



ORIGINAL ARTICLE

## Medical complications after live donor kidney transplantation: An experience from tertiary care hospital of south Punjab, Pakistan.

Raheel Khan<sup>1</sup>, Suhail Iqbal Malik<sup>2</sup>, Shoaib Manzoor<sup>3</sup>, Qazi Masroor Ali<sup>4</sup>, Junaid Sarwar<sup>5</sup>, Muhammad Tahir Riaz<sup>6</sup>

**Article Citation:** Khan R, Malik SI, Manzoor S, Ali QM, Sarwar J, Riaz MT. Medical complications after live donor kidney transplantation: An experience from tertiary care hospital of south Punjab, Pakistan. Professional Med J 2023; 30(01):239-244. <https://doi.org/10.29309/TPMJ/2023.30.02.7285>

**ABSTRACT... Objective:** To determine the frequency of medical complications after renal transplantation in recipients. **Study Design:** Prospective Cohort study. **Setting:** Nephrology Unit, Bahawal Victoria Hospital, Bahawalpur. **Period:** December 2018 to March 2022. **Material & Methods:** All patients undergoing renal transplant during the study period were included. Patients unwilling to be part of this study or losing follow-ups were excluded. At the time of enrollment, all patients underwent pre-transplant work-up and routine investigations. Baseline characteristics of renal transplant recipients and donors were noted while frequency of post renal transplant medical complications was also noted. **Results:** In a total of 39 renal transplant recipients, 32 (82.1%) were male while the mean age was  $30.31 \pm 7.21$  years. Mean duration of dialysis before transplantation was  $6.81 \pm 5.15$  months (ranging between 0-24 months). Mean age of the live donors was  $35.90 \pm 9.36$  years. Mean duration of follow up was  $26.15 \pm 11.62$  months. Renal graft dysfunction was reported in 10 (25.6%) patients. Most common medical complications reported in post-transplantation period were sepsis 19 (48.7%), anemia 19 (48.7%), secondary polycythemia 10 (25.6%), CMV infection 4 (10.3%) and new onset diabetes mellitus 3 (7.7%). Mortality was reported in 2 (5.1%) renal transplant recipients and the cause of mortality in both those patients was sepsis. **Conclusion:** Medical complications are common after renal transplantation. Sepsis being more common in 1<sup>st</sup>-6-months post-transplant period. Early recognition and management of these complications is essential for decreasing mortality and morbidity of patients.

**Key words:** Anemia, Polycythemia, Renal Transplantation, Sepsis.

### INTRODUCTION

The first ever successful renal transplantation was performed by Dr. Joseph E. Murray in 1954<sup>1</sup> while in Pakistan, first successful renal transplant was performed in 1979.<sup>2</sup> After the first successful renal transplantation in Pakistan, other major renal centers started developing and doing renal transplantations. Renal transplantation is considered to be a perfect choice for individuals who are suffering with “end stage renal disease (ESRD)”.<sup>3</sup> The literature has shown that in comparison to long-term hemodialysis, successful renal transplant improves quality and life and improves overall survival among affected ESRD patients.<sup>4-6</sup> Renal transplant is also considered to have better cost-effectiveness and thus, may improve overall healthcare costs.<sup>7,8</sup>

Kidney transplantation is known to lead to complex mechanisms in the human body. Engraftment of a solid organ adopting multiple immunomodulating agents with pre-existing complexity of uremic environment can put the patients into a special risk of both predictable as well as unpredictable complications.<sup>9,10</sup> Peri-operative complications in renal transplantation can range between minor to major life-threatening ones like bleeding or pulmonary embolism.<sup>11</sup>

As factors like surgical techniques, surgeon's expertise and experience are important contributing factors in the outcomes of renal transplant recipients<sup>12</sup>, not much local work is seen analyzing medical complications following renal transplant in the recipients. This study was

1. MBBS, FCPS (Medicine), Senior Registrar Medicine, Bahawalpur Victoria Hospital, Bahawalpur.  
2. MBBS, FCPS (Medicine), FCPS (Nephrology), Associate Professor of Nephrology, Bahawalpur Victoria Hospital & QAMC, Bahawalpur.  
3. MBBS, FCPS (Nephrology), Assistant Professor of Nephrology, Shahida Islam Medical & Dental College, Lodhran.  
4. MBBS, FCPS (Medicine), Professor Medicine, Ava Serene Hospital, Bahawalpur.  
5. MBBS, PGR Nephrology, Bahawalpur Victoria Hospital, Bahawalpur.  
6. MBBS, PGR Nephrology, Bahawalpur Victoria Hospital, Bahawalpur.

