

## Are Elderly Donors Good Alternatives for Kidney Transplantation While Kidney Transplant Waiting Lists Are Widening?

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### ABSTRACT

**Background:** Kidney donors who are elderly, who have obesity, hypertension, previous malignancy, proteinuria and kidney stones are called complex living donors. Elderly donors have smaller kidney sizes, less glomerular filtration rate and more glomerulosclerosis. But the list of patients waiting for kidney transplantation is widening, so we need to use elderly donors for kidney transplantation.

**Aim:** In this study we wanted to see the effect of donor age on graft function and we made a retrospective study including elderly donors in transplantation center.

**Patients and Method:** This randomized study included 104 adult kidney transplant recipients whose donors were older than 65 years old (Group 1) and 95 adult kidney transplant recipients whose donors were younger than 65 years old (Group 2). Demographic features, delayed graft function rates, hospitalization days of donors and clinical parameters regarding levels of serum creatinine on 1, 30, 180 day, first year and second year of transplant were compared between the two groups. **Results:** Delayed graft function ratio of Group 1 was higher than Group 2 but it was not statistically significant ( $p=0.554$ ). 30<sup>th</sup>, 180<sup>th</sup> day, first year and second year creatinine level of Group 1 was significantly higher than Group 2.

**Conclusion:** In our study, the creatinine level of recipients of elderly donors were higher than recipients of younger donors, but there was no statistically significant difference in terms of delayed graft function between the two groups.

Our data reveals that individuals over 65 years of age may be suitable donors after careful evaluation of kidney function.

**Key words:** Creatinine levels, Elderly donors, Kidney transplantation,

### INTRODUCTION

Prevalance of chronic kidney disease is increasing worldwide. As it is known, kidney transplantation is the gold standart therapy for end stage renal disease and provides longer survival than hemodialysis<sup>(1)</sup>. But the main problem is that cadaveric donation is not enough. So the clinicians have to perform living donor kidney transplantation (LKT) more than deceased donor kidney transplantation in most of the countries. If we compare LKT with deceased-donor kidney transplantation, of course LKT has advantages of shorter waiting time on dialysis, lower incidence of rejection, reduced ischemic injury, longer graft and patient survival<sup>(2)</sup>.

Mortality and morbidity increases due to longer waiting time for transplantation. But, all patients do not have the equal chance of having a suitable living kidney donor. Because of this, selection criteria for organ donation have been widened and the term marginal donor has been used for these extended criteria donors. Types of marginal donors are: complex living donor, non-heart beating donor and marginal deceased donor. Donors who are elderly, who have obesity, hypertension, previous malignancy, proteinuria and kidney stones are called complex living donors<sup>(3)</sup>.

Previously, it was thought that elderly donors were not suitable for donation, but because the list of patients waiting for kidney transplantation is widening, we need to use elderly donors for kidney transplantation. Acceptance

of elderly individuals as living kidney donors is controversial, because they have lower kidney function and many comorbidities. The risk for end stage renal disease and perioperative complications for elderly donors must be estimated. We know that renal graft function is lower in recipients of elderly donors. So, acceptance of elderly for kidney donation is a hard decision. **Terasaki et al.** searched the data of the United Network for Organ Sharing (UNOS) Scientific Renal Transplant Registry and they analysed the effects of donor age, donor death cause, cold ischemia time, HLA mismatch, recipient race and age on graft survival. They found that the best results were obtained with zero HLA mismatched transplants from young donors and transplants from elderly donors were the worst<sup>(4)</sup>.

Despite that, **Johnson et al.** analysed 78 live donor transplant and 22 of the donors were elderly than fifty. They found that graft function is comparable in recipients of young and old donor kidneys. They also found that donor age >50 years was not an independent risk factor for complications<sup>(5)</sup>.

Many studies have reported different graft survival results after kidney transplantation from living elderly kidney donors, but we still need more studies for accepting these donors. So, we also wanted to see the effect of donor age on graft function and we made a retrospective study including elderly donors in our transplantation center.



