

Kidney conundrum: comparing survival outcomes between patients who received live and deceased donor transplants

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Abstract

Aims This research aimed to review patients listed for kidney transplantation between 1 January 2011 and 31 March 2014 in Cardiff and determine if they had received a transplant at 1, 3 or 5 years post-listing. The difference in survival rate in patients who received a transplant from a live versus deceased donor at 5 years was also compared.

Methods Data were obtained from the kidney transplant list during the time period specified, removing any patients who were listed for multi-organ transplant. Data were then analysed to assess type of transplant and survival outcomes.

Results Of the 364 patients listed, 40% had been transplanted within 1 year, 67% by 3 years and 73% by 5 years. Of those who had been transplanted, survival rate was 90%, and of those who had not, survival rate was 68%. Recipients of live donors had a mortality rate of 1.5% if they received a transplant 5 years post-listing, whilst those of deceased donors had a mortality rate of 11%.

Conclusions Currently, live donor transplants result in a higher survival rate if received within 5 years of being listed than deceased donor transplants. This may be due to the reduced time on dialysis and may change with the introduction of the opt-out donation system across the UK as the donor pool will increase. Future studies could be carried out to explore the effect of this new system.

Introduction

Over the past 8 years, the number of patients requiring a kidney transplant has been declining (from 287 in 2011 to 253 in 2019). Alongside this, the number of kidney donors has been increasing: when comparing 2017–2018 with 2016–2017, deceased donors increased by 10%, while living donors increased by 1%.¹ This is likely due to the introduction of the opt-out system in Wales and campaigns across the UK increasing awareness about organ donation. This article reviews the patients listed for kidney transplant at 1, 3 and 5 years post-listing to see if they received a transplant and compares the survival differences between recipients of live and deceased donor transplants, assessing the benefits and limitations to these patients. This is particularly important as the introduction of the opt-out system to England in 2020 means that kidneys from many more deceased donors are likely to become available.

Methods

This study retrospectively analysed the outcomes of patients being treated in Cardiff on the NHS Wales Kidney Transplant list between

1 January 2011 and 31 March 2014. Patients requiring multi-organ transplants were excluded. Patient outcomes at 1, 3 and 5 years post-listing were recorded and categorised as one of the following: active (still waiting), removed, transplanted (deceased donor), transplanted (live donor), or died.

There are two main types of donor: living and cadaveric. The recipient mortality rate at 5 years post-listing for the two different types of transplantation was compared. Patients were also grouped demographically by sex and age bracket (discrete variable) and their outcomes were compared to see if there was a difference in transplant rates between groups. Patients who were still listed at the 5-year mark were explored further to find out if there was a reason for them not being transplanted during this time.

Results

A total of 364 patients were included and, of these, 40% (146) had been transplanted within 1 year, 67% (244) by 3 years and 73% (267) by 5 years post-listing (**Figure 1**).

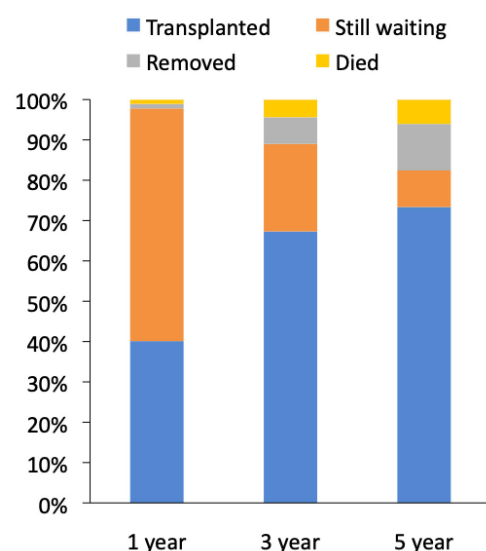


Figure 1. Proportional transplant outcomes of patients requiring a kidney transplant at 1, 3 and 5 years post-listing.

Of those who had been transplanted within 5 years of being listed, survival rate at the end of the 5 year period (post-listing) was 90% and of those who had not been transplanted during this time, survival rate was 68%. When distinguishing between deceased and live donor transplant recipients, it was found that those who had live transplants had a better survival outcome, with a mortality rate of only 1.5%. The mortality rate amongst deceased donor recipients

was 11% and the mortality rate amongst those not transplanted was 32% (Figure 2). Of total live transplants, 75% occurred within the first year post-listing, compared with 55% of total deceased transplants.

