

URINE BIOMARKERS FOR GENTAMICIN-INDUCED ACUTE KIDNEY INJURY IN THE NICU

D. Jansen¹, S. Heemskerk², L. Koster-Kamphuis³, T. Bouw¹, A. van Heijst⁴, P. Pickkers¹

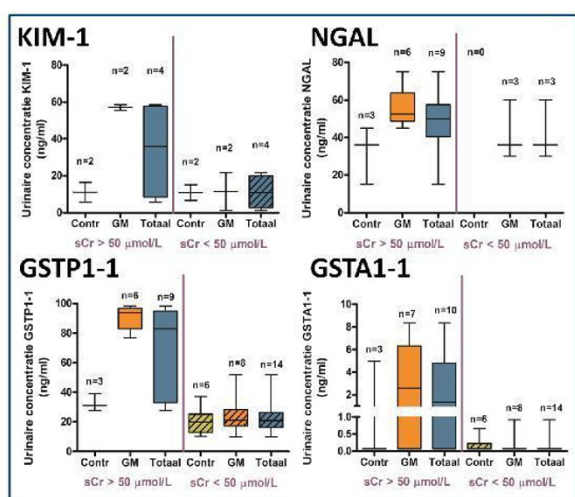
¹Department of Intensive Care Medicine, ²Pharmacology and Toxicology, ³Department of Pediatric Nephrology, ⁴Department of Neonatal Intensive Care Unit, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

Background: Gentamicin (GM) is an aminoglycoside frequently used in the neonatal intensive care unit (NICU). Despite low resistance and costs, GM is also nephrotoxic and may cause acute kidney injury (AKI). Serum creatinine appears to be an insensitive and unreliable marker for detecting AKI in this setting.

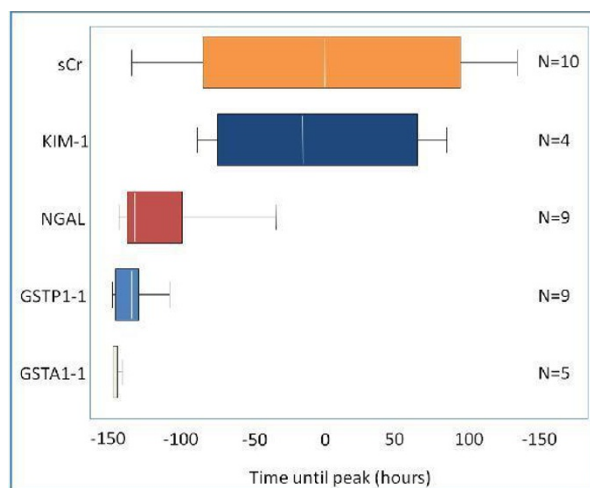
Aims: To determine whether urine biomarkers are useful for early detection of gentamicin-induced AKI in neonates in the NICU.

Methods: Forty-four neonates (32M/12F, gestational age 36.1 weeks) with a bladder catheter without pre-existent kidney disease were divided in a GM group (n=24) and a reference group (n=20). Demographics, vital signs and clinical conditions were recorded. Every two hours, during the period of bladder catheter, urine samples were collected and renal injury biomarkers glutathione S-transferase A1-1 (GSTA1-1), GSTP1-1, Kidney Injury Marker-1 (KIM-1) and neutrophil gelatinase-associated lipocalin (NGAL) were determined. Residual blood samples were used to measure serum creatinine (sCr).

Results: Demographics were similar between both groups. No significant differences were found in baseline kidney function, hemodynamics, demographics, ventilation support and reason for admission. Treatment with GM resulted in higher levels of sCr compared to the reference group (80[64-87] vs 60[55-76] mol/L; $P < 0.05$). The average time until the highest peak was shorter for all biomarkers compared with sCr ($P < 0.05$). Furthermore, higher levels of sCr corresponded with higher levels of KIM-1, GSTA1-1 and GSTP1-1.



[Peak values of different biomarkers]



[Time until the peak of the different biomarkers]

Conclusion: Treatment with GM results in higher levels of sCr. In addition, the urinary biomarkers KIM-1, GSTA1-1 and GSTP1-1 might be useful for early detection of AKI in the NICU.