**Correspondence Address:**  
Dr. Raheel Khan  
Department of Medicine  
BV Hospital, Bahawalpur.  
[x\\_raheel@yahoo.com](mailto:x_raheel@yahoo.com)

**Article received on:** 15/09/2022  
**Accepted for publication:** 06/12/2022

planned to determine the frequency of medical complications after renal transplantation in recipients. The findings of this study were thought to give us some estimation about the burden of most common medical complications following renal transplant so that appropriate measures can be taken to reduce the burden of these medical complications.

## MATERIAL & METHODS

This prospective cohort study was conducted at Nephrology Unit, BV Hospital, Bahawalpur from December 2018 to March 2022. All patients undergoing renal transplant during the study period were included in this study. Patients unwilling to be part of this study or losing follow-ups were excluded. Approval from the "Institutional Ethical Committee" was obtained (1940/DME/QAMC/Bahawalpur). Informed as well as written consents were acquired from all study participants ensuring them the privacy of their data.

At the time of enrollment, all patients underwent pre-transplant work-up and routine investigations. Immunosuppression was initiated 24-hours prior to surgery among all study participants. The 1<sup>st</sup> dose of calcineurin inhibitor was administered 24-hours prior to surgery. Post-transplantation, all patients were shifted to intensive care unit (ICU) where vital signs, intake/output, lab-investigations and standard treatment protocols were observed. Patients were discharged once they were judged fit while initial follow-ups were advised twice a week for the first month. Later on, patients were advised to have a weekly follow-up plan for the next month, afterwards, monthly follow-ups were advised. Data of patients losing follow-up until the end of the study period was excluded from the final analysis. A special proforma was designed to record all study information.

For data analysis, "Statistical Package for Social Sciences (SPSS), version 26.00 was employed. Descriptive statistics were applied to represent data. Qualitative variables were shown as frequencies and percentages while quantitative variables were highlighted as mean and standard deviation.

## RESULTS

A total of 47 renal transplants were performed during the study period. There were 8 patients who lost follow-ups so the final analysis included data of 39 live donor recipients of renal transplant.

In a total of 39 renal transplant recipients, 32 (82.1%) were male while the mean age was  $30.31 \pm 7.21$  years (ranging between 16-48 years). The mean BMI was noted to be  $22.36 \pm 3.32$  kg/m<sup>2</sup> (ranging between 16.0 to 31.1 kg/m<sup>2</sup>). Mean duration of dialysis before transplantation was recorded to be  $6.81 \pm 5.15$  months (ranging between 0-24 months). Table-I is showing baseline characteristics of patients.

Mean age of the live donors was  $35.90 \pm 9.36$  years while 17 (43.6%) donors were aged between 31-40 years. Human leukocyte antigen (HLA) typing was identical in 22 (56.4%) donors. Table-II is showing donors characteristics.

Post renal transplant, induction therapy with ATG was given to 5 (12.8%) patients. Anti-metabolite agents were used azathioprine (AZA) and mycophenolate mofetil (MMF) in 22 (56.4%) and 17 (43.6%) patients respectively. In terms of calcineurin inhibitor agents, cyclosporin and tacrolimus were administered in 26 (66.7%) and 13 (33.3%) patients respectively. Mean duration of follow up was  $26.15 \pm 11.62$  months. Renal graft dysfunction was reported in 10 (25.6%) patients while acute rejection observed in 6 (15.4%) and chronic allograft nephropathy noted in 4 (10.3%) patients. Most common medical complications reported in post-transplantation period were sepsis 19 (48.7%), anemia 19 (48.7%), secondary polycythemia 10 (25.6%), CMV infection 4 (10.3%) and new onset diabetes mellitus 3 (7.7%). Mortality was reported in 2 (5.1%) renal transplant recipients and the cause of mortality in both those patients was sepsis. Figure-1 is showing frequency of most common medical complications reported in the renal transplant recipients.

