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Deceased Donor Renal Transplantation: A South Indian Experience.

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Abstract: *The first deceased donor kidney transplant in our hospital was performed in 1996 with74deceased donor transplantations thereafter.We retrospectively analysed various donor and recipient characteristics with focus on vessel anatomy and type of anastomosis. Intraoperative andpost-operativecomplications. Patient and graft survival rates of deceased donor renal transplant recipientsat 1 year & 3 years.Donor age was between12-68 years. Main cause of brain death was RTA.Recipientage was between 18-57years. Only19(25.67%) werefemales. Etiology for ESRD was not known in many, followed by CGD. Average Cold ischemia time was 8.01 (± 2.73) hours.17 (22.97%) cadaveric kidney had double renal arteriesof which, in 10 accessoryarteries were ligated, double anastomosis to External Iliac arteryand Internal iliac artery was done in others. Intraoperative one case eachof mottling and impending graft rupture was encountered. Postoperatively 23(31.5%)cases had DGF and 5(6.8%) had SGF. 11(14.86%) patients developed sepsis, 7(9.5%) had pneumonitis, one case each of graft artery thrombosis and anastomotic dehiscence seen.1 year Survival rates was 89.33 % and 73 % for patient and graft respectively.3 year survival rate was56.4 % and 44% for patient and graft respectively.*

Keywords: *Deceased donor renal transplantation, graft vascular anomalies, cold ischaemic times.*

I. Introduction

In India the End Stage Renal Disease (ESRD) is a major disease burden[1] .Crude incidence rates of - 151 per million population per year[1] and the age- adjusted incidence rates is around 232 per million population per year.[1]The renal transplantation rates are only 3.20 per million populations per year.[1] Of which 2% of total kidneys procured from deceased renal donor. [2]

The state of Tamilnadu has been a pioneer in deceased donor renal transplantation with good political will and commitment a successful program has been running in the state for nearly 15 years now. We have published our data incorporating our challenges we faced and our results.

II. Aims

- To analyse various donor and recipient characteristics with focus on vessel anatomy and type of anastomosis.
- To analyse Intraoperative and post-operative complications
- To analyse Patient and graft survival rates of deceased donor renal transplant recipients

III. Methodology

We did a Retrospective analysis of all cadaver transplant from October 2008 to July 2014. The donor - recipient characteristics, post-transplant complication and graft function were analysed. Kaplan-Meier analysis to evaluate survival rates of patient & graft at 1 year & 3 years. Total number of deceased donor transplantation studied was 74 (n)

IV. Results

Donor characteristics

It is our department policy not to refuse any graft. Multiple vessel grafts have also been used. Only one graft refused out of total where there was a hilar rent in the vein. The age of donor was between 12-68 years.The mean age of donor was 33.51 (± 13.3) years

Main cause of brain death was RTA with almost 57 grafts from this category. 13 had fall from height with 1 deceased donor had fall at home, 2 aneurysmal bleed and 1 had traumatic asphyxia. 3 fit into extended criteria for deceased donors who were either hypertensive or Sr. creatinine more than 1.5 g/dl. Most of the grafts were from right side, totally 44 in number.

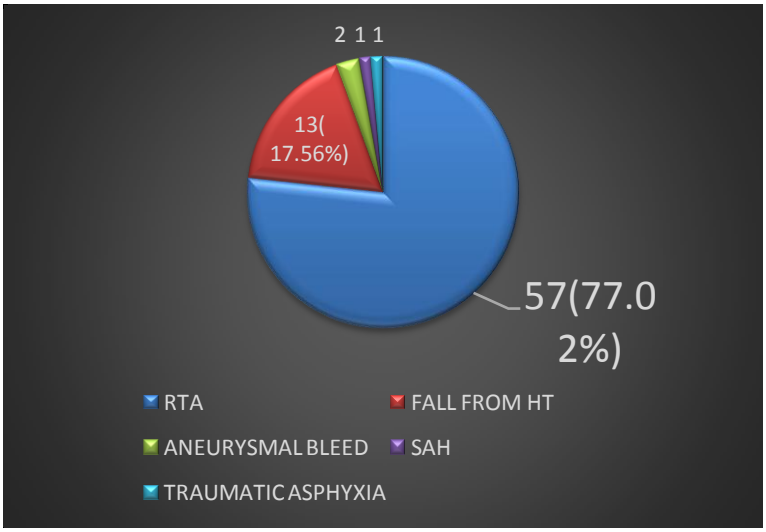

Fig no 1- Pie chart showing causes of deceased donor deaths

Table No. 1 showing Frequency of the side of graft.

