# Living Donor Kidney Transplantation: The Donor Profile in Trinidad and Tobago

A Ali<sup>1</sup>, L Roberts<sup>2</sup>, F Ahmed<sup>3</sup>

## ABSTRACT

**Objective:** The National Organ Transplant Unit (NOTU) of Trinidad and Tobago, first implemented in January 2006, was mandated to facilitate renal and corneal transplantation. Since then, 60 transplants have been performed utilizing living kidney donors. The aim of this study is to ascertain the typical donor profile and to highlight the safety involved with live kidney donation.

*Subjects and Methods:* This descriptive study utilized the medical records of 60 consecutive live kidney donors between the period January 2006 and May 2010. Donor information was recorded on Microsoft Excel spreadsheets and analysed using the Statistical Package for Social Sciences 12.0.

**Results:** Among the 60 donors, males and females were in equal proportions with a mean age of 35.0 ( $\pm$  10.7) years; a mean body mass index (BMI) of 25.8 ( $\pm$  4.2) kg/m2 and 48.3% were of East Indian decent. The majority of donors were related to the recipient (71.7%). At donation, the mean creatinine was 84.9 ( $\pm$  17.7) µmol/L, average urine creatinine clearance, 1.83 ( $\pm$  0.53) mL/s and mean 24 hour urine protein, 141.8 ( $\pm$  78.6) mg. There was a significant association between the BMI at donation and proteinuria one year after donation (p = 0.043). The average hospital stay was 5.0 ( $\pm$  0.95) days with minimal postoperative complications.

**Conclusion:** The typical live kidney donor in Trinidad and Tobago is a 35-year old, slightly overweight male or female who is usually of East Indian decent, donating a kidney to a relative. Living kidney donation in this Transplant Unit is safe with minimal short-term complications.

Keywords: Donor profile, kidney transplantation, living donor

# **Trasplante Renal de Donantes Vivos: Perfil del Donante en Trinidad y Tobago** A Ali<sup>1</sup>, L Roberts<sup>2</sup>, F Ahmed<sup>3</sup>

## RESUMEN

**Objetivo:** La Unidad Nacional de Trasplantes de Órganos (UNTO) de Trinidad y Tobago, implementada por primera vez en enero de 2006, fue instituida con el propósito de facilitar los trasplantes de riñón y córnea. Desde entonces se han realizado 60 trasplantes utilizando donantes vivos de riñón. El objetivo de este estudio es determinar el perfil del donante típico y destacar la seguridad que conlleva la donación renal de vivo.

**Sujetos y Métodos:** Este estudio descriptivo utilizó historias clínicas de 60 donantes vivos de riñón consecutivos, entre el período de enero de 2006 a mayo de 2010. La información del donante fue registrada en hojas de cálculo de Microsoft Excel y analizada usando el programa estadístico para las ciencias sociales SPSS 12.0.

**Resultados:** Entre los 60 donantes, hubo igual proporción de hombres y mujeres con edad promedio de 35.0 (± 10.7) años, un índice de masa corporal (IMC) promedio de 25.8 (± 4.2) kg/m2, y un 48.3% eran de descendencia indo-oriental. La mayor parte de los donantes eran parientes del receptor (71.7%). En el momento de la donación, la creatinina promedio fue 84.9 (± 17.7) µmol/L, el promedio de aclaramiento de creatinina en orina fue 1.83 (± 0.53) mL/s, y el promedio de proteína en orina de 24 horas, 141.8 (± 78.6) mg. Hubo una asociación significativa entre el IMC en la donación y la proteinuria un año después de la donación (p = 0.043). El promedio de estadía en el hospital fue 5.0 (± 0.95) días con complicaciones postoperatorias mínimas.

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**Conclusión:** El típico donante vivo de riñón en Trinidad y Tobago es un hombre o mujer de 35 años de edad, ligeramente pasado de peso, generalmente de descendencia indo-oriental, que dona el riñón a un pariente. La donación renal de vivo en esta Unidad de Trasplante es segura, con complicaciones mínimas a corto plazo.

