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The Combination of Serum Cystatin C, Urinary Kidney Injury Molecule-1 and MELD plus Score Predicts Early Acute Kidney Injury after Liver Transplantation

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Abstract

Introduction: Acute kidney injury (AKI) following liver transplantation (LT) is a frequent complication and is associated with increased morbidity and mortality.

Aim: To investigate whether the levels of urinary KIM-1 and serum Cystatin C are able to predict early occurrence (within the first 48 hours) of the post-LT renal dysfunction.

Methods: The study was conducted on 25 recipients transplanted in the Fundeni Clinical Institute between May 2016 and February 2017. Serum Cystatin C, urinary KIM-1 and serum creatinine were analysed before LT, as well as 4 and 24 hours after graft reperfusion. In defining renal failure, the criteria of The Acute Kidney Injury Network (AKIN) were used. All patients received the same renal sparing regimen of immunosuppression (basiliximab, mycophenolate mofetil and delayed tacrolimus).

Results: Ten patients (40%) had early post-LT (<48h) renal dysfunction according to the AKIN classification. In the AKI group, there was a considerable increase of serum Cystatin C at 4 and 24 h after LT in comparison with baseline values (p=0.011), whereas in the group without AKI, the values of Cystatin C dropped (p=0.11). There were no significant differences between the KIM-1 values between the two groups. The single independent risk factor for early post-LT AKI occurrence was serum Cystatin C value 4 hours after hepatic reperfusion. The clinical utility of serum Cystatin C and urinary KIM-1 4 h after reperfusion, evaluated by AUROC, was good (0.79). However, the combination of the two biomarkers and the MELD plus score had a better performance, with an AUROC of 0.83, an 80% sensitivity and 80% specificity for distinguishing patients with early post-transplant AKI from those without AKI.

Conclusion: Early renal dysfunction following LT is frequent (40%) despite using a renal sparing immunosuppression regimen. Combination of serum Cystatin C and urinary KIM-1, 4 hours after hepatic reperfusion and pre-LT MELD-plus score performed the best in screening the early post-LT renal dysfunction.

Key words: biomarkers, acute kidney injury, liver transplantation, kidney injury molecule-l, cystatin C