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Effect of Graft Body Weight Ratio on Creatinine Levels After Living Donor Kidney Transplantation

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Abstract

Background: Kidney transplantation is the best treatment of end-stage kidney disease. The aim of this study was to evaluate the effect of Graft Body Weight Ratio (GBWR) on creatinine levels after living donor kidney transplantation.

Methods: Between January 2018 and January 2019 at Medipol University Medical Faculty Hospital Organ Transplantation Department, Istanbul, Turkey, 26 patient's in living donor kidney transplantation graft body weight ratio evaluated were studied retrospectively. In these patients were divided into two groups; Group 1: GBWR < 3 gram/kilogram (g/kg). Group 2: GBWR >3 gram/kilogram (g/kg). Between these two groups, demographic features, clinical features and creatinine levels were compared.

Results: The mean age was 37.4±16.7 years. 16 (61.5 %) patients were male and 10 (38.5 %) patients were female. 10 (38.5 %) patients were GBWR < 3 g/kg and 16 (61.5 %) patients were GBWR >3 g/kg. The mean GBWR were 2.6±0.18 g/kg in GBWR < 3 g/kg group, 4.5±0.74 g/kg in GBWR > 3 g/kg group. Mean follow-up was 15.4±1.2 months. First month creatinine levels and sixth months creatinine levels were statistically significantly high in the GBWR < 3 g/kg group ($p<0.05$).

Conclusions: Creatinine levels, appear to be high in the GBWR < 3 g/kg group after living donor kidney transplantation. Low GBWR should be remembered in patients with high creatinine levels.

Keywords: Creatinine Levels; Graft Body Weight Ratio; Living Donor Kidney Transplantation

Introduction

The only definitive treatment of end-stage kidney disease is kidney transplantation [1]. Creatinine level is the most important criterion to evaluate graft function after kidney transplantation. Graft function after kidney transplantation is influenced by many factors (ischemia/reperfusion injury, rejection episodes, nephrotoxic drugs, hypertension, diabetes, infections, etc.) [2]. Incompatibility between graft weight and recipient body weight effects long-term graft survival in patients with kidney transplantation [3,4]. The graft weight and recipient body weight ratio is correlated with long-term graft function but not related to the long-term graft failure [5]. The aim of this study was to evaluate the effect of Graft Body Weight Ratio (GBWR) on creatinine levels after living donor kidney transplantation.

Methods

Between January 2018 and January 2019 at Medipol University Medical Faculty Hospital Organ Transplantation Department, Istanbul, Turkey, 26 patients' in living donor kidney transplantation graft body weight ratio evaluated were studied retrospectively. In these patients were divided into two groups; Group 1: GBWR < 3 gram/kilogram (g/kg). Group 2: GBWR >3 gram/kilogram (g/kg). Between these two groups, demographic features, clinical features, and creatinine levels were compared. Exclusion criteria were other factors of high creatinine levels (acute rejection, renal artery stenosis, etc).

Immuno suppression

All patients received quadruple sequential immunosuppression consisting of induction with ATG, followed by triple immunosuppressive therapy.All this patients were given ATG at the intraoperative period and continues postoperative 2 days. The patient will be used as a standard immunosuppressive therapy for life-long calcineurin inhibitors (tacrolimus or cyclosporine). Mycophenolate Mofetil or Mycophenolate Sodium to be used in the first year, Prednisolone to be used in the first third months.

Opportunistic Infection Prophylaxis

In our clinic, patients were given the 900 milligram (mg) /day Valganciclovir for the first 100 days in CMV prophylaxis. Patients were given the 400 mg /day Sulfamethoxazole/trimethoprim prophylaxis for Pneumocystis Pneumonia and urinary tract infection was administered for 6 months. Patients were given the 100 mg / day Flukonazole for the first 30 days in candida prophylaxis. All patients received a single preoperative dose of intravenous cefuroxime (750 mg) and oral ciprofloxacin (500 mg) two times daily for the first 5 days. Patients received control once a week for the first month after discharge, and once every 15 days for the second month and monthly for the following months.

Statistical Analysis

SPSS 22.0 (SPSS for Windows, 2007, Chicago) was used for statistical analysis. Continuous variables which have normal distribution were presented as mean ± Standard deviation. Statistical analysis for the parametric variables was performed by the Student's T-test. The qualitative variables were given as percent and the correlation between categorical variables was investigated by the chi-square test and Fisher's exact test. Statistical significance level was defined as $p<0.05$.