Palabras claves: Perfil del donante, trasplante renal, donante vivo

#### West Indian Med J 2011; 60 (3): 291

### **INTRODUCTION**

Living donor kidney transplantation began 55 years ago and has become the preferred treatment for patients with endstage renal disease [ESRD] (1) because it provides a better quality of life and improved survival compared to dialysis (2). The rate of living donor transplantation varies in different countries: Saudi Arabia had the highest reported living kidney donor transplant rate at 32 procedures per million population (pmp) followed by Jordan, then Iceland and lastly Iran (3). The availability of deceased donors and personal choice influence the type of transplant. Even in countries where large numbers of cadaveric donors are available eg the United States of America (USA), the rate of living donor transplant is still high, 21 persons pmp. This emphasizes the advantages of live donation: short waiting times, obtaining a preemptive transplant, elective surgery and achieving better outcomes (4).

The National Organ Transplant Unit (NOTU) in Trinidad and Tobago is one of the few active renal transplant centres in the Caribbean. Living donor transplantation for citizens has become the favoured choice since the availability of deceased donor grafts is low and outcomes from living donor grafts are superior to that from cadaveric transplants. Furthermore, even transplants with poor human leukocyte antigen (HLA) matching between spouses do better than matched cadaveric kidneys, primarily because these kidneys are uniformly healthier (5).

The life span of living kidney donors seems to be similar to that of a person in the general population; the risk of developing ESRD is not increased and their quality of life also appears to be excellent (6). Cross-sectional studies also indicate that there is no major increase in serum creatinine levels or changes in the glomerular filtration rates [GFR] (7). Therefore, since the living donor plays a significant role in this fledgling programme which commenced in January 2006, an examination of the living donor and his/her outcomes was undertaken.

## SUBJECTS AND METHODS

From January 2006 to May 2010, 60 living donor transplants from a total of 63 kidney transplants were performed through the NOTU at the Eric Williams Medical Sciences Complex. Living donors were selected based on a multidisciplinary approach involving a physician (not affiliated to the NOTU team), the social worker, psychiatrist, transplant surgeon and nephrologist and an ethical committee for unrelated pairs. The transplant coordinators who function as the link between the donor and the transplant team manage this approach.

All donors must come to the NOTU with a current letter from their private doctor stating their interest and current medical information including evidence of their blood group. Donors are first interviewed by a social worker, then seen by a transplant coordinator who gives an introduction to the transplant process and explains the tests involved. These include:

> 2–3 x 24-hour urine collections for protein quantitation and assessment of creatinine clearance Mid-stream urine for microscopy, culture and sensitivity Blood investigations for complete blood count, lipid profile, renal function, liver enzymes, calcium, phosphorus and fasting blood sugar Electrocardiogram and chest X-ray

Mantoux test

If the donor's results are acceptable, then the directed donor and recipient are sent for histocompatibility testing, cross-matching and relevant serology. If the cross-match is negative and the serology for both parties is free from active infection, a computed tomography angiogram is done on the donor. If this is satisfactory, surgery is scheduled and the potential donor has a unilateral nephrectomy *via* the open laparotomy method.

Follow-up care of the living donor takes place initially at one week, one month, three months, six months and then yearly. Measurements of body mass index (BMI), blood pressure and heart rate with a physical examination are performed at these visits. Twenty-four hour urine for protein and creatinine clearance are done at the sixth month, twelfth month and then yearly. The National Organ Transplant Unit, a vertical unit of the Ministry of Health, provides all services free of charge to citizens of Trinidad and Tobago.

The screening notes, preoperative, postoperative and outpatient clinic notes for the donors were all used to gather information for the study. Living donor relations were defined as biological blood related (siblings, parent, child, other types of biological relation) and non-biological donors *eg* spouses and those unrelated.

Pre-set parameters were entered into a Microsoft Excel worksheet that included demographic and outcome variables. The data were then analysed using Microsoft Excel calculators for the mean and standard deviations. The Statistical Package for the Social Sciences (SPSS 12.0 for Windows) was used to enter the data and further descriptive analysis extracted from its calculators. Modification of Diet and Renal Disease (MDRD) study equation, (4-variable) calculator was used to find the estimated glomerular filtration rate (eGFR).

