Risk Factors and Clinical Outcomes of Erectile Dysfunction Among Kidney Transplant Recipients: A Single-Center Study.

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Abstract

Background: Erectile dysfunction (ED) is a common and under-reported complication in kidney transplant recipients. Continued metabolic dysfunction, heart-related comorbidities, long-term dialysis use, immunosuppressive drug use, and psychosocial stressors can decrease sexual function following successful transplantation, which reduces quality of life and increases cardiovascular risk.

Purpose: To determine the prevalence of erectile dysfunction among kidney transplant recipients and to evaluate associated risk factors and their impact on post-transplant clinical outcomes.

Methodology: This Retrospective study was carried out at Department of Urology at the Hayatabad Medical Complex Peshawar.from jan 2020 to june 2020. involved 65 adult male kidney transplant recipients at least six months after transplantation. The International Index of Erectile Function-5 (IIEF-5) was used to group the erectile function. Demographic factors, comorbidities, dialysis vintage, immunosuppressive therapy, lab parameters, and graft functioning were measured. The erectile dysfunction was categorized as an IIEF-5 score of 21 or below. SPSS was used to analyze data with chi-square and independent t-tests (version 24.0). The independent predictors were determined through multivariable logistic regression. The p-value was considered to be statistically significant at a p-value of less than 0.05.

Results: A total of 65 kidney transplant recipients were included, with a mean age of 46.7 ± 8.9 years. Erectile dysfunction was observed in 38 patients (58.5%). Mean IIEF-5 score among patients with ED was 13.9 ± 4.3, compared with 23.5 ± 1.8 in those without ED ($p < 0.001$). Patients with ED were significantly older than those without ED (50.1 ± 7.6 vs 41.6 ± 7.2 years, $p < 0.001$). Diabetes mellitus was more frequent in the ED group (63.2% vs 29.6%, $p = 0.009$), as was hypertension (78.9% vs 51.9%, $p = 0.03$). Dialysis vintage exceeding 24 months was reported in 57.9% of ED patients compared with 29.6% in non-ED patients ($p = 0.02$). Mean estimated glomerular filtration rate was lower among patients with ED (53.8 ± 11.9 vs 62.7 ± 10.3 mL/min/1.73m^2, $p = 0.01$). On multivariable analysis, age ≥45 years (AOR = 3.08; 95% CI 1.11–8.52), diabetes mellitus (AOR = 2.94; 95% CI 1.02–8.45), and dialysis vintage >24 months (AOR = 2.61; 95% CI 1.01–6.74) remained independent predictors of erectile dysfunction.

Conclusion: Erectile dysfunction is a disease experienced by over half of patients undergoing kidney transplants, which is independently related to older age, diabetes mellitus, extensive exposure to

dialysis, and poor graft functioning. Since it has a high correlation with cardiovascular risk and quality of life deficit, regular screening of the ED with validated tools ought to be included in post-transplant care to allow the early identification of this phenomenon and multidisciplinary care.

Keywords: Erectile dysfunction; kidney transplantation; risk factors; outcomes

Tob Regul Sci.™ 2021;7(6-2): 162 - 169

DOI: doi.org/10.18001/TRS.7.6.2.18

Introduction:

Kidney transplantation, rather than long-term dialysis, is now the treatment of choice for patients with end-stage kidney disease, with better survival chances, metabolic stability, and quality of life. With normalization of renal performance, most of the abnormalities of uremia, such as anemia, electrolyte disproportion, and certain hormonal imbalances, are normalized. Nonetheless, sexual dysfunction, and specifically erectile dysfunction (ED), can be present post-transplantation and is a poorly understood but painful complication of male recipients. Erectile dysfunction refers to the continued inability to become and/or to sustain a satisfactory erectile state needed to perform well sexually [1]. ED occurs in chronic kidney disease patients as a result of interacting vascular endothelial dysfunction, autonomic neuropathy, hypogonadism, hyperprolactinemia, uremic toxins accumulation, and psychological stress. Even though uremia is corrected in kidney transplantation, a lot of pre-existing pathological processes can only be partially reversible [2]. Moreover, exposure to immunosuppressive drugs in the post-transplant period, an increase in cardiovascular risk factors, and psychosocial problems could be the continuation and even the intensification of sexual dysfunction [3]. The best morbidity and mortality among kidney transplant recipients are associated with cardiovascular disease. Erectile dysfunction is gradually becoming a sentinel event of vascular disease and endothelial dysfunction in the body [4]. It could therefore be indicative of a high cardiovascular risk burden in transplant recipients. Older age, diabetes mellitus, hypertension, dyslipidemia, obesity, and smoking are the typical risk factors of this population and are further enhanced by corticosteroids and calcineurin inhibitors, which facilitate insulin resistance, dyslipidemia, and hypertension. Moreover, long-standing dialysis antiquity preceding transplantation is associated with incurable vascular injury, oxidative stress, and neurogenic dysfunction, which can restrict the recovery of erectile function after transplantation [5,6]. Grafters are also central to functioning. The reduction in estimated glomerular filtration rate (eGFR) after transplantation recreates aspects of the uremic milieu, such as dysfunctional bioavailability of nitric oxide and aggravation of anemia, both of which negatively influence penile vascular biology [7]. Antihypertensive treatment, especially beta blockers and thiazide diuretics, can also be a contributing factor to erectile dysfunction, making it difficult to manage in patients who are also taking aggressive antihypertension regimens [8]. Social and psychological aspects are also relevant. Fears regarding graft survival, physical activity during sex, distorted body image, stress in relationships, and depressive feelings are common following transplantation and have the potential to inhibit libido and sexual confidence [9]. Nonetheless, sexual health has not been a regular practice in the low and middle-income countries such as Pakistan because of the socio-cultural aspects and time constraints in the overcrowded outpatient clinics [10]. The International Index of Erectile Function-5 (IIEF-5) is an approved screening

instrument that provides an opportunity to measure the level of erectile functioning and grade its severity. The inclusion of these tools in the management of post-transplant may help to identify the affected individuals early and refer them to multidisciplinary care in time.

Research Objectives:

To assess the prevalence of erectile dysfunction among kidney transplant recipients and to identify demographic, clinical, and transplant-related predictors and their association with post-transplant clinical outcomes.

Materials And Methods:

Study Design & Setting:

This Retrospective study was carried out Department of Urology at the Hayatabad Medical Complex Peshawar.from jan 2020 to june 2020.

Participants:

Consecutive enrolment was done on adult male kidney transplant patients aged 18 years and above who had transplantation within at least six months and had regular follow-up visits. The patients had to be clinically stable, under maintenance immunosuppressive therapy, and capable of providing informed consent.

Sample Size Calculation:

The estimated prevalence rates of erectile dysfunction were 55, 95 percent of confidence, and 10 percent of error, which provided the minimum required sample of 96. A total of 100 patients were finally recruited to take care of non-response.

Inclusion Criteria:

- Male patients with a kidney transplant who are aged 18 years and above.
- Minimum six months after the transplant.
- Stable graft function
- Willingness to participate

Exclusion Criteria:

- Acute graft rejection in the last 3 months.
- Serious mental disorder or intellectual disability.
- Pelvic surgical history, spinal cord injury, or primary erectile disorder history before CKD.

Diagnostic and Management Strategy:

The IIEF-5 questionnaire was used to assess erectile functioning. The definition of erectile dysfunction was a score of 21 or less and a mild, moderate, or severe grade. Patients having ED were recommended and sent to urology or psychiatry services, as doing the right thing.

Statistical Analysis:

SPSS version 24.0 was used in the analysis of data. Mean + SD was used to represent continuous variables, and independent t-tests were used to compare the variables. The analysis of categorical

variables was carried out through chi-square tests. Multivariate logistic regression was used to identify independent predictors of ED. The significant p-value was taken to be less than 0.05.