Side of graft	Frequency	Percent
Right	44	59.45
Left	30	40.54
Total	74	100.0

Recipient characteristics

The Recipient age was between 18-57 years.The overall mean of recipient was 34 (± 7.8) years. 19(25.67%) were females.Etiology for ESRD was not known in 38 recipients and 27 had chronic glomerulonephritis. The mean duration of dialysis in our recipient group was 20.1 months with minimum of 1 month and maximum of 60 months on dialysis.

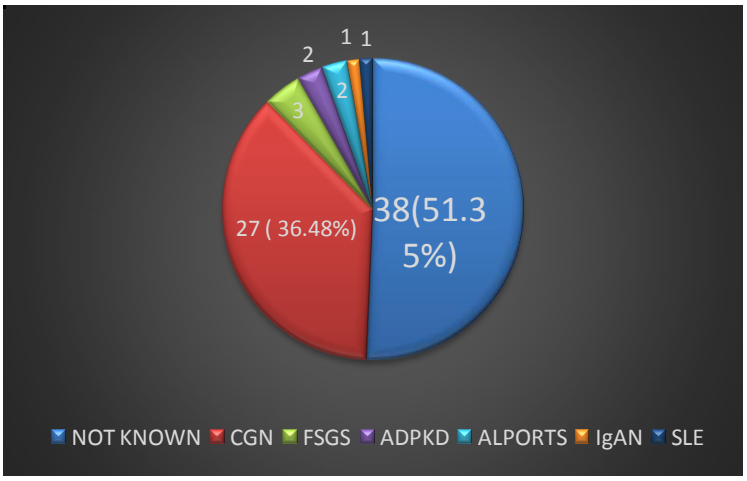

Fig no 2:- Pie chart showing Etiology of CKD in recipients.

Graft vascular anatomy

In our series, 17 of our grafts had double renal artery. Out of which upper polar accessory artery ligated in 10 patients.Double anastomosis to EIA and IIA was done in 7 patients.

6 of our patients had triple renal arteries. ALL in SINGLE CUFF ANASTOMOSIS was done in 4 patients. Two in cuff and one single artery anastomosis done in 1patients (with one vessel anastomosed end to end). Three individual anastomosis was done in 1 patient. One patient had double renal vein.9 patients with vascular anomalies had delay graft function and rest had normal graft functions.

Cold ischemic times

In our series the mean Cold Ischemic times was 8.01 (± 2.73) hours in deceased donor renal transplantation, with minimum CIT of 3 hours when graft was harvested from our centre and maximum time of

15 hours when the graft was harvested from other centres. It was noted that there was no difference in graft function among groups with CIT less than 8 hours and with CIT beyond 12 hours.

Table no 2:- showing comparison of graft outcome with cold ischemic times

Cold ischemia time	DGF/SGF
Upto 8 hours	12(32)
8-10 hours	4(18)
Beyond 10 hours	12(24)

Graft preservation

HTK (Histidine-Tryptophan-Alpha Ketoglutarate) – CUSTODIOL was used in all the deceased donor transplantations. Thestandard sterile three bag technique is used for packing and transportation is done in sterile ice.

Cost of HTK is a major limitation

Induction agent

Anti-Thymocyte Globulin – rabbit origin (rATG). A single dose of 1.5 mg/kg was given as intravenous infusion in the preoperative and intraoperative period. Valganciclovir 450 mg twice daily is given for three months for Cytomegalovirus prophylaxis if ATG is used

Other induction agent used was Interleukin-2 receptor blockers (Basiliximab) which is given as two doses of 20 mg each is given at 4 days interval. First just before surgery followed by second dose 4 days later.

Routine post-operative care protocol included

- Input/ output charting
- Renal function test
- Immunosuppression
- Tacrolimus
- Mycophenolate mofetil
- Predinisolone.
- Doppler ultrasound – when necessary.
- Renal biopsy – rarely
- Tacrolimus levels at day 4 and day 10

Table no 3:- Frequency of Intraoperative events

INTRA OP EVENTS	Frequency	Percent
Absent	66	89.18
Present	8	10.82
Total	74	100.0

Among the cases of that had intraoperative events included mottling in one, impending graft rupture in one, bleeding in two and hypotension in four cases.

