Allocation of renal grafts to older recipients does not result in loss of functioning graft-years

Multi-Organ Transplant Program, McGill University, Montreal, Quebec, Canada

Abstract

Background: Most deceased donor kidney allocation protocols are based on waiting time and do not take into account either recipient’s life expectancy. This study investigates whether graft survival is affected by patient life expectancy.

Methods: A total of 640 adult kidney transplants were performed. Recipients were divided in group A (patients ≤ 50 years) and group B (patients > 50 years). The status of graft+recipient combination was characterized as: a) deceased recipient with functional graft, b) alive recipient with functional graft and c) deceased or alive recipient with non-functional graft.

Results: Mean kidney recipient survival was 15.15 (95% CI: 14.54, 15.77) and 12.40 (95% CI: 11.47, 13.33) years for groups A and B respectively (p < 0.0001). Mean graft survival was 13.62 (95% CI: 12.81, 14.43) and 12.42 (95% CI: 11.59, 13.25) years for groups A and B respectively (p=0.6516). Non-functional grafts were identified in 18.4% (n=57) and 16.4% (n=54) of group A and B respectively.

Conclusions: Allocation of renal grafts to older patients does not result in significant loss of graft-years. Recipients’ life expectancy has a small impact on graft survival. We should not deviate from the basic principles of equality, when kidney allocation systems are designed. Hippokratia 2011; 15 (2): 167-169

Key words: waiting list, equality, utility, outcomes, survival

Corresponding author: Dionisios Vrochides, Royal Victoria Hospital, 687, Pine Avenue West, S10.26, Montreal, Quebec, H3A 1A1, Canada, Tel.: +1 514 8431600, Fax: +1 514 8431434, E-mail: vrochides@yahoo.com
justed for patient age-group and stratified by graft ECD-status. The prevalence of the three graft+recipient status categories within the four patient age-groups was also studied. Finally, the incidence of acute cellular rejection (ACR), adjusted for patient age-group, was calculated too. The SPSS version 16.0 was used for statistical analysis.

**Results**

Three hundred and ten patients (48.44%) comprised group A, whereas 330 patients (51.66%) comprised group B. Mean kidney recipient survival was 15.15 (95% CI: 14.54, 15.77) and 12.40 (95% CI: 11.47, 13.33) years for groups A and B respectively (Figure 1). That was statistically significant (p < 0.0001). Even after stratification according to graft ECD-status, group A exhibited better patient survival than group B (Table 1).

Mean graft survival was 13.62 (95% CI: 12.81, 14.43) and 12.42 (95% CI: 11.59, 13.25) years for groups A and B respectively (Figure 2). That was not statistically significant (p=0.6516). Even after stratification according to graft ECD-status, group A and group B showed similar graft survivals (Table 1).

Alive recipients with functional grafts were identified in 75.8% (n=235) and 68.8% (n=227) of groups A and B respectively. Deceased recipients with functional grafts were identified in 5.8% (n=18) and 14.8% (n=49) of groups A and B respectively. Finally, non-functional grafts (in alive or deceased recipients) were identified in 18.4% (n=57) and 16.4% (n=54) of group A and B respectively.

The incidence of ACR was 21% (n=65) and 12% (n=40) for groups A and B respectively. That was statistically significant (p=0.003).

**Table 1:** Patient and graft survival in patients ≤ 50 (group A) and > 50 (group B) years of age after stratification according to graft ECD-status. Notice that CI overlapping (absence of statistical significance) occurs for graft but not for patient survival values.

<table>
<thead>
<tr>
<th>Patient's age</th>
<th>SCD graft Recipient</th>
<th>ECD graft Recipient</th>
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<tbody>
<tr>
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<td>95% CI</td>
<td>Value (years)</td>
</tr>
<tr>
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<td>15.22</td>
<td>14.54, 15.89</td>
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<tr>
<td>&gt; 50 years</td>
<td>12.65</td>
<td>11.47, 13.82</td>
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<tr>
<td>Value (years)</td>
<td>95% CI</td>
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</tr>
<tr>
<td>≤ 50 years</td>
<td>13.66</td>
<td>12.8, 14.51</td>
</tr>
<tr>
<td>&gt; 50 years</td>
<td>13.13</td>
<td>12.12, 14.14</td>
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</tbody>
</table>

**Figure 1:** Patient survival in kidney transplants stratified by recipient’s age. The trends are similar even when maximum follow-up is 15 instead of 10 years (data not shown).

**Figure 2:** Graft survival in kidney transplants stratified by recipient’s age. The trends are similar even when maximum follow-up is 15 instead of 10 years (data not shown).
Discussion

In our patient population, the older recipients (> 50 years) show inferior patient survival curves when compared to the younger ones (≤ 50 years). Of course, this is an expected finding. What is surprising is that despite their shorter life expectancy, older recipients have similar graft survival curves when compared to the younger ones. To be more precise, difference of almost four years in mean patient survival yields a mere difference of approximately one year in mean graft survival, regardless of graft ECD-status. This is also reflected to the almost similar percentage of alive recipients with a functioning graft between older and younger patients (69% and 76% respectively). One possible explanation is that, the higher incidence of ACR (almost double) in recipients ≤ 50 years of age, causes faster graft function “deterioration” in the younger population, and offsets the advantage of placing a kidney graft to patients with higher life expectancy.

However, there is another way of analyzing the same results. In a hypothetical allocation of all the grafts utilized by our center to recipients ≤ 50 years old, the 10-year graft survival would be 74%. If all ECD grafts were given to recipients > 50 years old and all SCD grafts were given to recipients ≤ 50 years old, the 10-year graft survival would be 68%. Both these scenarios compare favorably to the present situation (free allocation, regardless recipients age) where the 10-year graft survival is 62%. Of course, under no circumstances the waiting list of a transplant center consists of young patients only. Furthermore, in a quantitative allocation scheme we should take into consideration what would happen to the “other side of the fence”, i.e. what would happen to the older patients waiting on the list for a graft, while the younger ones are prioritized. A possible solution to this problem would be to analyze not only recipient survival curves but also enlisted patient (waiting and transplanted) survival curves.

In conclusion, allocation of renal grafts to older patients does not result in significant loss of graft-years. Recipients’ life expectancy has a small impact on graft survival. Although a different, more quantitative, allocation system might be better, we should not deviate from the basic principles of equality, especially since patients considered for renal transplantation do not face immediate risk of dying and kidney transplantation, unlike other organs (i.e. liver, heart, etc.), does not have an imposing life or death imperative1,7.

References