Results

Mean age of the in patients with GBWR < 3 g/kg were 34.5±11.4 years, in patients with GBWR > 3 g/kg were 39.3±19.4 years (p:0.471). There were 2 (20%) males and 8(80%) females in patients with GBWR < 3 g/kg, there were 8 (50%) males and 8 (50%) females in patients with GBWR > 3 g/kg (p:0.218). The mean Body Mass Index (BMI) were 25.1±5.5 kg/m^2 in GBWR < 3 g/kg group, 26.2±4.6 kg/m^2 in GBWR > 3 g/kg group (p: 0.514). The mean graft weight were 194±14.2 grams in GBWR < 3 g/kg group, 231.2±29.4 grams in GBWR > 3 g/kg group ($p<0.05$). The mean GBWR were 2.6±0.18 g/kg in GBWR < 3 g/kg group, 4.5±0.74 g/kg in GBWR > 3 g/kg group ($p<0.05$).

Mean warm ischemia time of the in patients with GBWR < 3 g/kg were 34.2±11.4 seconds, in patients with GBWR > 3 g/kg were 41±13.6 seconds (p:0.202). Mean cold ischemia time of the in patients with GBWR < 3 g/kg were 50±13.5 minutes, in patients with GBWR > 3 g/kg were 53.5±10.4 minutes (p:0.572). Mean first month creatinine levels of in patients with GBWR < 3 g/kg were 1.2±0.14 mg/dL, in patients with GBWR > 3 g/kg were 0.88±0.14 mg/dL ($p<0.05$). Mean sixth month creatinine levels of in patients with GBWR < 3 g/kg were 1.1±0.19 mg/dL, in patients with GBWR > 3 g/kg were 0.82±0.14 mg/dL ($p<0.05$). (Table 1) shows comparison of graft body weight ratio groups.

	GBWR < 3 (g/kg)(n:10)	**GBWR > 3 (g/kg)(n:16)**	**p**
Age (Years)	34.5±11.4	39.3±19.4	0.471
Sex (Male/Female) (n/%)	2(20%)/8(80%)	8(50%)/8(50%)	0.218
Body Mass Index (kg/m^2)	25.1±5.5	26.2±4.6	0.514
Graft Weight(g)	194±14.2	231.2±29.4	**<0.05**
Warm Ischemia Time (Second)	34.2±11.4	41±13.6	0.202
Cold Ischemia Time(Minute)	50±13.5	53.5±10.4	0.572
First Month Creatinine Levels (mg/dL)	1.2±0.14	0.88±0.14	**<0.05**
Sixth Month Creatinine Levels (mg/dL)	1.1±0.19	0.82±0.14	**<0.05**
GBWR: Graft Body Weight Ratio, g: Gram, kg: Kilogram, m^2 : Square meter, g: Milligram, dL: Deciliter.			

Table 1: Comparison of Graft Body Weight Ratio Groups.

Dıscussion

The only definitive treatment of end-stage kidney disease is kidney transplantation [1]. Creatinine level is the most important criterion to evaluate graft function after kidney transplantation. Graft function after kidney transplantation is influenced by many factors (ischemia/reperfusion injury, rejection episodes, nephrotoxic drugs, hypertension, diabetes, infections, etc). Also, a recipient with a high Body Mass İndex (BMI), deceased donor kidney transplantation, donor kidney volume, donor kidney weight affects the renal functions after transplantation [2,6,7]. In our

study evaluated the effect of Graft Body Weight Ratio (GBWR) on creatinine levels after living donor kidney transplantation. Patients with elevated creatinine levels due to other reasons (acute rejection, renal artery stenosis) were excluded. In our study, between these two groups will increase the cretaının levels age, sex, body mass index, warm ischemia time, cold ischemia time was not statistically significantly.

Codas and associates reported donor kidney weight to bodyweight ratio affected creatinine clearance values in the first three years after transplantation [8]. Duvernay and associates reported graft weight is an important factor in the prediction of renal function 12 months after transplantation [9]. Simforoosh and associates reported the graft weight and recipient body weight ratio is correlated with long-term kidney graft function [10]. In our study, first-month creatinine levels and sixth months creatinine levels were statistically significantly higher in the GBWR < 3 g/kg group. Incompatibility between graft weight and recipient body weight effects long-term graft survival in patients with kidney transplantation [3,4]. The graft weight and recipient body weight ratio is correlated with long-term graft function but not related to the long-term graft failure [5]. Song and associates reported kidney weight and recipient weight ratio does not significantly affect the long-term graft survival [11]. In our study, during follow up GBWR did not significantly affect long-term graft survival. There was no graft loss in these patients. Our study has several limitations. First, this study was retrospective. Second, the number of cases was small.

Conclusions

Despite the limitations described in the discussion, creatinine levels, appear to be high in the GBWR < 3 g/kg group after living donor kidney transplantation. Low GBWR should be remembered in patients with high creatinine levels.

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Author Contributions

GE and BK collected, analyzed, interpreted the data, and wrote the manuscript. All authors read and approved the fnal manuscript.

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Compliance with Ethical Standards

Conflict of Interest: The authors declare no confict of interest

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