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**PATIENTS and METHODS**

This retrospective study was performed in Yeni Yüzyıl University Gaziosmanpasa Hospital and it included 104 adult kidney transplant recipients whose donors were older than 65 years old (Group 1) and 95 adult kidney transplant recipients whose donors were younger than 65 years old (Group 2). Demographic features, delayed graft function (DGF) rates, hospitalization days of donors and clinical parameters regarding levels of serum creatinine on 1, 30, 180 day, first year and second year of transplant were compared between the two groups.

**Ethical approval:**

**Ethical clearance form was taken from Erzurum Regional Research Hospital Ethical Committee from Turkey.**

**Statistical analysis**

The IBM SPSS 20.0 software was used for the analyses. Descriptive statistics was given as number, percentage, average and standard deviation. Wilkison shapiro test was used for normality. For continous variables independetn sample t test was used, chi-sqaure test was used for categorical varibles. Pearson correlation analysis was used to evaluate correaltion between variables. A two sided p value < 0.05 was accepted for significance.

**RESULTS**

This randomized study included 104 adult kidney transplant recipients whose donors were elderly than 65 years old (Group I=104) and 95 adult kidney transplant recipients whose donors were younger than 65 years old (Group 2=95). Demographic features of whole group are expressed in table 1. There was no difference of sex between the groups.

**Table (1): Demographic features of whole group**

Demographic features of whole group	Mean± Standard deviation
Recipient age (years)	39.57 ± 14.06
Donor age (years)	58.41 ±15.02
Hospitalization days of recipient	8.86 ± 5.85
Hospitalization days of donor	3.35 ± 1.91
Recipient sex (Female/Male (%))	74 (37.2%)/125 (62.8%)
Donor sex (Female/Male (%))	82 (42.2%)/115 (57.8%)
Recipients whose donors were elderly than 65 years old (Group 1)	104 (52.3%)
Recipients whose donors were younger than 65 years old (Group 2)	95 (47.7%)
Delayed graft function rate of whole group	8 (4.0%)

DGF ratio of Group 1 was higher than Group 2 but it was not statistically significiant. Preoperative creatinine clarence of donors of Group 2 was significantly higher than Group 1. 30<sup>th</sup>, 180<sup>th</sup> day, first year and second year creatinine level of Group 1 was significantly higher than Group 2. Hospitalization day of donor of Group 1 was higher than Group 2. Hospitalization day of recipient of Group 1 was significantly higher than group 2 (Table 2).

**Table (2): Gender, Delayed graft function ratio, Creatinine levels and Hospitalization day of whole group**

	Group 1 (n=104)	Group 2 (n=95)	p
Recipients; Female sex	44 (%42.3)	30 (31.6%)	0.118
Male sex	60 (%57.7)	65 (68.4%)	
Donors; Female sex	45 (%43.3)	39 (41.1%)	0.752
Male sex	59 (%56.7)	56 (58.9%)	
Delayed Graft Function	5 (%4.8)	3 (3.2%)	0.554
Recipients 1 <sup>st</sup> day creatinine (mg/dl)	4.14±1.78	3.69±1.66	0.109
Recipients 30 <sup>th</sup> day creatinine (mg/dl)	1.41±0.53	1.22±0.81	<0.001
Recipients 180 <sup>th</sup> day creatinine (mg/dl)	1.39±0.51	1.12±0.32	<0.001
Recipients 360 <sup>th</sup> day creatinine (mg/dl)	1.43±0.62	1.17±0.35	0.001
Recipients 2 <sup>nd</sup> year creatinine (mg/dl)	1.45±0.52	1.18±0.36	<0.001
Preoperative creatinine level of donor (mg/dl)	0.79±0.17	0.78±0.18	0.672
Preoperative creatinine clearance of donor (ml/min)	107.6±26.38	121.90±31.48	<0.001
Hospitalization day of donor	3.82±2.18	2.83±1.40	0.001
Hospitalization day of recipient	9.37±7.01	8.32±4.21	0.424

There was a positive correlation between donor age and recipients first day, 180<sup>th</sup> day, first year and second year creatinine level. There was a negative weak correlation between donors preoperative creatinine clarence and recipients first day, 180<sup>th</sup> day, first year and second year creatinine (Table 3).