Distribution of gender with respect to medical complications is shown in table-3 and it was found that sepsis (40.6% in males vs. 85.7% in

females,  $p=0.031$ ) and anemia (40.6% in males vs. 85.7% in females,  $p=0.031$ ) were significantly more common in females while all remaining medical complications did not have any significant relationship with the gender distribution.

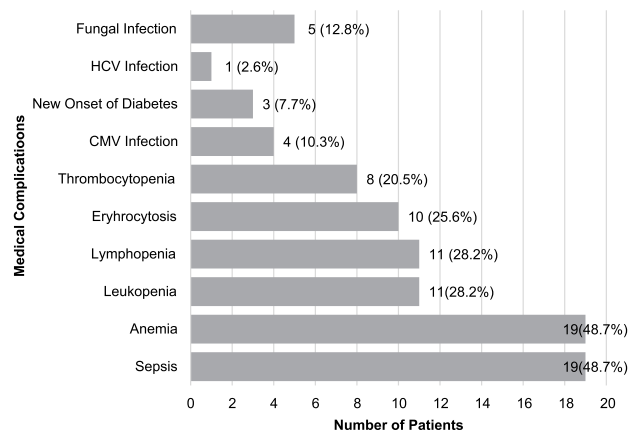
Table-IV is showing association of induction therapy with AGE with respect to hematological medical complications and it was found that significant association of induction therapy with ATG was found with thrombocytopenia ( $p=0.019$ ).

Characteristics		Frequency (%)
Gender	Male	32 (82.1%)
	Female	7 (17.9%)
Age Groups (years)	16-30	22 (56.4%)
	31-45	16 (41.0%)
	>45	1 (2.6%)
BMI (kg/m <sup>2</sup> )	<23	23 (59.0%)
	23-25	6 (15.4%)
	>25	10 (25.6%)
Causes of ESRD	Unknown	30 (76.9%)
	Glomerulonephritis	1 (2.6%)
	Pyelonephritis	6 (15.4%)
	Others	2 (5.1%)
Duration of Dialysis before Renal Transplant (months)	<6	16 (41.0%)
	6-12	22 (56.4%)
	>12	1 (2.6%)
Blood Group	A	7 (17.9%)
	B	22 (56.4%)
	O	5 (12.8%)
	AB	5 (12.8%)
Hepatitis C Virus Infection		4 (10.3%)

**Table-I. Baseline characteristics of renal transplant recipient patients (n=39)**

Donors Characteristics		Frequency (%)
Gender	Male	16 (41.0%)
	Female	23 (59.0%)
Age Groups (years)	21-30	13 (33.3%)
	31-40	17 (43.6%)
	41-50	7 (17.9%)
	>50	2 (5.1%)
Human leukocyte antigen (HLA) typing	Identical	22 (56.4%)
	Non-Identical	17 (43.6%)

**Table-II. Donors characteristics (n=39)**



**Figure-1. Frequency of medical complications in the renal transplant recipients (n=39)**

Medical Complications	Male (n=32)	Female (n=7)	P-Value
Sepsis	13 (40.6%)	6 (85.7%)	0.031
Anemia	13 (40.6%)	6 (85.7%)	0.031
Leukopenia	8 (25.0%)	3 (42.9%)	0.342
Lymphopenia	8 (25.0%)	3 (42.9%)	0.342
Erythrocytosis	8 (25.0%)	2 (28.6%)	0.845
Thrombocytopenia	5 (15.6%)	3 (42.9%)	0.106
CMV Infection	3 (9.4%)	1 (14.3%)	0.698
New Onset of Diabetes	3 (9.4%)	-	0.399
HCV Infection	1 (3.1%)	-	0.636
Fungal Infection	5 (15.6%)	-	0.263