Table no 4:- Frequency of Post-operative events:-

POST OP EVENTS	Frequency	Percent
Absent	44	58.9
Present	30	41.1
Total	74	100.0

11(14.86%) patients developed sepsis in the post-operative period, 7(9.5%) patient had pneumonitis, 9 patients had persistent drain, 2 patients had pancreatitis and one patient had right lower limb ischemia following external iliac artery thrombosis.

Table no 5:-Post operative graft function outcomes

GRAFT FUNCTION	Frequency	Percent
Normal	46	62.16
DGF	23	31.08
SGF	5	6.75
Total	74	100.0

23(31.5%) cases had DGF and5(6.8%) had SGF in the immediate post-operative period.Rest had normal graft function.

4 patients had nephrectomies. Two cases intraoperatively that had mottling and impending graft rupture were removedand two cases with graft artery thrombosis and anastomotic site dehiscence respectively were removed in the post-transplant period.

Other post-operative parameters

The mean follow up period was 3 years.The meanpost-operative urine output was 6733.33 ml on day 1. The mean baseline serum creatinine was 1.45 (±0.42) mg/dl on follow up. New onset of Diabetes after renal transplant (NODAT) was observed in 10(13.69 %) patients. The mean tacrolimus levels on fourth postoperative day were: 6.75 (±4.05) ng/ml.Acute cellular rejections were encountered in 7 (9.58 %) patients. Acute antibody mediated rejection was encountered in 2 (2.74%) patients. Biopsy proven acute tubular necrosis (ATN) was observed in 6 (8.21 %) patients.

In the follow up period 10 patients developed sepsis with no identifiable focus of infection. 7 patient had Pneumonitis of various aetiologies.Recurrent UTI and BK virus was seen in 1 each. 1 patient had HCV Related DCLD. 6 of our patients had mycobacterial infections. Mycobacterial tuberculous infections were seen in 6 patients.4 patients had lymph nodal involvement and 2 patients had pulmonary tuberculosis.

Survival rates

1 yr. survival rates was 89.33 % for patients and 73% for graft respectively.
At 3 year survival rate for Patient was 56.4 % and for graft was 44% respectively.