## RESULTS

The following is the profile generated for the living kidney donor in Trinidad and Tobago (60 live donors).

The mean age of the donors was  $35.0 (\pm 10.7)$  years; 46.7% of donors were between 18-34 years. The percentage of male and female donors was equal – 50%. The average BMI was found to be  $25.8 (\pm 4.2) \text{ kg/m}^2$ . Most of the donors were of East Indian descent, 48.3% (29), with 30% (18) of African descent, 18.3% (11) of mixed and 3.3% (2) of other (1 Caucasian, 1 Chinese) ethnic background. The average stay in hospital for the living donor was  $5.0 (\pm 0.95)$  days (Table).

### Table: Kidney donor demographic profile

Living Donor (n = 60)	
35 ± 10.7	
46.7%	
43.3%	
10.0%	
50.0	
48.3%	
30.0%	
18.3%	
3.3%	
$25.8\pm4.2$	
$5.0\pm0.95$	
	Living Donor (n = 60) $35 \pm 10.7$ 46.7% 43.3% 10.0% 50.0 48.3% 30.0% 18.3% 3.3% $25.8 \pm 4.2$ $5.0 \pm 0.95$

Forty-three (71.7%) of the living donors were biologically blood related to the recipient. Sibling donors were the highest, 35.0% (21), followed by the non-biological unrelated donors 21.6% (13). There were more 'parent to child' donors 16.7% (10) than 'child to parent' 13.3% (8). Four (6.7%) donors were spouses and 6.7% (4) were other types of biological blood relations *eg* cousins, uncle (Fig. 1).

The mean creatinine at donation was found to be 84.9  $(\pm 17.7) \mu mol/L$ . There was a transient increase at six months to 117.6  $(\pm 23.0) \mu mol/L$  with the serum creatinine levelling in the following two years to approximately 111.4  $(\pm 23.0) \mu mol/L$  (Fig. 2).

Urine creatinine clearance at donation was an average of 1.83 ( $\pm$  0.53) mL/s, decreasing by 34% at six months postnephrectomy and then remained above 1.17 mL/s thereafter. The average eGFR at donation was 1.59 ( $\pm$  0.30) mL/s with a decline of 30% six months postnephrectomy, almost parallel to the urine creatinine clearance (Fig. 3).



Fig. 1: Living donor transplants by donor relation.



Fig. 2: The mean serum creatinine in µmol/L from the living kidney donor at the donation and for time intervals after.

The average 24-hour urine protein excretion at donation was 141.8 ( $\pm$  78.6) mg. An increase to 284.6 mg at six months and then a drop in the subsequent two years (Fig. 4) was observed. There was an association between the BMI of the donor at donation and the quantity of urine protein one year after donation (p = 0.043).

Two minor postoperative complications of wound infection and incisional hernia were reported. These did require readmission and were both in female donors.

### DISCUSSION

This study describes the first 60 cases of living kidney donors used by NOTU in Trinidad and Tobago. In the population studied, there was no gender imbalance; equal numbers of



Fig. 3: Living kidney donor's mean glomerular filtration (GFR) rate in mL/s as calculated by using 24-hour urine collection compared to the eGFR (estimated glomerular filtration rate) using the MDRD (Modification of Diet and Renal Disease) calculator *versus* time. Urine CrCl = urine creatinine clearance



Fig. 4: The mean urine protein collected in milligrams from the living kidney donors at donation and for time intervals after.

men and women were donors. This was different from international experience where 65% of live kidney donors have been women (8) and in 2009, 60% of living donors in the USA were female (based on Organ Procurement and Transplantation Network [OPTN] data as of June 23, 2010). The role of women in society as "nurturers and caregivers" and cultural expectations were some of the reasons given for this gender bias seen even in Western countries. There are more males than females with ESRD (9), thus among spouses, there are notably more wives who donate to husbands, and this is what was seen in the present study. Among the spousal transplants, there were no husbands donating to their wives. In order to ensure that no gender pressure occurs at the NOTU, independent reviews of the donors and the recipients by the ethics committee, psychiatrist and medical social worker are done prior to donor consent. The role of these donor advocate committees with the necessary legislation proclaimed cannot be over played as they perform a critical

role in guarding against coercion and transplant commercialism.