**Table-III. Distribution gender with respect to medical complication (N =39)**

Hematological Medical Complications	Induction Therapy with ATG		P-Value
	Yes (n=5)	No (n=34)	
Anemia	4 (80.0%)	15(44.1%)	0.134
Erythrocytosis	1 (20.0%)	9 (26.5%)	0.757
Leukopenia	3 (60.0%)	8 (23.5%)	0.091
Lymphopenia	3 (60.0%)	8 (23.5%)	0.091
Thrombocytopenia	3 (60.0%)	5 (14.7%)	0.019

**Table-IV. Association of induction therapy with ATG with regards to hematological medical complications (N=39)**

## DISCUSSION

Most of the data about the outcomes of renal transplant recipients is through retrospective analysis or single center studies. There is a need for the long term follow up data about the most

common post renal transplant complications especially from developing countries where resource constraints in terms of healthcare facilities and human resource exist.

In this study, mean age of the renal transplant recipients was  $30.31 \pm 7.21$  years while for donors, it was  $35.90 \pm 9.36$  years. The contemporary literature reports that there is a gradual shift towards older age groups among renal transplant recipients as well donors in the developed world<sup>13</sup> but local data shows that most of the renal transplant recipients are from the age groups between 30-35 years so our findings are similar to what has been reported previously from the developing regions of the world.<sup>14-17</sup>

Majority of the renal transplant recipients (82.1%) were male in this study while 59.0% live kidney donors were females. Data from the developed countries like USA and UK reports male gender to have predominance among cases undergoing renal transplant or hemodialysis.<sup>18</sup> Our findings in terms of clear male predominance among renal transplant recipients is similar to what has been reported locally in the past where male to female ratio of 6:1 was reported for renal transplant recipients.<sup>19</sup> Data from India reports male to female ratio of 8:1 which is again near to what we found in our set of patients undergoing renal transplant.<sup>17</sup> Economic and social factors could be the reasons behind this male predominance among renal transplant recipients whereas females being the most kind and courteous in the family forms the majority when it comes to live kidney donations in our society.

In this study, HLA typing was non-identical among 43.6% donors. Data reports that live donation antigen mismatching does not impact renal transplant outcomes so no issues with the higher proportion of donors with HLA typing mismatch in this study.<sup>20,21</sup> We found that acute rejection of renal allograft was reported in 15.4% renal transplant recipients. The risk of acute rejection has been decreasing in the past couple of decades among renal transplant recipients and literature reports in burden to be around 10% in the recent decades.<sup>22</sup> A local study reported

in 2018 reported incidence of acute rejection in 12.7% cases of renal transplant which is somewhat closer to what we observed.<sup>19</sup>

Most common medical complications reported in post-transplantation period were sepsis 19 (48.7%), anemia 19(48.7%), secondary polycythemia 10 (25.6%), CMV infection 4 (10.3%) and new onset diabetes mellitus 3 (7.7%). Infections are considered to be the most prevalent and important post renal transplant complications.<sup>23</sup> Retrospective study by Schachtner et al reported 10.4% of their renal transplant recipients to have sepsis, out of which, 30% developed severe sepsis while 27% of those cases died due to sepsis.<sup>24</sup> Local study had reported frequency of sepsis among renal transplant recipients to be 14.3%<sup>19</sup> which is less than what we observed while international data reports this to be 10.4%.<sup>18</sup> Anemia is considered to be a common medical complication among renal transplant recipients and it was reported in 48.7% of our patients. Other researches have reported frequency of anemia among similar set of patients to be 39.7%<sup>25</sup> while some others have reported this to be 17.8%.<sup>19</sup> The CMV infection is another commonly observed post renal transplant complication and this was noted to be present in 10.3% patients in this study. The prevalence CMV infection used to be around 20% among renal transplant recipients but as recent decades have seen lots of improvement in the preventive strategies for CMV infections, its burden has decreased to be around 5% among renal transplant recipients.<sup>26,27</sup>

In the present study, we observed 25.6% renal transplant recipients to have erythrocytosis. The literature reports the frequency of post renal transplant erythrocytosis to be ranging between 10-15% while local data reported this frequency to be 20%.<sup>28,29</sup> We initially managed all these cases ARBs or ACE inhibitors and if there was no response venesection was done.

#### LIMITATIONS OF THE STUDY

Being a single center study conducted on a relatively small sample size, our findings cannot be generalized. Nearly 17% of the patients lose



follow ups in our study so were excluded in the final analysis, these cases could have impacted the findings of this study but we were unsure about the reasons of missing those cases.

