

Improvement of Erectile Dysfunction after Kidney Transplantation

The Role of the Associated Factors

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Introduction: The aim of this study was to evaluate erectile dysfunction (ED) in hemodialysis patients and the factors influencing ED after a successful kidney transplantation.

Materials and Methods: A total of 64 patients on hemodialysis were evaluated before and 6 months after the kidney transplantation. They were all recipients of their first kidney allografts from living unrelated donors and had a functional kidney allograft during the follow-up. The 5-item version of the International Index of Erectile Function (IIEF-5) was used to assess their erectile function. A group of age-matched controls were compared with them before transplantation. The effects of pretransplant IIEF-5 score, age at transplantation, the artery used for anastomosis, and duration of the dialysis prior to transplantation on ED were also studied.

Results: Fifty-six of the patients (87.5%) and 23 of the controls (35.9%) had ED ($P < .001$). The prevalence of ED was 87.5% in the hemodialysis patients. There was no relationship between the duration of dialysis and the severity of ED. Successful transplantation improved IIEF-5 score significantly (13.6 ± 5.2 before and 19.2 ± 5.0 after transplantation; $P < .001$). Based on the IIEF-5 scores, the severity of ED increased in 6 (9.4%) patients; 8 (12.5%) experienced no change in their erectile function; and 50 (78.1%) reported an improved erectile function. Preoperative IIEF-5 score and age at transplantation had statistically significant associations with ED improvement ($P < .001$; $P = .02$).

Conclusion: Erectile dysfunction is highly prevalent in hemodialysis patients and significantly improves after successful kidney transplantation. Younger patients with a less severe ED have the most improvement after transplantation.

Keywords: impotence, kidney transplantation, erectile dysfunction, hemodialysis

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INTRODUCTION

Erectile dysfunction (ED) is a major health issue in modern life and is often underdiagnosed and underestimated due to the patient's embarrassment and the physician's unawareness about its high prevalence and impact on the quality of life.^(1,2) The prevalence of ED in 40- to 70-year-old men was about 52% in

Massachusetts Male Aging Study.⁽¹⁾

End-stage renal disease (ESRD) is a chronic disease which is frequently associated with ED. The high prevalence of ED in ESRD is multifactorial; it is due to the comorbid conditions that frequently accompany ESRD (eg, diabetes mellitus, hypertension, atherosclerosis,

heart disease, etc), neurogenic disorders, hormonal imbalance, metabolic abnormalities, drugs side effects, and psychogenic factors.⁽¹⁻¹⁴⁾ The prevalence of ED in hemodialysis patients is reported to be up to 82%.⁽⁵⁾ Although several studies have shown significant improvement in ED after a successful kidney transplantation,^(3,4,7,15,16) some other studies reported minimal effect of transplantation on the status of ED.^(12,17-19) The present study was planned to assess the effect of kidney transplantation on ED in ESRD patients and determine the influential factors on ED improvement after transplantation.

MATERIALS AND METHODS

This prospective study was conducted between September 2002 and November 2005. During this period, 270 patients who were on hemodialysis for at least 6 months underwent kidney transplantation. We selected 80 patients and excluded the others (group 1). The exclusion criteria were age less than 20 years, diabetes mellitus, history of ischemic heart disease, hypercholesterolemia, history of pelvic trauma or prostate surgery, presence of penile deformities, cigarette smoking, an uncontrolled major medical illness, previous kidney transplantation, and the use of medications with significant adverse effects on erectile function. The ethics committee of Tehran University of Medical Sciences approved our study. A written consent was taken from all patients. All patients received the kidneys from living unrelated donors and were on a same regimen of immunosuppressive drugs. Renal arteries of the graft were anastomosed to the internal and external iliac arteries and common iliac artery in 45 (56.3%), 11 (13.7%), and 8 (10%) patients, respectively. They were followed for 6 months. Of 80 eligible kidney recipients, 64 (80%) completed the study protocol. During the study, 4 cases of death (5%) and 5 cases of suboptimal graft function (6.3%) were reported. Seven patients (8.7%) did not return for follow-up.

