Analysis of a National Dataset: Single Kidney Transplant Outcomes in Paediatric Donors to Adult Recipients

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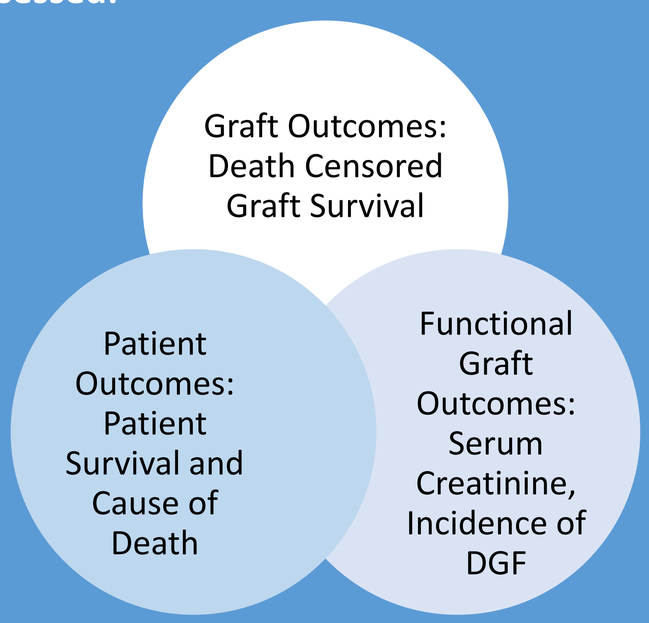
Introduction and Aims:

- The disparity between supply and demand for organs in kidney transplantation has forced a re-evaluation of the limits on donor age acceptability.
- Single organ paediatric donor kidneys are underutilized at some centres, but it is unclear whether they have inferior outcomes for adult recipients.
- The aim of this nationwide population-cohort analysis was to look at the outcomes of paediatric donors in adult recipients.

Methods:

This study analysed the NHS Blood and Transplant dataset for all deceased donor single kidney transplants to adults aged 18-55 performed in the UK from 2003 to 2015.
The 11,748 cases were then divided into those with donors aged 0-16, 17-18,19-44 and 45-55 years, along with a subgroup analysis of donors aged under 18.

Outcomes Assessed:



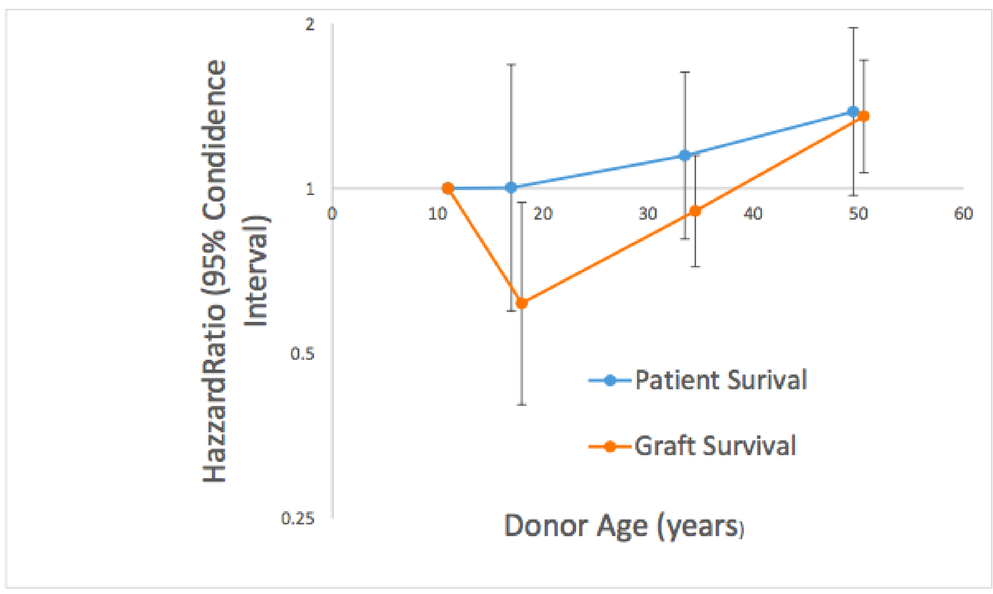
Patient and graft survival outcomes were assessed using Kaplan Meier curves and Cox regression models, delayed graft function using binary logistic regression and creatinine levels using a Kruskal-Wallis test.

Results:

- Patient survival was not found to differ significantly between the 0-16 and 17-18 donor age groups (hazard ratio [HR]: 1.08, p=0.775), but was significantly shorter in the 19-44 (HR=1.43, p=0.035) and 45-55 (HR=2.16, p<0.001) year age groups.
- Death censored graft survival, on the other hand, was significantly longer for donors aged 17-18 than for those aged 0-16 (HR=0.61, p=0.017), with no significant difference detected between the 0-16 and 44-55 year age groups (HR=1.23, p=0.068).
- The rates of delayed graft function differed significantly between the 4 donor age bands (p<0.001). Relative to recipients who received a graft from donors under 16 years, the rates of DGF were significantly higher in recipients who received a graft from older donors, 19-44 years (HR 1.457) and 45-55 years, (HR1.954).

Results:

Figure 10. Graft and Patient Survival:



- Creatinine levels at three months post-transplant were also found to differ significantly across the donor age groups (p<0.001), with the median declining from 116µmol/L in the 0-16 year group to 110 µmol/L in the 17-18 year group, before increasing progressively to 140µmol/L for donors aged 45-55 years.
- **Subgroup Analysis**:

Table 11: Patient and Graft Survival.

Donor Age (years)	Patient Survival			Graft Survival		
	1 year	**2 years**	**5 years**	**1 year**	**2 years**	**5 years**
0-6	100.0%	100.0%	98.7%	91.0%	89.9%	84.4%
7-12	97.3%	96.6%	95.9%	95.9%	93.7%	89.5%
13-18	98.9%	98.5%	94.3%	95.3%	94.4%	90.0%

- The relatively small sample size (n=930) did not show significant results in univariable analysis yet it is still pertinent to asses this population.
- In terms of patient survival the trend shown was as donor age increased patient survival decreased, however this was not significant (p=0.667). Overall, patient survival for all 3 age bands was over 96% at 5 years highlighting the operative safety of performing transplants from these paediatric deceased donors.
- Death censored graft survival showed the opposite trend with the oldest age band having the best graft survival and as donor age decreased so did graft survival. This effect was not significant (p=0.224). Notably, although the graft survival for donors aged 0-6 years was the lowest, it was not a poor result with 84% graft survival at 5 years.

Conclusions:

- Transplants from paediatric (0-18 years) donors compare favourably to those from older donors for overall recipient survival and rates of DGF.
- However, there is evidence that organs from the youngest of these patients (0-16 years) have a shorter death-censored graft survival than those from older paediatric donors (17-18 years). As such, whilst paediatric donors are a valuable source of organs for adult recipients in an era where organ demand is increasingly rising, caution is advised when transplanting from the youngest donors.

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