## CONCLUSION

Medical complications are common after renal transplantation. Sepsis being more common in 1<sup>st</sup> 6-months post-transplant period. Early recognition and management of these complications is essential for decreasing mortality and morbidity of patients.




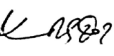

Copyright© 06 Dec, 2022.

## REFERENCES

1. Tan SY, Merchant J. **Joseph Murray (1919-2012): First transplant surgeon.** Singapore Med J. 2019 Apr; 60(4):162-163. doi: 10.11622/smedj.2019032
2. Rizvi SA, Anwar NSA, Zafar MN, Hussain Z, Hashmi A, Akhtar F, et al. **Pakistan abolishes kidney market and ushers in a new era of ethical transplantation.** Int J Organ Transplant Med. 2010; 1(4):193-7.
3. Jain D, Haddad DB, Goel N. **Choice of dialysis modality prior to kidney transplantation: Does it matter?** World J Nephrol. 2019 Jan 21; 8(1):1-10. doi: 10.5527/wjn.v8.i1.1
4. Schnuelle P, Lorenz DG, Trede M, Van Der Woude FJ. **Impact of renal cadaveric transplantation on survival in end stage renal failure: evidence for reduced mortality risk compared with hemodialysis during long-term follow-up.** J Am Soc Nephrol. 1998; 9(11):2135-41.
5. Port FK, Wolfe RA, Mauger EA, Berling DP, Jiang K. **Comparison of survival probabilities for dialysis patients vs cadaveric renal transplant recipients.** JAMA 1993; 270(11):1339-43.
6. Wolfe RA, Ashby VB, Milford EL, Ojo AO, Ettenger RE, Agodoa LY, et al. **Comparison of mortality in all patients on dialysis, patients on dialysis awaiting transplantation, and recipients of a first cadaveric transplant.** N Engl J Med. 1999; 341(23):1725-30.
7. Heldal K, Midtvedt K, Lønning K, Iversen T, Hernæs KH, Tsarpali V, Reisæter AV, Bernklev T. **Kidney transplantation: An attractive and cost-effective alternative for older patients? A cost-utility study.** Clin Kidney J. 2019 Feb 28; 12(6):888-894. doi: 10.1093/cjk/sfz018
8. YaghoubiFard S, Goudarzi R, Etmnan A, Baneshi M, Barouni M, Jafari Sirizi M. **Cost-effectiveness analysis of dialysis and kidney transplant in patients with renal impairment using disability adjusted life years in Iran.** Med J Islam Repub Iran. 2016 Jun 28; 30:390.
9. Reyna-Sepúlveda F, Ponce-Escobedo A, Guevara-Charles A, Escobedo-Villarreal M, Pérez-Rodríguez E, Muñoz-Maldonado G, et al. **Outcomes and surgical complications in kidney transplantation.** Int J Organ Transplant Med. 2017; 8(2):78-84.
10. Levine MA, Schuler T, Gourishankar S. **Complications in the 90-day postoperative period following kidney transplant and the relationship of the Charlson Comorbidity Index.** Can Urol Assoc J. 2017 Dec; 11(12):388-393. doi: 10.5489/cuaj.4378
11. Pencheva VP, Petrova DS, Genov DK, Georgiev OB. **Risk factors for lung diseases after renal transplantation.** J Res Med Sci. 2015 Dec; 20(12):1127-32. doi: 10.4103/1735-1995.172978
12. Lentine KL, Lam NN, Axelrod D, Schnitzler MA, Garg AX, Xiao H, Dzebisashvili N, Schold JD, Brennan DC, Randall H, King EA, Segev DL. **Perioperative complications after living kidney donation: A national study.** Am J Transplant. 2016 Jun; 16(6):1848-57. doi: 10.1111/ajt.13687
13. Knoll G. **Trends in kidney transplantation over the pastdecade.** Drugs 2008; 68(l):3-10.
14. Ayub S, Zafar MN, Aziz T, Iqbal T, Khan S, Rizvi SA. **Evaluation of renal function by cystatin C inrenal transplant recipients.** Exp Clin Transplant2014; 12(1):37-40.
15. Yunus M, Aziz T, Mubarak M. **Posttransplant malignanciesin renal transplant recipients: 22-years experience from a single center in Pakistan.** Asian Pac J CancerPrev 2012; 13(2):575-8.
16. Ali AA, Al-Saedi AJ, Al-Mudhaffer AJ, Al-Tae KH. **Fiveyears renal transplantation data: Single-center experiencefrom Iraq.** Saudi J Kidney Dis Transpl 2016; 27(2):341-7.
17. Prakash J, Ghosh B, Singh S, Soni A, Rathore SS. **Causes ofdeath in renal transplant recipients with functioning allograft.** Indian J Nephrol 2012; 22(4):264-8.
18. Jindal RM, Ryan JJ, Sajjad I, Murthy MH, Baines LS. **Kidney transplantation and gender disparity.** Am J Nephrol 2005; 25(5):474-83.

