Spousal renal donor transplantation in Chinese subjects: a 10 year experience from a single centre

Sydney Tang, Sing Leung Lui, Chi Yuen Lo, Wai Kei Lo, Ignatius K. P. Cheng, Kar Neng Lai and Tak Mao Chan

Division of Nephrology, Department of Medicine, University of Hong Kong, Queen Mary Hospital, Hong Kong SAR, China

Abstract

Background. The shortage of cadaveric kidneys for renal transplantation is a particularly problematic situation in the locality of Hong Kong. Kidneys from spousal donors are therefore increasingly being used for transplantation. This study was undertaken to evaluate the outcome of spousal donor transplant recipients in comparison with that of genetically related living donor (LRD) allograft recipients.

Methods. From 1988, we have transplanted 22 spousal kidney recipients (group 1). All donors must demonstrate a genuine spousal relationship. Their outcome was compared with that of 24 LRD allograft recipients (group 2) transplanted in the same period with similar demographics, pre-transplant dialysis duration, immunosuppressive protocol and length of post-transplant follow-up.

Results. The mean (±SD) age was 36.5 ± 8 and 32.5 ± 6 years for groups 1 and 2, who were followed for 56.6 ± 35 and 59.1 ± 38 months, respectively. There was no difference in the incidence of delayed graft function, acute rejection and serum creatinine level at 5 years. Graft survival rates were 86.4 and 79.2% (P = 0.56), while patient survival rates were 100 and 91.7% (P = 0.171) at 5 years for groups 1 and 2, respectively.

Conclusions. Spousal kidney transplantation shares comparable results with LRD transplantation and should be encouraged in places where cadaveric organs remain scarce. Stringent measures must be implemented to prevent the possible emergence of kidney bartering and to protect the interests of living donors. The ethical and social issues regarding the spousal donor in Hong Kong and other countries are discussed.

Keywords: ethics; living-related donor; outcome; renal transplantation; spousal donor

Introduction

Kidney transplantation offers the best potential for full rehabilitation to normal life in the patient with end-stage renal disease, and carries the added advantage of reducing the overall cost in the maintenance of the renal replacement therapy programme. Yet, the shortage of organ donors despite a widely publicized organ donation campaign represents a major barrier toward kidney transplantation in Hong Kong. Among 119 per million population (pmp) incident patients established on dialysis in year 2000, only 9.9 pmp underwent kidney transplantation in this locality [1], one of the lowest rates among developed countries worldwide.

Spousal renal donation has become an important source of donor kidneys to combat the problem of organ shortage and to significantly reduce the waiting time and queue for cadaveric kidney transplantation at Queen Mary Hospital, the largest transplant centre in Hong Kong. In this report, we describe our experience in performing spousal donor renal transplantation over the past decade, and evaluate the outcome of these recipients in comparison with recipients of living, genetically related donor (LRD) kidneys. The ethical and social aspects surrounding spousal donor kidney transplantation in Hong Kong and other countries around the world are discussed.

Subjects and methods

Spousal kidney donor evaluation

We retrospectively reviewed the outcome of all successfully transplanted recipients of spousal kidney donors since the
Study design

The clinical course of all successfully transplanted recipients of spousal kidney donors (group 1) since 1988 was compared with that of then contemporary LRD kidney recipients (group 2) who were transplanted in the same period with comparable demographics, pre-transplant dialysis duration, immunosuppressive protocol and length of post-transplant follow-up. The following parameters were compared: incidence of delayed graft function, duration of hospital stay, biopsy-proven acute allograft rejection within the first 6 months after transplantation, graft and patient survival, and serum creatinine levels at 5 years.

Statistical analyses

Data are expressed as mean values ± SD. Statistical analysis was performed using SPSS statistical software (Statistical Package for the Social Sciences, Inc., Chicago, IL, USA). The incidence of acute allograft rejection between the two groups was compared with the $\chi^2$ test. Comparison of graft and patient survival was performed using the Kaplan–Meier with log-rank testing. Serum creatinine levels were compared with one-way analysis of variance. A P-value of <0.05 was considered statistically significant.

Table 1. Demographic data of recipients of spousal (group 1) and LRD (group 2) kidneys

<table>
<thead>
<tr>
<th></th>
<th>Group 1 (n=22)</th>
<th>Group 2 (n=24)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at transplant (years)</td>
<td>36.5 ± 8.0</td>
<td>32.5 ± 6.0</td>
<td>0.058</td>
</tr>
<tr>
<td>Male/female</td>
<td>13/9</td>
<td>18/6</td>
<td>0.25</td>
</tr>
<tr>
<td>Duration on dialysis (months)</td>
<td>20.0 ± 14.7</td>
<td>23.1 ± 24.0</td>
<td>0.601</td>
</tr>
<tr>
<td>Transfusion history</td>
<td>4</td>
<td>6</td>
<td>0.575</td>
</tr>
<tr>
<td>Donor/recipient relationship</td>
<td>Between spouses</td>
<td>Between siblings (n=14)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W to H (n=14)</td>
<td>From parents (n=10)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>H to W (n=8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of HLA mismatches</td>
<td>4.4 ± 1.29</td>
<td>1.1 ± 0.57 haplotypes</td>
<td></td>
</tr>
<tr>
<td>Immunosuppressive protocol</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATG induction</td>
<td>2 (9.1%)</td>
<td>0</td>
<td>0.04</td>
</tr>
<tr>
<td>Prednisolone</td>
<td>22 (100%)</td>
<td>24 (100%)</td>
<td></td>
</tr>
<tr>
<td>Cyclosporin A</td>
<td>21 (95.5%)</td>
<td>23 (95.8%)</td>
<td></td>
</tr>
<tr>
<td>Azathioprine</td>
<td>17 (77%)</td>
<td>19 (79.2%)</td>
<td></td>
</tr>
<tr>
<td>Post-operative ATN</td>
<td>1 (4.5%)</td>
<td>1 (4.2%)</td>
<td>0.95</td>
</tr>
<tr>
<td>Rejection within first year</td>
<td>5 (23%)</td>
<td>4 (17%)</td>
<td>0.605</td>
</tr>
<tr>
<td>Post-transplant follow-up duration (months)</td>
<td>56.6 ± 35.0</td>
<td>59.1 ± 38.0</td>
<td>0.821</td>
</tr>
</tbody>
</table>