Erectile function of the patients was assessed by the 5-item version of the International Index of Erectile Function (IIEF-5) before and 6 months after kidney transplantation.⁽²⁰⁾ According to the IIEF-5 scores, ED was classified into 4 groups of mild (17 to 21), mild to moderate (12 to 16), moderate (8 to 11), and severe (5 to 7).⁽²⁰⁾

IIEF-5 in detail available from:

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A control group was selected (group 2), consisting of age-matched patients who referred to the outpatient clinics for neither ED nor kidney function impairment (none of them had any of the exclusion criteria). They were assessed using IIEF-5. All questionnaires were completed by a single physician.

The IIEF-5 scores of the patients before transplantation were compared with the scores after transplantation and with those of the control group, using paired *t* test and *t* test, respectively. Also, the effect of the pretransplant IIEF-5 score, age at transplantation, the artery used for anastomosis, and duration of the dialysis prior to transplantation on ED was assessed using chi-square test and Mann-Whitney test. A *P* value less than .05 was considered significant.

RESULTS

A total of 64 ESRD patients (group 1) and 64 controls (group 2) were studied. The mean age of the patients in group 1 was 42.3 ± 10.4 years (range, 23 to 63 years). They had been on hemodialysis for a mean time of 16.8 ± 18.7 months (range, 6 to 120 months). The mean age of the patients in group 2 was 42.7 ± 11.2 years (range, 24 to 64 years). Fifty-six of the patients in group 1 (87.5%) and 23 in group 2 (35.9%) had ED ($P < .001$). The mean IIEF-5 score was 13.6 ± 5.2 (range, 5 to 25) in group 1 before transplantation and 22.0 ± 2.8 (range, 8 to 25) in group 2 ($P < .001$). In group 1, mild to severe ED was present in 41 out of 49 men aged 50 years or younger (83.7%) and in all of the 15 patients older than 50 years (100%). There was no significant correlation between the score of IIEF-5 and the age in group 1 ($P = .10$). Also, duration of hemodialysis was not associated with the pretransplant IIEF scores ($P = .18$).

Six months after the successful kidney transplantation, the mean IIEF-5 score of the patients in group 1 increased to 19.2 ± 5.0 which was significantly higher than that before transplantation ($P < .001$). The degrees of ED before and after the operation are shown in Table. Based on the IIEF-5

Degree of ED in Controls and in Patients Before and After Kidney Transplantation*

Degree of ED	Kidney Transplant Patients		Controls
	Before Kidney Transplantation	After Kidney Transplantation	
No ED	8 (12.5)	26 (40.6)	41 (64.1)
Mild	11 (17.2)	18 (28.1)	22 (34.4)
Mild to Moderate	19 (29.7)	13 (20.3)	0
Moderate	19 (29.7)	5 (7.8)	1 (1.6)
Severe	7 (10.9)	2 (3.1)	0

*Values in parentheses are percents. ED indicates erectile dysfunction.

scores, the severity of ED increased in 6 (9.4%) patients; 8 (12.5%) experienced no change in their erectile function; and 50 (78.1%) reported an improved erectile function.

In an attempt to find the predictors of ED improvement after transplantation, factors including pretransplant IIEF-5 score, age at transplantation, the artery used for anastomosis, and duration of the dialysis prior to transplantation were evaluated. Pretransplant IIEF-5 score had a significant inverse association with improvement of erectile function ($P < .001$). Also, younger patients had a more significant ED improvement ($P = .02$). The artery used for anastomosis and duration of the dialysis prior to transplantation were not associated with ED improvement ($P = .93$; $P = .71$).

DISCUSSION

The effect of kidney transplantation on ED has been evaluated in several studies. In this prospective study, we assessed the effect of kidney transplantation on ED by evaluating a group of hemodialysis men before and after a successful transplantation. In different studies, the reported prevalence of ED in hemodialysis patients has been different. In a study by Rosas and colleagues, the prevalence of ED in hemodialysis patients was estimated to be 82%.⁽⁵⁾ Other investigators have found the prevalence of ED to be even lower in this group of patients.^(21,22) We observed a higher prevalence (87.5%). A total of 11% and 30% of the hemodialysis patients had severe and moderate ED while these numbers were reported to be 45% and 8% in the study of Rosas and colleagues.⁽⁵⁾ This may be due to the higher mean age of the participants in comparison with that in our study (59.5 years versus 42.3 years).

