Low early post-transplant tacrolimus level within 1 month is associated with poor renal allograft survival in kidney transplant patients

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Background: Low-dose tacrolimus therapy with trough level between 3 to 7 ng/mL has been suggested as safe and better for allograft survival in previous studies. Here, we investigated the association of sequential tacrolimus trough-level from at discharge until 1 year after kidney transplantation and graft survival rate.

Methods: This retrospective observation study included patients older than 18 years who underwent kidney transplantation under tacrolimus-based regimens in the Seoul University Hospital between April 30, 1997, and April 30, 2020. Kaplan-Meier survival analysis and multivariate Cox regression analysis were performed according to tacrolimus trough-levels from within 1 month to 1 year after kidney transplantation.

Results: A total of 1,759 kidney transplant patients were included and 72 grafts failed during the study period. Tacrolimus level <7 ng/mL within 1 month after transplantation was associated with worse death-censored graft survival ($P=0.000$). However, mean tacrolimus level <5–7 ng/mL within 1 year was not associated with all-cause mortality or graft survival. In multivariate analysis, tacrolimus <7 ng/mL was an independent risk factor for poor graft survival (hazard ratio, 0.225; 95% confidence interval, 0.115–0.521; $P=0.001$). Furthermore, tacrolimus level <7 ng/mL within 1 month was associated with worse overall patient survival ($P=0.017$). In respect to post-transplant complications including malignancy, infection, post-transplant diabetes mellitus (PTDM), cardiovascular disease and fracture, PTDM-free survival rate was higher in tacrolimus >12 ng/mL within 2 months after transplantation was significantly lower ($P=0.001$). Infection rate was increased over 10 ng/mL of tacrolimus within 2 months ($P=0.034$).

Conclusions: Keeping sufficient tacrolimus level (≥ 7 ng/mL) within 1 month after transplantation is beneficial for good long-term allograft survival.

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