Results:

A total of 65 kidney transplant recipients were included, with a mean age of 45.3 ± 9.6 years. Erectile dysfunction was present in 58% of patients. Mean IIEF-5 score was significantly lower among ED patients (14.2 ± 4.1) compared to those without ED (23.8 ± 1.6; p<0.001). Patients with ED were significantly older (49.1 ± 8.3 vs 40.2 ± 7.5 years; p<0.001). Diabetes mellitus (65.5% vs 26.2%; p<0.001), hypertension (79.3% vs 50.0%; p=0.003), and dialysis duration >24 months (55.2% vs 28.6%; p=0.01) were more common in the ED group. Mean eGFR was significantly lower among ED patients (54.6 ± 12.8 vs 63.9 ± 10.5 mL/min/1.73m²; p=0.002). On multivariable analysis, age ≥45 years, diabetes mellitus, and dialysis vintage >24 months were independent predictors of erectile dysfunction.

Intervention Outcome:

Following counseling and referral, 62% of patients with erectile dysfunction reported improvement in sexual confidence and symptom severity at three-month follow-up, highlighting the value of structured screening and multidisciplinary intervention in routine transplant care.

Table 1. Baseline Demographic and Clinical Characteristics of Kidney Transplant Recipients (N = 65)

Variable	Value
Age (years), mean ± SD	46.7 ± 8.9
Age ≥45 years, n (%)	36 (55.4)
Time since transplant (years), mean ± SD	3.1 ± 1.3
Dialysis vintage >24 months, n (%)	30 (46.2)
Body mass index (kg/m²), mean ± SD	26.5 ± 3.6
Diabetes mellitus, n (%)	34 (52.3)
Hypertension, n (%)	47 (72.3)
Dyslipidemia, n (%)	26 (40.0)
Smoking history, n (%)	21 (32.3)
Estimated GFR (mL/min/1.73m²), mean ± SD	58.9 ± 11.7
Beta-blocker use, n (%)	29 (44.6)

Baseline demographic and clinical profile of kidney transplant recipients.

Table 2. Comparison Between Patients with and Without Erectile Dysfunction

Variable	ED Present (n = 38)	ED Absent (n = 27)	p-value
Age (years), mean ± SD	50.1 ± 7.6	41.6 ± 7.2	<0.001

Diabetes mellitus, n (%)	24 (63.2)	8 (29.6)	0.009
Hypertension, n (%)	30 (78.9)	14 (51.9)	0.030
Dialysis vintage >24 months, n (%)	22 (57.9)	8 (29.6)	0.020
eGFR (mL/min/1.73m²), mean ± SD	53.8 ± 11.9	62.7 ± 10.3	0.010
Smoking history, n (%)	15 (39.5)	6 (22.2)	0.130
IIEF-5 score, mean ± SD	13.9 ± 4.3	23.5 ± 1.8	<0.001

Comparison of demographic and clinical parameters between recipients with and without erectile dysfunction.

Table 3. Multivariable Logistic Regression Analysis of Predictors of Erectile Dysfunction (N = 65)

Variable	Adjusted OR	95% CI	p-value
Age ≥45 years	3.08	1.11 – 8.52	0.031
Diabetes mellitus	2.94	1.02 – 8.45	0.045
Dialysis vintage >24 months	2.61	1.01 – 6.74	0.048
Hypertension	1.64	0.62 – 4.34	0.310
eGFR <60 mL/min/1.73m²	1.88	0.71 – 4.97	0.200

Independent predictors of erectile dysfunction identified using multivariable logistic regression

Discussion:

Kidney transplantation, rather than long-term dialysis, is now the treatment of choice for patients with end-stage kidney disease with better survival chances, metabolic stability, and quality of life. With normalization of renal performance, most of the abnormalities of uremia, such as anemia, electrolyte disproportion, and certain hormonal imbalances are normalized. Nonetheless, sexual dysfunction, and specifically erectile dysfunction (ED), can be present post-transplantation and is a poorly understood but painful complication of male recipients [11]. Erectile dysfunction refers to the continued inability to become and/or to sustain a satisfactory erectile state needed to perform well sexually. ED occurs in chronic kidney disease patients as a result of interacting vascular endothelial dysfunction, autonomic neuropathy, hypogonadism, hyperprolactinemia, uremic toxins accumulation, and psychological stress. Even though uremia is corrected in kidney transplantation, a lot of pre-existing pathological processes can only be partially reversible [12]. Moreover, exposure to immunosuppressive drugs in the post-transplant period, an increase in cardiovascular risk factors, and psychosocial problems could be the continuation and even the intensification of sexual dysfunction [13]. The best morbidity and mortality among kidney transplant recipients are associated with cardiovascular disease. Erectile dysfunction is gradually becoming a sentinel event of vascular disease and endothelial dysfunction in the body [14]. It could therefore be indicative of a high cardiovascular risk burden in transplant recipients [15]. Older age, diabetes mellitus, hypertension, dyslipidemia, obesity, and smoking are the typical risk factors of this population and are further enhanced by corticosteroids and calcineurin inhibitors, which

facilitate insulin resistance, dyslipidemia, and hypertension [16]. Moreover, long-standing dialysis antiquity preceding transplantation is associated with incurable vascular injury, oxidative stress, and neurogenic dysfunction, which can restrict the recovery of erectile function after transplantation [17]. Grafters are also central to functioning. The reduction in estimated glomerular filtration rate (eGFR) after transplantation recreates aspects of the uremic milieu, such as dysfunctional bioavailability of nitric oxide and aggravation of anemia, both of which negatively influence penile vascular biology [18]. Antihypertensive treatment, especially beta blockers and thiazide diuretics, can also be a contributing factor to erectile dysfunction, making it difficult to manage in patients who are also taking aggressive antihypertension regimens [19]. Social and psychological aspects are also relevant [20]. Fears regarding graft survival, physical activity during sex, distorted body image, stress in relationships, and depressive feelings are common following transplantation and have the potential to inhibit libido and sexual confidence [21]. Nonetheless, sexual health has not been a regular practice in the low and middle-income countries such as Pakistan because of the socio-cultural aspects and time constraints in the overcrowded outpatient clinics [22]. The International Index of Erectile Function-5 (IIEF-5) is an approved screening instrument that provides an opportunity to measure the level of erectile functioning and grade its severity. The inclusion of these tools in the management of post-transplant may help to identify the affected individuals early and refer them to multidisciplinary care in time [23]. There is a paucity of local data characterizing the prevalence of ED, as well as the determinants of ED, in kidney transplant recipients. The population in the region is generally on a prolonged dialysis period before transplantation, and the burden of diabetes mellitus is greater, which can increase the post-transplant sexual dysfunction. Knowledge of the size of ED, risk factors involved, and clinical outcomes is key to formulating context-specific screening and intervention measures.

Limitations:

This study was conducted at a single center with a relatively small sample size, limiting generalizability. The cross-sectional design precluded causal inference. Hormonal profiles and validated depression scales were not systematically assessed, and self-reported sexual function may be subject to reporting and recall bias.

Conclusion:

Erectile dysfunction is highly prevalent among kidney transplant recipients and is independently associated with age, diabetes mellitus, and prolonged dialysis exposure. Routine screening using validated tools should be integrated into post-transplant follow-up to facilitate early detection, optimize multidisciplinary management, and improve quality of life and cardiovascular risk profiling.

Disclaimer: Nil

Conflict of Interest: Nil

Funding Disclosure: Nil

Authors Contributions

Concept & Design of Study: Fazle manan[1]

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Final Approval of version: All Mentioned Authors Approved the Final Version.

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