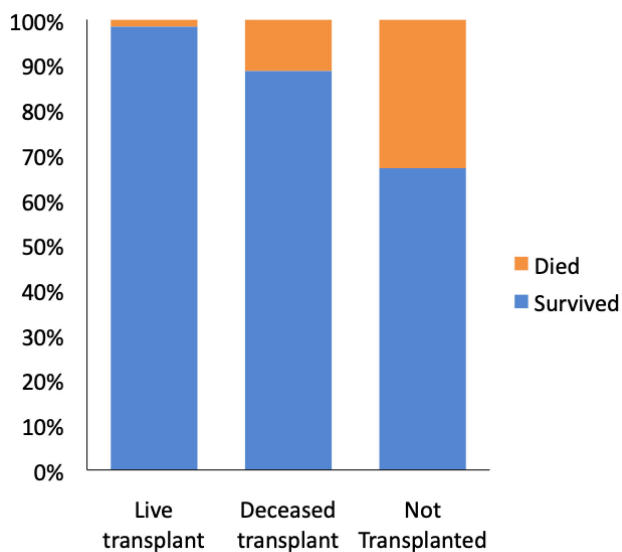


Figure 2. Overall survival rate at 5 years post-listing, grouped by live donor recipient, deceased donor recipient and not transplanted.

Further analysis considered the demographics of those listed, focussing on sex and age at listing. Although the total number of males listed ($n=253$) was over double the number of females ($n=111$), the proportional 5-year outcomes (transplanted, removed, still waiting or died) were very similar between the two groups. Outcomes were slightly more varied with age at listing, with the highest proportion of transplantation occurring amongst those aged 20–39 years (80% of those listed in this age bracket were transplanted by 5 years) and lowest amongst those aged 70–79 years (64% of those listed in this age bracket were transplanted by 5 years). The highest proportion of individuals removed from the transplant list was in the 70–79 years age bracket (27% of those listed in this age bracket were removed by 5 years). The median age at listing of those who received a live transplant was 50 years and, for those who received a deceased transplant, it was 54 years.

Discussion

These findings show that, for patients with renal disease, live kidney transplants lead to a higher survival rate than deceased donor transplants. One reason for this may be because such transplants tend to occur sooner post-listing, whereas waiting times for cadaveric transplants are generally longer, meaning more time is spent on dialysis, which is known to worsen outcomes.² Specifically, in this study, the mean time spent on dialysis pre-listing was 237 days for patients who received a live transplant, whereas it was 360 days for patients who received a deceased transplant.

Another possible reason why patients who received a deceased transplant had a higher mortality rate could have been because, on average, they were older at listing and older recipients are known to have a higher risk of graft failure.³ A likely explanation for why older patients (aged 70–79 years) were least likely to be transplanted in the 5 years post listing is because they are more likely to become unsuitable for transplant due to other health issues and comorbidities, such as diabetes or cardiovascular disease.⁴

Although it has the most optimal outcome, live transplant is not always an option for patients because they may not have someone who is willing or suitable to donate. It is also important to consider that although a live transplant prolongs the life of the recipient and improves their quality of life by removing their need for dialysis,⁵ it involves an unnecessary surgical procedure for the healthy donor,

which carries its own set of risks that the donor would otherwise not have had, such as increased cardiovascular disease risk.⁶ In the case of cadaveric donors, concerns regarding the donor's health are not an issue. Hence, the transplant list and cadaveric donors still play a very important part in the treatment for end-stage renal disease and allocation is a very complex process, which tries to optimise the available kidneys whilst providing the best-matched graft for each individual.

This study focussed on survival as a measure of successful transplantation but it is also important to consider the patient's quality of life and, whilst a transplant may not always extend a patient's life, it provides a much better quality of life than they would have had on dialysis,⁷ so may still be the most desirable treatment option.

Conclusion Overall, at 5 years post-listing, there is a higher rate of recipient survival with live kidney donors than with deceased donors. Further research is required to determine the balance between waiting longer for a potentially closer-matched live kidney donor and the risk of spending longer on dialysis. This is particularly important with the expansion of the opt-out organ donation scheme to England in 2020 (as well as in Wales), as it will result in a significant increase in deceased kidney donors becoming available across the UK.

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