



# Exploring the connection between types of acute kidney injury and chronic kidney disease

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## ABSTRACT

Acute kidney injury (AKI) is a common clinical condition characterized by a rapid decline in renal function. AKI is associated with significant morbidity and mortality, and many patients with AKI develop chronic kidney disease (CKD). Previous studies have examined the association between AKI and CKD; however, the relationship between AKI types and CKD development has not been thoroughly investigated. Therefore, a multi-center prospective observational study is required to investigate this relationship thoroughly. These findings may have significant implications for the early identification, prevention, and management of CKD in patients with a history of AKI.

### Implication for health policy/practice/research/medical education:

Acute kidney injury (AKI) is a common clinical condition that can lead to chronic kidney disease (CKD). The severity and type of AKI can influence the risk of developing CKD. While previous studies have examined the association between AKI and CKD, the relationship between AKI types and CKD development has yet to be thoroughly investigated.

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## Background

Acute kidney injury (AKI) is a common clinical condition characterized by a rapid decline in renal function (1). A range of factors, including hypoxia, nephrotoxins, and inflammation, can cause AKI (1). AKI is associated with significant morbidity and mortality since a considerable proportion of patients with AKI could develop chronic kidney disease (CKD) (2). CKD is a global health issue characterized by the progressive and irreversible loss of renal function due to damage to renal parenchyma (3). CKD accounts for a considerable proportion of disability-adjusted life years (DALYs) and mortality worldwide. Given the irreversible nature of CKD, it is essential to explore its risk factors to prevent its development (4).

## Exploring the connection between types of acute kidney injury

Acute kidney injury has various etiologies, including prerenal disease, obstructive nephropathy, and acute

tubular necrosis (ATN). The injury's origin and severity determine the extent of kidney damage and the likelihood of developing CKD. In cases of prerenal disease or obstructive nephropathy-induced AKI, the injury originates outside the kidney, and if the causes are resolved promptly, renal tissue damage is minimal. On the other hand, ATN and prolonged AKI due to prerenal disease or obstructive nephropathy impose damage to the glomeruli, tubules, and interstitium, which can lead to CKD development (5).

Previous studies have examined the association between AKI and CKD. For instance, Hsu et al found that AKI severity was associated with an increased risk of developing CKD (6). Coca et al reported a similar association between AKI and CKD, even after adjusting for confounding factors (2). However, the relationship between AKI types and CKD development has yet to be thoroughly investigated.

Histological assessments of kidneys affected by AKI reveal

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damage to renal vessels, glomeruli, tubules, and interstitial cells (7). Hypoxia, nephrotoxins, and inflammation are common causes of AKI. While removing these causes can restore kidney function by replacing damaged cells, the kidney may not fully recover its original form (1). Consequently, post-AKI kidneys may be vulnerable to additional damage, leading to scarring, fibrosis, and chronic inflammation (8).

Given the etiologies of AKI, specific follow-up protocols may benefit high-risk AKI patients (9). However, the relationship between AKI types and CKD development has yet to be thoroughly investigated. Therefore, a multi-center prospective observational study is needed to investigate the relationship between AKI types and CKD development. Such a study would contribute to understanding the underlying mechanisms and risk factors for CKD following AKI. The findings could have significant implications for the early identification, prevention, and management of CKD in patients with a history of AKI.

### Conclusion

Acute kidney injury is a significant risk factor for CKD development. The injury's origin and severity determine the extent of kidney damage and the likelihood of developing CKD. While previous studies have examined the association between AKI and CKD, the relationship between AKI types and CKD development has not been thoroughly investigated. A multi-center prospective observational study is needed to investigate the relationship between AKI types and CKD development. The findings could have significant implications for the early identification, prevention, and management of CKD in patients with a history of AKI.

### Authors' contribution

**Conceptualization:** Mahdi Maloomi, Ali Noursina, Maryam Omid.

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The authors declare that they have no competing interests.

### Ethical issues

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