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신장이식후 혈청요산수치 변화와 환자예후

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The Long-term Change of Serum Uric Acid Level and Patient Outcomes Following Kidney Transplantation

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Background: The high incidence of hyperuricemia in kidney transplant (KT) recipients may be related with a reduced glomerular filtration rate (GFR), cyclosporine therapy, diuretic use, and/or pre-existing hyperuricemia. Hyperuricedmia may be a cardiovascular (CV) risk factor in transplant recipients and reduce graft survival. We investigated whether the long-term change of serum uric acid levels (⊿UA) following KT may be associated with patient outcomes.

Method: Change of serum uric acid levels was determined by the difference over 9 years after KT: ⊿UA=UA at 10 yr posttransplant − UA at 1 yr. All recipients were divided into 3 groups according to ⊿UA: Group I (n=68), <0 mg/dL; Group II (n=88), ≥0 and <1.5 mg/dL; and Group III (n=76), ≥1.5 mg/dL. Multiple linear regression analysis was used to find contributing factors to ⊿UA, and Kaplan-Meier (KM) analysis was used to compare patient outcomes among 3 Groups. The relationship between patient outcomes and factors including ⊿GFR and ⊿UA was evaluated by Cox proportional hazard model.

Results: Two hundred and twenty-four allograft recipients were followed for 166±38 months. At 1 yr posttransplant, Group I had a higher serum UA level (8.2±2.1, 6.8±1.4, and 5.8±1.3 mg/dL, $p<0.01$), and a lower eGFR (50.1±16.8, 59.4±16.4 and 58.5±12.7 mL/min/1.73m^2, $p<0.01$) compared with Group II and III. Diuretics was more frequently used in Group I (41%, 20%, and 20%, $p<0.01$). Multiple linear regression revealed that ⊿UA was significantly associated with ⊿eGFR. KM analysis revealed that Group III had a worse patient survival, dialysis-free survival, CV event-free survival, and cancer-free survival as compared with Group I and II ($p<0.05$ by the log-rank test). In Cox proportional hazard model, ⊿UA was inversely associated with patient survival (HR=2.111; 95% CI=1.281-3.478), CV event-free survival (HR=1.405; 95% CI=1.138-1.734), and cancer-free survival (HR=1.266; 95% CI=1.067-1.502), while ⊿ eGFR was associated with dialysis-free survival (HR=0.112; 95% CI=0.046-0.276).

Conclusion: These results suggest that ⊿UA may predict eventual survival in patient death, CV event, and malignancy although ⊿eGFR was associated with dialysis-free survival. Patient outcomes may be more closely associated with ⊿UA rather than hyperuricemia at 1yr posttransplant and ⊿eGFR. Serial follow-up of serum UA and lowering serum UA levels are recommended to improve patient outcomes after KT.

Key Words: 요산, 예후, 신장이식
Uric acid, Outcomes, Kidney transplantation