W, wife; H, husband; HLA, human leukocyte antigen; ATG, anti-thymocyte globulin; ATN, acute tubular necrosis.
functioning grafts at 5 years were $133 \pm 42.3 \, \text{mol/l}$ for group 1, and $152.2 \pm 51.6 \, \text{mol/l}$ for group 2 ($P = 0.22$). To date, all spousal donors are well with stable renal function.

**Discussion**

Shortage of cadaveric donor organs prompts transplant centres to examine all possible alternatives in addition to living-related transplantation. One possibility is spousal transplantation. From our results, it is apparent that spousal kidney transplantation is a viable option in Chinese subjects, which carries success rates and 5 year survival outcomes that parallel those of LRD renal transplantation despite poor HLA matching. The comparable outcome may be explained by the quality of the living graft, short ischaemic times, similar age between husband and wife, and better compliance in taking immunosuppressant drugs because the recipient and donor live together. The similarity in outcome between spousal and LRD allografts was also reported in Caucasian [2–4] and Japanese [5] subjects. Despite the use of anti-thymocyte globulin in two patients who received spousal kidneys before 1990, the overall acute rejection rate during the first 6 months in group 1, though not reaching statistical significance, appears higher than group 2. To this end, the use of mycophenolate mofetil instead of azathioprine has shown clear benefits in reducing the incidence of acute
rejection in spousal donor transplants [6]. Whether the use of newer immunosuppressive agents may further improve rejection rates deserves further investigation.

The most common reason for declining spousal transplants in Hong Kong is donor–recipient incompatibility as a result of ABO blood group mismatch or a positive direct lymphocyte cross-matching arising from pre-sensitization, such as blood transfusion, pregnancy or previous transplants. To circumvent this problem, Park et al. [7] in Korea have reported a successful donor exchange programme between couples who have a willing but incompatible spousal donor. The programme involved simple exchanges (between two couples) and pool exchanges (among more than two couples). Five year patient and graft survivals were comparable among spousal donor-exchanged, living-unrelated and haplo-identical allografts.

While the similarity in results between spousal and LRD transplants is indisputable, an important concern surrounding the use of the spousal organ is the ethical aspect [8,9]. Advocates of spousal donor transplantation from Japan [10], Switzerland [9] and some transplant centres in the USA [11,12] have reported improved family psychodynamics, including strengthening of marital bond, restoration of the functional role of the husband and wife, improved sexual relationship and emotional bonding with children. On the other hand, this practice must be condemned in areas where human organs may be ‘traded as merchandise’, such as in certain developing or third-world countries, or in certain cultures where one gender, usually the male, is a dominant figure in the family and coerces the opposite sex into becoming a so-called ‘voluntary’ donor [13]. The situation is even more complex in extended families and in places where multiple-partner marriage is considered legal. It is for these reasons that the transplant of spousal organs is seldom practiced in some developed countries such as in Europe, Australasia, or remains illegal in certain countries such as France [14], or entails complex regulatory procedures such as in the UK [8].

In Hong Kong, the 3 year requirement is rather arbitrary, but nevertheless casts a deterrent effect on ‘purposed’ marriages. Legislation and regulatory bodies governing the practice of organ transplantation in Hong Kong are entirely distinct from those in mainland China, even after Hong Kong has become a Special Administrative Region (SAR) of the People’s Republic of China in 1997. Marriages of <3 years in Hong Kong are under the meticulous scrutiny of the local authority, which requires proof of a genuine relationship that may entail the examination of information considered personal such as photographs of daily living, evidence of mutual interest such as a joint-name bank account or jointly owned property, or interview of close family members, relatives and friends. The couple will also be invited to write personal statements in support of their case. The enforcement of local legislation that protects the well being of the donor is the cornerstone to the success of a healthy spousal transplantation programme that not only ethically justifies the spouse donor, but also opens the door to this excellent but underused source of organs for patients awaiting renal transplantation. It is envis-aged that as the spousal donor programme matures, the application of swap donors can be contemplated to further expand the donor pool. Even more stringent laws must be implemented to guard against any form of coercion, reneging and bartering.


Conflict of interest statement. None declared.

References


Received for publication: 21.5.03
Accepted in revised form: 13.8.03