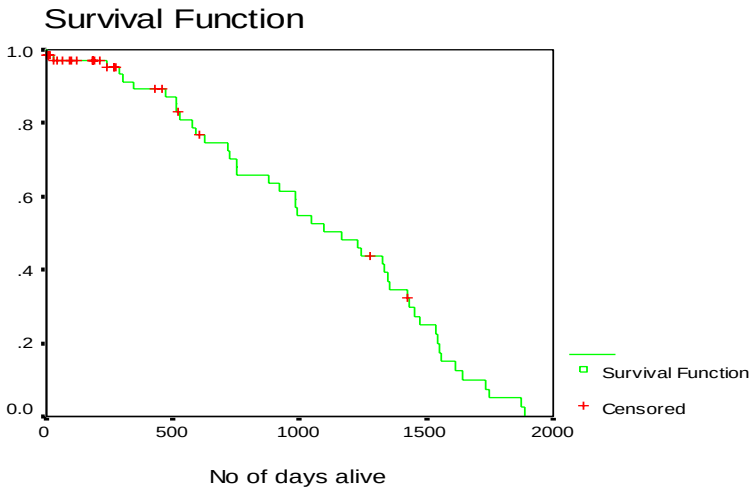

Fig No: - 3 Kaplan Meier analysis of patient survival

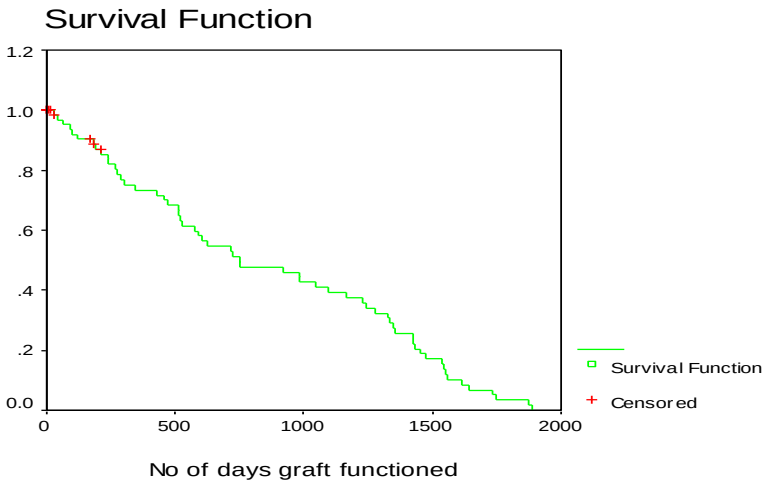

Fig No 4 Kaplan Meier analysis of graft survival

V. Discussion

The deceased donor renal transplantation in our country is still in its infancy. While the rates of deceased donor renal transplantation in US and Europe are high, it has not materialized in many states in India. We present a series of deceased donor renal transplantation done at our institution from 2008 to 2012. A unique fact about our Centre is that it caters to the patients of poor socio economic strata who live in substandard living conditions. The source of kidney was predominantly from victims of road traffic accidents as usually these are young people with no comorbidities and the graft was usually from right side as most of the time the source of the graft is from other centre.

There are many factors that determine the immediate graft function which include Risk factors for DGF in cadaver renal transplantation are Donor age (>50 years),Cold ischemia time (>12 hrs.),Recipient race ,Panel Reactive Antibodies (>50%), HLA mismatch, graft vascular anatomy and duration of dialysis.[1,2]In our series, the mean donor age was well below 50 years except in 4 cases and all recipients were of same race, Panel Reactive antibodies less than 50 and HLA cross match of less than 5-10 %.

The overall outcomes of deceased donor transplantation in our series is compared with other series below

Table No 6:- Comparison of patient and graft outcomes in different studies

	Patient 1 Year (%)	**Patient (Year) (%)**	**Graft 1 year (%)**	**Graft (Year) (%)**
Takashi.M. et al (n= 56) [3]		96.52 (15 yrs.)	89	80.3 (5yrs.)
Shroff et al (n=100)[4]	86	80 (2 yrs.)	82	74 (2 yrs.)
Mani et al [5]			72	63(4yrs.)
Gumber M.R. et al (n=160) [6]	79.58(1 yr.)	76.7(2 yrs.)/ 74.8(3 yrs.)	92.4	87.9 (2 and 3 yrs.)
Swami Y.K et al (n= 35) [8]	83.8	61.2(3 yrs.)	95.4	79.3(3 Yrs.)
Our data (n= 74)	89.33	56.44(3 yrs.)	73	44 (3 yrs.)

In this paper we have mainly discussed the impact of cold ischemic times and graft vascular anatomy outcomes. The table below gives a comparison of graft outcomes with cold ischemic times.

Table no 7:- Comparison of cold ischemic times with delayed graft function.

	Cold ischemic times (hours)	**Delayed graft function (%)**
Moyers.C et al [8]	15	20.8 (machine perfused) 26.5 (cold preservation)
Swami Y K et al [7]	6.25 +/- 2.5	34
Gumber M R et al [6]	5.56 +/- 2.04	30.6
Mehta T R et al [9]	10.3 +/- 4(inter-city) 4.2+/- 1.8(Ahmedabad)	42.4 22.2
Our data	8.01+/-2.73	31.5

Our series had comparable graft function with other series in India whereas Moyers.C had reported a better graft outcomes in spite of having higher cold ischemic times.[8] This probably could be due to post-operative factors like higher dose of immunosuppression given in western countries which our nephrologist here

find it difficult to give due to fear of infections. As per table a subgroup analysis was done in our series and the outcome did not vary if cold ischemic times were below or above 10 hours (TABLE NO-3).

The use of grafts with multiple renal arteries has been considered a relative contraindication because of the increased incidence of vascular and urologic complication. 17 cases had doublerenal artery and in many the upper polar artery was sacrificed, however we were careful with 6 cases with triple vessels where we feel it is mandatory to preserve all vessels as the vessels are of equal caliber and have equal perfusion.[10, 11, 12, 13]

In our series we had good graft function in up to 1 year in comparison with other series however our graft outcomes and patient outcome were inferior at the end of 3 years. Of 74 patients 28 patients died. There are many reasons for this of which infection were a major culprit. We had almost more than a 3 rd of patients with infective complication leading to graft failure and subsequently for poor patient survival. Second important reason is more rejection rates as our tendency is to give reduced doses of immunosuppressive drugs due to fear of infection. The infection rates are probably higher due to poor socioeconomic status of our patient groups and poor hygiene and sanitary condition of our patients.

