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Original article

PRETRANSPLANT DIALYSIS MODALITY AND KIDNEY TRANSPLANT OUTCOME: THE SOUTH AFRICAN EXPERIENCE

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ABSTRACT

Background: Comparison of outcome of kidney allograft function between those that were treated with HD and those treated with PD while in the waitlist have been debated over time. We compared graft function, cardiovascular status and biopsy proven rejection between these two groups of kidney transplant recipients in a South African Transplant Centre. Methodology: Recipients of first kidney transplant at the Charlotte Maxeke Johannesburg Academic Hospital were recruited for this study. Their records were reviewed and information collated included; age, gender, type of dialysis before transplant, duration on dialysis before transplant, duration after transplant, graft function measured using Modification of Diet in Renal Disease formula (MDRD) and presence of biopsy proven rejection. Echocardiography for assessment of cardiac function was done as well as serum cholesterol and haemoglobin. Results: One hundred KTRs were recruited. There were 63 males and 37 females with M: F ratio of 1.7:1. There were 44 males and 20 females on haemodialysis while 19 males and 17 females were on peritoneal dialysis at the time of the transplant. Recipients treated withHD waited longer to be transplanted, p=0.03 while systolic blood pressure was lower in those treated with PD, p=0.012.Graft function, biopsy proven rejection, haemoglobin, serum cholesterol and cardiac function were similar among the two groups.Conclusion:Shorter duration on the waitlist and lower systolic blood pressure post-transplant were the clear superiority of PD over HD in our study.

1. Introduction

Global prevalence of Chronic Kidney Disease (CKD) is put at 13.4% making it among the top non-communicable diseases with public health concerns.1 CKD is associated with significant morbidity, very expensive cost of care when renal failure sets in and excess mortality.1 Modalities for renal replacement are either dialysis or the more definitive kidney transplant. Haemodialysis (HD) and peritonealdialysis (PD) are the two modalities employed for chronic treatment while patients are placed on the wait list for transplant. Dialysis centers in different countries have different policy regarding initiation modality depending on patients' characteristics, co morbidity, affordability and insurance requirements among others.

Studies comparing outcomes among End Stage Renal Disease (ESRD) patients on HD and PD have yielded conflicting results. It is established that PD offers preservation of residual kidney function and therefore a better clearance than HD2. A South Asian study2 showed a better survival among patients started on HD compared with PD whereas Noshadet al3 reported a better quality of life and survival of patients on peritoneal dialysis than those on haemodialysis with exceptions being diabetic patients. Whether these controversies exist beyond the dialysis period,Huan-Tang Lin in Taiwan reported a higher risk of death after kidney transplant for patients on pretransplant HD than those who were on PD4. This was corroborated by Molnaz et al5, where they showed a significantly lower mortality among patients treated with PD than HD, but they reported a similar rate of delayed graft function or graft failure.

We reviewed our kidney transplant recipients (KTRs)in Charlotte Maxeke Johannesburg Academic Hospital (CMJAH)and compared their pretransplant dialysis modality with graft function, rejection and cardiovascular status.

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Methods

This was a cross sectional study conducted at the CMJAH, South Africa.Patients records were retrieved and information collated included; age, gender, type of dialysis before transplant, duration on dialysis before transplant, duration after transplant, graft function measured using Modification of Diet in Renal Disease formula(MDRD) and presence of biopsy proven rejection. Echocardiography for assessment of cardiac function was done to all the KTRs as well as serum cholesterol and haemoglobin. Standard immunosuppression consisted of tacrolimus/cyclosporine, mycophenolate mofetil and prednisolone. Graft dysfunction was defined as estimated glomerular filtration rate (eGFR) of less than 60 mL/min/1.73m2.Data was entered into SPSS and analysed. Relevant statistical tests were employed in the analysis of the data and results presented below. A p value of 0.05 was considered statistically significant. Ethical approval for the study was obtained from the institution's Human Ethics Research Committee.

Results

One hundred KTRs whose data were complete and had either haemodialysis or peritoneal dialysis were recruited. There were 63 males and 37 females with M: F ratio of 1.7:1. There were 44 males and 20 females on haemodialysis while 19 males and 17 females were on peritoneal dialysis at the time of the transplant. The mean duration on dialysis for HD was longer than those on PD and was statistically significant, p=0.03.There was no gender difference in terms of dialysis modality, p=0.134. Comparison of clinical and laboratory profile of these patients are provided in table 1 and 2.