**Table (3): Relation between the donor age, postoperative creatinine, creatinine clearance of donor and recipients creatinine levels**

	Donor Age	Preoperative creatinine clearance of donor	Preoperative creatinine of donor
Recipients 1 <sup>st</sup> day creatinine	r :0.202 p : <b>0.004</b>	r : -0.144 p : <b>0.042</b>	r : 0.188 p : <b>0.008</b>
Recipients 30th day creatinine	r : 0.135 p : 0,058	r : -0.108 p : 0.130	r : 0.079 p : 0.265
Recipients 180th day creatinine	r : 0.320 p : <b>&lt;0.001</b>	r : -0.251 p : <b>&lt;0.001</b>	r : 0.130 p : 0.066
Recipients 360th day creatinine	r : 0.242 p : <b>0.001</b>	r : -0.243 p : <b>0.001</b>	r :0.187 p : <b>0.008</b>
Recipients 2nd year creatinine	r :0.324 p : <b>&lt;0.001</b>	r : -0.300 p : <b>&lt;0.001</b>	r : 0.149 p : <b>0.047</b>

**DISCUSSION**

Incidence of end-stage renal disease is rapidly increasing worldwide. Kidney transplantation is the most effective renal replacement therapy that reduces mortality and morbidity of end-stage renal disease patients. Selection criterias for living donation changes across transplantation centers. Making transplantation from marginal donors who are elderly, hypertensive or diabetic individuals is still controversial. The main problem about elderly donors is that, these donors have comorbid diseases, they have smaller kidney sizes and less kidney function compared to young donors. Elderly donors also have a small risk of end stage kidney disease in long term. Studies suggest that the risk of end stage renal disease of living donors is less than 1%<sup>(6)</sup>.

Kidneys from deceased or living elderly donors have been used in many transplant centers successfully. **Reese et al.** conducted a retrospective study of live kidney donors using Organ Procurement and Transplantation Network data. They found that 24.2% of 9319 donors were complex: 12.8% were obese, 10.3% hypertensive and 4.2% had low glomerular filtration rate. The outcomes of these transplants were acceptable<sup>(7)</sup>. **Sapir-Pichhadze et al.** analysed the Scientific Registry of Transplant Recipients between 2000 and 2009 and reported a 10-year survival rate of 72% for recipients who received a kidney from an elderly living kidney donor compared with 84% for recipients who received a kidney from a younger living kidney donor<sup>(8)</sup>.

In our study preoperative creatinine clearance of elderly donors was lower than younger donors and there

was a negative weak correlation between donors preoperative creatinine clearance and recipients first day, 180<sup>th</sup> day, first year and second year creatinine. These creatinine levels were also acceptable when we compare the patient survival between transplant patients and hemodialysis patients<sup>(9)</sup>.

DGF is associated with worse outcomes and higher rejection rates<sup>(10)</sup>. Donor related risk factors for the development of DGF are; female gender, body mass index, deceased or live donor, increasing donor creatinine level, increasing age, diabetes, hypertension, cold ischemic time and warm ischemic time<sup>(11)</sup>. **Lebranchu et al.** analysed the risk factors for DGF. They found that higher donor age was a risk factor for DGF and renal function of DGF kidneys at 1 year was lower in kidneys of elderly donors<sup>(12)</sup>. In our study, DGF ratio of Group 1 (recipients of elder donors) was higher than Group 2 (recipients of younger donors), but this was not a statistical significant difference. DGF is associated with shorter graft survival. In a single center analysis DGF grafts survival was 3-5 year shorter than non-DGF grafts<sup>(13)</sup>. We need longer following time for the evaluation of graft survival of two groups.

**CONCLUSION**

Our data reveals that renal function is lower in recipients of elderly donors but these results are acceptable. So we think that elderly donors can be accepted after evaluating seriously for renal function and comorbid diseases comprehensively. We need more studies with high numbers of recipients of elderly donors and we must follow these patients and donors for long time survival.

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