With the adequate counselling we have been able to educate patient about basic sanitation but it is difficult for them to maintain same due to poverty and also their neighbors and friends fail to do so leading to inevitable exposure to infective agents.

Though the transplant procedure in the state of Tamilnadu is funded by the government through chief minister's insurance scheme, which is a boon to the people of low socioeconomic strata it is however difficult to withstand cost incurred in thepost-transplant period. In spite of free medications offered by the government the cost incurred in travel, recurrent hospitalization, cost of relatives stay around our institute and their food expenses in case of hospitalization are high.

VI. Conclusion

Deceased donor renal transplantation is way to increase graft pool with prolonged cold ischemic times and multiple renal arteries is not a deterrent to transplant, however it is essential to promote a positive public attitude, identification of early brain death and certification, getting prompt consent for organ donation, develop adequate hospital infrastructure and cover long term cost post transplantation in poor patients. Cadaver organs should be considered as nation's resource and organs wasted should be treated as lives lost.

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References

[1]. Jha.V .Current status of end-stage renal disease care in India and Pakistan, Kidney International Supplements (2013) **3,** 157–160; doi:10.1038/kisup.2013.3
[2]. Shroff S. Indian transplant registry. Indian J Urol 2007;23:272-7.
[3]. Tasaki, M. et al.20-Year Analysis of Kidney Transplantation: A Single Center; Japan Transplantation Proceedings , Volume 46 , Issue 2 , 437 - 441
[4]. Shroff S, Navin S, Abraham G, Rajan PS, Suresh S, Rao S, et al. Cadaver organ donation and transplantation-an Indian perspective. Transplant Proc 2003;35:15-7.
[5]. Mani MK. Review article, development of cadaver renal transplantation in India. Nephrology 2002;7:177-82.
[6]. Gumber M R, Kute V B, Goplani K R, Shah P R, Patel H V, Vanikar A V, Modi P R, Trivedi H L. Deceased donor organ transplantation: A single center experience. Indian J Nephrol [serial online] 2011 [cited 2015 Jan 26];21:182-5. Available from: http://www.indianjnephrol.org/text.asp?2011/21/3/182/82636
[7]. Swami YK, Singh DV, Gupta SK, Pradhan AA, Rana YP, Harkar S, Wani M S. Deceased donor renal transplantation at army hospital research and referral: Our experience. Indian J Urol 2013;29:105-9
[8]. Moyers et al. Machine Perfusion or Cold Storage in Deceased-Donor Kidney Transplantation**.**N Engl J Med 2009; 360:7-19January 1, 2009DOI: 10.1056/NEJMoa0802289
[9]. Mehta T R, Shah V R, Butala B P, Parikh G P, Parikh B K, Vora K S, Modi M P, Bhosale G P, Kadam P G, Shah P R, Gumber M R, Patel H V, Kute V B, Modi P R, Rizvi S J, Vanikar A V, Trivedi H L. Intercity deceased donor renal transplantation: A single-center experience from a developing country. Saudi J Kidney Dis Transpl 2013;24:1280-4
[10]. Roza AM, Perloff LJ, Naji A, Grossman RA, Barker CF. Living-related donors with bilateral multiple renal arteries. A twenty-year experience. Transplantation. 1989;47:397–9. [PubMed]
[11]. Oesterwitz H, Strobelt D. Extracorporeal microsurgical repair of injured multiple donor kidney arteries prior to cadaveric allotransplantation. Eur Urol. 1985;11:100–105. [PubMed]
[12]. Makiyama K, Tanabe K, Ishida H, Tokumoto T, Shimmura H, Omoto K, Toma H. Successful renovascular reconstruction for renal allografts with multiple renal arteries.Transplantation.2003;75:828–832.doi: 10.1097/01.TP.0000054461.57565.18. [PubMed] [Cross Ref]
[13]. Ali-El-Dein B, Osman Y, Shokeir AA, Shehab El-Dein AB, Sheashaa H, Ghoneim MA. Multiple arteries in live donor renal transplantation: surgical aspects and outcomes. J Urol. 2003;169:2013–7. [PubMed]