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

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Objectives: 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 year 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 (HR 0.225: 95% C.I. 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, PTDM, CVD, 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.