

## 신 이식 후 부신피질기능저하증의 발생과 위험인자 분석에 대한 연구

서울특별시 보라매병원 신장내과<sup>1</sup>, 서울대병원 신장내과<sup>2</sup>, 중앙대학교병원 신장내과<sup>3</sup>  
분당서울대병원 신장내과<sup>4</sup>, 아산병원 외과<sup>5</sup>, 아산병원 신장내과<sup>6</sup>, 서울대병원 장기이식센터<sup>7</sup>

안정남<sup>1</sup>, 황진호<sup>3</sup>, 이선화<sup>2</sup>, 김세중<sup>4</sup>, 김영훈<sup>5</sup>, 오윤규<sup>1</sup>, 한덕종<sup>5</sup>  
박수길<sup>6</sup>, 임춘수<sup>1</sup>, 안규리<sup>7</sup>, 김연수<sup>2</sup>, 이정표<sup>1</sup>

### Incidence and Risk Factors for Adrenal Insufficiency after Kidney Transplantation

Jung Nam An<sup>1</sup>, Jin Ho Hwang<sup>3</sup>, Sunhwa Lee<sup>2</sup>, Sejoong Kim<sup>4</sup>, Young Hoon Kim<sup>5</sup>, Yun Kyu Oh<sup>1</sup>  
Duck-Jong Han<sup>5</sup>, Su-Kil Park<sup>6</sup>, Chun Soo Lim<sup>1</sup>, Curie Ahn<sup>7</sup>, Yon Su Kim<sup>2</sup>, Jung Pyo Lee<sup>1</sup>

Department of Internal Medicine<sup>1</sup>, Seoul National University Boramae Medical Center  
Department of Internal Medicine<sup>2</sup>, Seoul National University Hospital  
Department of Internal Medicine<sup>3</sup>, Chung-Ang University Hospital  
Department of Internal Medicine<sup>4</sup>, Seoul National University Bundang Hospital  
Department of Surgery<sup>5</sup>, Asan Medical Center and University of Ulsan College of Medicine  
Department of Internal Medicine<sup>6</sup>, Asan Medical Center and University of Ulsan College of Medicine  
Transplantation Center<sup>7</sup>, Seoul National University Hospital

Corticosteroid, which has been the mainstay of immunosuppressive treatment after kidney transplantation, is associated with several clinical problems including adrenal insufficiency (AI), therefore remains controversial as to its duration of administration, optimal dose and the tapering strategy. We analyzed the incidence, clinical features, and risk factors, and then investigated the clinical outcomes of AI. Among the 1189 Korean patients who underwent kidney transplantation in a single center cohort from 1997 to 2012, a total of 922 patients were enrolled in this study. The patients with symptoms implying AI had standard adrenocorticotropin stimulation test, and were diagnosed according to peak cortisol level measured at 30-60 minutes after corticotropin administration. Symptomatic AI was diagnosed in 16 (1.7%) recipients during a mean follow-up period of 70 months. The incidence was higher in patients with larger cumulative dose of steroid (7798.7±2013.6 mg vs. 6477.2±1619.3 mg) as well as in patients who treated for longer duration more than 1 year (93.8% vs. 68.8%). AI was significantly associated with the patients with older-age, the higher level of HLA mismatch, and lower pretransplant albumin level. Biopsy proven acute rejection was also risk factor for the development of AI. However, there were no associations between AI and gender, comorbidities, donor type, and immunosuppressant. Furthermore, adrenal insufficiency was independently associated with post-transplant cardiovascular events, graft failure, and mortality. In particular, the risk of infection requiring hospitalization and the number of infection episodes were significantly higher in patients with AI. In conclusion, adrenal insufficiency developed in patients with higher cumulative dose and longer duration of steroid treatment. Older age and acute rejection were associated with the occurrence of AI. The development of AI adversely affected renal and patient outcomes.

**Key Words:** 신장이식, 부신피질기능저하증, 위험인자  
Kidney transplantation, Adrenal insufficiency, Risk factor