Table 1; Clinical and laboratory parameters of study population (n = 100

Variable	Haemodialysis (n=64)	Peritoneal Dialysis (n=36)	P value
Age (Mean±SD) years	41.61±11.75	43.25±13.63	0.53
Dialysis duration (months)	53.25±29.46	40.33±25.52	**0.03**
SBP (mmHg)	135.62±14.69	127.36±16.78	**0.012**
Creatinine (µmol/L)	133.72±64.16	140.97±79.76	0.62
eGFR (ml/min/1.73m^2)	66.4330.83	66.0±33.29	0.95
Haemoglobin (g/dl)	13.24±2.29	13.1±1.76	0.75
Cholesterol (mmol/L)	4.84±1.34	4.61±1.27	0.41
LVEF (%)	69.48±9.24	71.03±10.56	0.45
LVMI (g/m^2)	133.01±46.19	121.91±43.34	0.24

Table 2; Comparison of Rejection and Graft dysfunction (n = 100)

	Rejection			P-value
Haemodialysis	19	45		
Peritoneal dialysis	12	24		
Total	31	68	0.143	0.71
		Graft dysfunction (eGFR <60ml/min/1.73m^2)		
Haemodialysis	32	32		
Peritoneal dialysis	20	16		
Total	52	48	0.283	0.59

Discussion

Sixty four (64%) of our patients were on HD as against 36% on PD, this predominance of HD over PD was seen in the study by Fan Yang et al in Singapore2, where 73.6% of their patients where on HD. Similarly, Molnar et al reported 85.6% of their patients were on HD at the time of transplantation5.Co morbidity at commencement of dialysis is an important determinant in considering type of dialysis to initiate patient on. Generally patients with significant vascular disease and those with diabetes are considered first on PD because of difficulty in creating and sustaining a viable vascular access.

Mean age of our patients on both dialysis modality were similar and were relatively young people. In contrast to studies by Huan-Tang Linet al4and Molnar et al5, their KTRs who received PD pretransplant were younger than those who were treated with HD. In Africa, CKD affect relatively younger population compared to other regions of the world.7 Patients who were on HD stayed longer on it before getting a transplant compared to those on PD. This finding in our study is corroborated by workers in Taiwan were they reported on a similar observation.4 It can be deduced that preservation of residual renal function with PD, better control of hypertension, better response to ESA and thus target haemoglobin attainment makes eligibility of PD patients more likely than HD patient in getting a donor in the waitlist.8

Our Kidney Transplant Recipients (KTRs) who were on PD had a significantly lower blood pressure than their counterparts who were on HD. This trend has been reported in the pretransplant PD patients and perhaps this advantage might have transcended into the post transplant period.4, 9

Graft dysfunction defined as estimated glomerular filtration rate (eGFR) less than 60 ml/min/1.73m2determined using MDRD was similar among the two groups. Better graft function was observed in PD than HD patients by Molnaret al4in their cohort.PD patients have a residual renal function that might contribute to the overall clearance in the post transplant period.

PD was associated with lower risk of DGF and cardiovascular mortality than HD but graft survival were similar.10Our study did not observe this trend, which perhaps may be explained by the relatively small sample size in our cohort. Both the left ventricular ejection fraction and left ventricular mass index were similar in our patients. This contrast with a study by Tang M et al10that reported higher cardiovascular death among KTRs that were treated with HD before transplant.

PD patients have relatively preserved haemoglobin than their HD counterparts; this largely is attributable to better response to ESA, lower haemolysis risk compared to HD and less inflammation. Our KTRs have similar haemoglobin levels regardless of their mode of dialysis pretransplant. This finding is similar to what was reported by Huan-Tang et al.4

Serum total cholesterol were similar among our patients this is similar to report by Song et al.12

Biopsy proven acute rejections were similar among our KTRs treated with both dialysis modalities. Similar observations were reported by other studies.11, 12The current era of highly effective immunosuppression protocol might have been responsible for this observation together with advances in compatibility testing.

Conclusion

Shorter duration on the waitlist before transplant and lower systolic blood pressure after transplant were the clear superiority of PD over HD in our study.

Graft function, incidence of acute rejection and cardiac function were similar among the two groups. A longitudinal study will further shed more light on the need to expand the proportion of PD usage over HD from it current low utilization.

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