In order to meet the supply for kidneys, there has been a tendency over the years of an increasing number of nonbiological donors, especially between spouses (10). In 2009, the United Network for Organ Sharing in the USA reported that among living donor transplants, 42% were non-biological transplants, which was a 16% increase over a 10-year period (based on Organ Procurement and Transplant Network data as of June 23, 2010). Non-biological unrelated donors are the second largest group in our Transplant Unit. With newer immunosuppressive medications and more education on the benefits and safety of living donation, Trinidad and Tobago can expect an increased trend in living nonbiological related and unrelated donors in the future.

The majority (46.7%) of the donors was found in the youngest band: 18–34 years. As the population ages and becomes more familiar with transplant education, the most common donor age band may change. However, advanced donor age was associated with a poorer graft outcome reported by a United Kingdom (UK) study analysing 3142 living kidney transplants (11) and it has also been shown that the prevalence of adverse findings post donation such as hypertension and proteinuria were not evident even after two decades beyond donation (6). The ethnic distribution reflects that of the general population; a higher number of East Indian living donors with a similar disposition in the respective recipients.

The living donors had a BMI average that placed them in the overweight category. This may reflect the growing tendency to a Western lifestyle and diet. The Amsterdam Forum Guidelines suggest that potential donors with a BMI > 35 kg/m<sup>2</sup> be discouraged from donating (12). Those who are obese and with a BMI > 30 are encouraged to lose weight prior to kidney donation because of the association between ESRD and obesity as well as possible surgical complications.

Following a 50% reduction in renal mass because of donation, the GFR with parallel values for eGFR are shown to be steady after an initial fall during the first six months post transplant. This same pattern was seen in a small study done in Belgium (13). A rise in proteinuria observed six months to two years postnephrectomy would be closely followed to see if this is a real occurrence or was a laboratory error since almost normal values were recorded at the third year. In fact, two of the donors became pregnant at the sixmonth milestone, and this could also account for the high proteinuria seen. There was no alteration in their renal function during the full-term pregnancies.

This analysis found that there was an association between BMI at donation and subsequent proteinuria one year after unilateral nephrectomy, similar to that seen by Praga *et* al (14). Long-term follow-up of the obese donors with attention to proteinuria and renal insufficiency is required. Education on healthy lifestyle behaviour is emphasized to all the living donors. Living donors in Trinidad and Tobago only stay in hospital for 5.0 days after unilateral open nephrectomy. These statistics are similar to programmes of longer duration (15, 16). Laparoscopic nephrectomy promises to reduce hospital stay and allow early return to work if implemented, thus increasing the productivity of the living donor. Postoperative morbidity is minimal and there have been no major surgical complications or deaths reported, solidifying the safety of being a living donor (17). Current reports from many transplant programmes indicate unanimously that in the long-term, living donors experience the same, if not better morbidity and mortality indices when compared to the general population (6, 18).

The main limiting factor in the index study is the number of donors who did not return for follow-up visits either because they migrated or residents opted not to return for clinic and laboratory reviews. In spite of this, this report is a representative reflection of the donor profile of living donors in Trinidad and Tobago. With an increasing number of citizens suffering with ESRD, kidney transplantation, particularly a preemptive transplantation, is a recommended option. This is even more attractive because it is offered in Trinidad and Tobago as part of the public health service. The positive short term outcomes give the assurance that donation is safe and does not significantly impact on lifestyle. Promotion of donor safety is the golden rule of living donor programmes and is evident in the NOTU programme.

## **ACKNOWLEDGEMENTS**

No sources of funding were used to assist in the preparation of this article. The authors have no conflict of interest that may be relevant to the content of this production. None of the authors has funding or support from any interest group. The authors are deeply indebted to Ms Sandra Ramlogan for her secretarial input.

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