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간수술 이후 신손상의 발생률 및 위험 인자

고대안암병원 신장내과

조은정, 김명규, 조상경, 김형규, 조원용

The Incidence and Risk Factors of Kidney Injury after Hepatobiliary Surgery

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Purpose: Although intraperitoneal procedure is known to be one of major operations associated with postoperative acute kidney injury (AKI), the incidence, risk factors or its long-term renal outcome have not been well known. This study aimed to determine the risk factors and six month renal outcome in patients with AKI or subclinical AKI after hepatobiliary surgery along with evaluating the role of urine neutrophil gelatinase-associated lipocalin (NGAL) in early detection of AKI.

Method: Data were collected from 135 consecutive liver surgeries. Urine samples for NGAL determination were collected before, 6, 12, and 24 hr after operation. AKI was defined according to the Acute Kidney Injury Network (AKIN) criteria. Outcome was defined as the decrease of estimated glomerular filtration rate (eGFR) at six month after surgery.

Results: We included 135 patients and 22 (16.3%) patients underwent liver transplantation (LT). AKI was developed in 3.5% (4/113) following non LT and 36.4% (8/22) following LT. Renal replacement therapy was required in only one patient who underwent LT. Urine NGAL at 12 hr after operation was most predictive for the development of AKI (AU-ROC, 0.769, p=0.003). Subclinical AKI (urine NGAL+, AKIN-) was diagnosed by the highest urine NGAL level (cutoff value, 87.71 ng/mL) during the first 24 hr after operation, and additional 27 patients were included in AKI group. AKI group showed higher level of urine NGAL at all time points, SOFA score, prothrombin time (INR), lower albumin, and had longer operation time than those of non-AKI group. AKI group also had longer hospital stay after operation, but there was no difference in in-hospital mortality. Six month outcome was analyzed from 96 patients, and there was no significant difference between AKI and non-AKI group. Neither AKI episode nor LT was associated with the decrease of 6 month eGFR. However, the operation time and fluid balance during operation were positively correlated, while preoperative albumin level was negatively correlated with the reduction of eGFR from baseline to 6 month after operation.

Conclusion: In hepatobiliary surgery, severe AKI rarely developed and urine NGAL was useful to diagnose AKI early. For the decline of eGFR during 6 month follow up, factors related to operation and preoperative albumin level were important risk factors. To assess the impact of postop AKI or subclinical AKI on progressive decline of renal function, longer term follow up is needed.

Key Words: 급성 신손상, 수술, 간질환
Acute kidney injury, Surgical procedure, Liver disease