: 신우신염, NGAL, Procalcitonin
APN, NGAL, Procalcitonin