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# 신장 절제술을 받은 환자에서 급성신장손상과 만성신질환의 위험인자

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# Risk Factors for Acute Kidney Injury and Chronic Kidney Disease in Patients Undergoing Nephrectomy

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**Background:** Despite surgical resection remains the standard of care in the treatment of renal and upper urinary tract malignancies, nephrectomy is a recognized risk factor for developing kidney disease. In this study, we investigated the risk factors for acute kidney injury (AKI) and chronic kidney disease (CKD) after nephrectomy including routine pathologic examination of non-cancerous tissue from the resected kidney.

**Methods:** We retrospectively reviewed 49 patients with renal cell carcinoma (RCC) and 7 patients with urothelial cancer received uninephrectomy or uninephroureterectomy between January 2010 and January 2014. Four cases of malignancies in native kidneys of patients with end-stage renal disease and 1 with transplanted kidney with RCC in the native kidney were excluded. The routine pathologic evaluation of non-cancerous tissues was performed.

**Results:** Out of 51 patients, 28 patients (54.9%) experienced post-operative AKI. Data on estimated glomerular filtration rate (eGFR) at 3-36 months after surgery were obtained from 47 (92.2%) patients; 19 patients (40.4%) developed CKD stage 3 to 5 (eGFR <60 mL/min/1.73m$^2$) after surgery. Older age [odds ratio (OR) 1.11, p=0.016] and radical nephrectomy (OR 20.36, p=0.003) were independent risk factors for post-operative AKI. Univariate analysis revealed that age (p=0.042), experience of post-operative AKI (p=0.004), radical nephrectomy (p=0.001), initial eGFR (p=0.005), initial proteinuria (p=0.015), and abnormal pathology (p=0.031) of non-cancerous tissue were associated with development of CKD. Since no one has developed CKD in partial nephrectomized patients, we determined independent risk factors for CKD in radical nephrectomized patients. Logistic regression analysis with variables of age, post-operative AKI, initial eGFR, initial proteinuria, and abnormal pathology of non-cancerous tissue demonstrated that initial proteinuria (OR 11.73, p=0.035) and post-operative AKI (OR 7.27, p=0.032) were independent risk factors for CKD in patients undergoing radical nephrectomy.

**Conclusion:** Post-operative AKI and CKD are common in patients undergoing nephrectomy for renal and upper urinary tract malignancies. Older age and radical nephrectomy are the independent risk factors for post-operative AKI, and radical nephrectomy, initial proteinuria, and experience of post-operative AKI are independent risk factors for CKD after nephrectomy.

**Key Words:** 신장 절제술, 급성신장손상, 만성신질환
Nephrectomy, Acute kidney injury, Chronic kidney disease