CONCLUSIONS:

INTRODUCTION AND AIMS: Diverse causes such as acute rejection, delayed graft function, infection and drug toxicity cause graft dysfunction during early post-transplant period and contribute to renal outcome in kidney transplant recipients. However, there is currently no sufficiently sensitive and predictive biomarker to detect graft injury and predict graft outcome. Recently, urinary mitochondrial DNA level has been reported to have a predictive value for renal outcome in AKI patient. This study aimed to evaluate whether cell-free mtDNA level during the early postoperative period has a predictive value for subsequent graft function and renal prognosis, and whether it is an indicator that reflects current graft injury and histopathologic findings in graft biopsy performed together.

METHODS: From January 2011 to February 2015, urine and plasma samples from 85 patients who underwent graft biopsy at an average of 17 days after transplantation were collected, and cell-free nuclear and mitochondrial DNA levels were measured by quantitative polymerase chain reaction targeting human lipoprotein lipase gene (LPL) and human NADH1 dehydrogenase subunit 1 gene (ND1). We analyzed the associations between cell-free mtDNA level and the changes of graft function from baseline to 6 months after transplantation, later rejection, and other clinical parameters including pathologic findings in graft biopsy.

RESULTS: Urinary mtDNA levels were significantly higher in patients with acute rejection in early postoperative graft biopsy than in those with normal pathology (P<0.005). Urinary mtDNA levels were significantly correlated with GFR in total patients from baseline to 6 months after transplantation (P=0.021 and 0.045, respectively) and correlated with 2-month ΔeGFR in patients with normal pathology (P=0.011). Urinary cell-free mtDNA levels were higher in subjects with delayed graft function (DGF) and slow graft function (SGF) than in those with immediate graft function (IGF) (P<0.001 and P=0.002, respectively) and higher in deceased-donor transplantation than in living-donor transplantation (P<0.005).

CONCLUSIONS: Urinary cell-free mtDNA levels during the early postoperative period are associated with the acute rejection in graft biopsy, early post-transplant graft function, and delayed graft function in kidney transplant recipients.