19. Baig ZF, Siddiqui UA, Mahmood A, Sabir H, Tareen TB. **Medical complications of renal transplant – 2 years' experience at armed forces institute of urology.** J Ayub Med Coll Abbottabad 2018; 30(3):345–50.
20. Tuncer M, Gurkan A, Erdogan O, Yucetin L, Dmirbas A. **Lack of impact of human leukocyte antigen matching in living donor kidney transplantation.** Experience at Akedeniz University. Transplant Proc 2005; 37(7):2969–72.
21. Lee HS, Kim MS, Kim YS, Joo MK, Kim SJ, Kim SI, et al. **Analysis of transplant outcomes after five or six human leukocyte antigen-mismatched living donor kidney transplantation.** Transplant Proc 2012; 44(1):273–5.
22. Hamida FB, Barbouch S, Bardi R, Helal I, Kaaroud H, Fatma LB, et al. **Acute rejection episodes after kidney transplantation.** Saudi J Kidney Dis Transpl 2009; 20(3):370–4.
23. Shah PR, Kute VB, Gumber MR, Patel HV, Vanikar AV, Trivedi HL. **Post-transplant infections.** Indian J Nephrol. 2012 May; 22(3):228-9. doi: 10.4103/0971-4065.98775
24. Schachtner T, Reinke P. **Severe sepsis after renal transplantation: The importance of HLA-B matching.** Am J Transplant 2013; 13:319.
25. Sunder Plassmann G. **Anemia and iron deficiencies among long term renal transplant recipients.** J Am Soc Nephrol 2002; 13(3):794–7.
26. Cordero E, Casasola C, Ecarma R, Danguilan R. **Cytomegalovirus disease in kidney transplant recipients: Incidence, clinical profile, and risk factors.** Transplant Proc 2012; 44(3):694–700.
27. Khoury JA, Storrch GA, Bhol DL, Schuessler RM, Torrence SM, Lockwood M, et al. **Prophylactic versus preemptive oral valganciclovir for management of cytomegalovirus infection in adult renal transplant recipients.** Am J Transplant. 2006; 6(9):2134–43.
28. Vlahakos DV, Marathias KP, Aqroyannis B, Madias NE. **Posttransplant erythrocytosis.** Kidney Int. 2003; 63(4):1187–94.
29. Ahmed S, Ahmed E, Naqvi R, Qureshi S. **Evaluation of contributing factors of post transplant erythrocytosis in renal transplant patients.** J Pak Med Assoc. 2012; 62(12):1326–9.

### AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Raheel Khan	Conception & design, acquisition of data, analysis & interpretation of data, Drafting the article, Revising it critically for important intellectual content.	
2	Suhail Iqbal Malik	Conception & design, acquisition of data, analysis & interpretation of data, Drafting the article.	
3	Shoaib Manzoor	Drafting the article, Revising it critically for important intellectual content.	
4	Qazi Masroor Ali	Drafting the article, Revising it critically for important intellectual content.	
5	Junaid Sarwar	Conception & design, acquisition of data, analysis & interpretation of data, Drafting the article.	
6	Muhammad Tahir Riaz	Conception & design, acquisition of data, analysis & interpretation of data, Drafting the article.	