Compared to the pretransplant status, erectile function after the transplantation deteriorated,

remained without change, or improved in 9.41%, 12.5%, and 78.1% of the patients, respectively. There was a higher percentage of improvement in erectile function of our patients compared to the other studies. For example, in the study by El-Bahnasawy and associates, erectile function deteriorated, had no change, and improved in 12.5%, 43.5% and, 44% of the patients, respectively.⁽¹²⁾ In another study by the same author, these rates were 18%, 42%, and 40%, respectively.⁽²²⁾

The effect of the associated factors was also assessed. As anticipated, the lower was the pretransplant IIEF-5 score, the higher was the difference between the pretransplant and posttransplant scores. Also, the present study showed a significant association between the age and the probability of ED improvement in kidney transplant recipients. Although in some studies there was an association between the duration of the dialysis and the probability of the recovery from erectile dysfunction after the kidney transplantation,⁽¹¹⁻¹⁷⁾ no significant relationship was found between these two variables in our study. The ESRD patients in our country usually can enjoy transplantation before being on dialysis for a long time; thus, the duration of hemodialysis was relatively shorter in our study (16.8 months).

There are different opinions about the effect of the type of the artery used for anastomosis on the ED improvement. The major blood supply of the penis is derived from 2 penile arteries which are branches of the internal iliac arteries. Most surgeons prefer the internal iliac artery for anastomosis.⁽²³⁾ A crucial question is that how much is the risk of vasculogenic ED following end-to-end anastomosis of the internal iliac artery to the graft respecting the basic problems in hemodialysis patients such as severe atherosclerosis and vascular insufficiency? Its reported risk is 10%.⁽²⁴⁾ An interesting study by El-Bahnasawy and coworkers

demonstrated that after excluding most major vascular factors, interruption of the hypogastric artery had led to a significant decrease in arterial blood flow in the 2 cavernous arteries. However, none of the evaluated patients had penile arterial insufficiency (peak systolic velocity less than 30 cm/s). Unilateral ligation of the internal iliac artery is not harmful to erectile function if the contralateral artery is normal. They recommended the use of end-to-side anastomosis of the graft to the external iliac artery in patients with impaired pelvic blood flow to reduce the risk of vasculogenic ED.⁽²²⁾ After a second kidney transplant to the other internal iliac artery, the risk of vasculogenic ED is between 25% and 65%.^(23,25) Therefore, in contrast to Nghiem and colleagues who stated that the ligation of both internal iliac arteries does not necessarily mean pelvic devascularization (due to reestablishment of the collateral vessels within a few months),⁽²⁶⁾ we believe that it is better to use an artery other than the internal iliac artery in the second kidney transplantation. Although in our study, the best ED improvement was obtained with anastomosis to the external iliac artery, the results were not significantly different between the types of anastomosis.

CONCLUSION

Erectile dysfunction is an extremely common problem in hemodialysis patients and has a major negative effect on the quality of life in these patients. Also, many patients with ED will not seek treatment themselves. Thus, respecting the development of effective oral therapies for ED, discussions about this problem should be a part of the routine management of the patients on hemodialysis. Finally, ED improvement seems to be higher when the kidney transplantation is performed at lower ages.

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CONFLICT OF INTEREST

None declared.

REFERENCES

1. Feldman HA, Goldstein I, Hatzichristou DG, Krane RJ, McKinlay JB. Impotence and its medical and psychosocial correlates: results of the Massachusetts Male Aging Study. *J Urol*. 1994;151:54-61.
2. Rosas SE, Joffe M, Franklin E, et al. Association of decreased quality of life and erectile dysfunction in hemodialysis patients. *Kidney Int*. 2003;64:232-8.
3. Saha MT, Saha HH, Niskanen LK, Salmela KT, Pasternack AI. Time course of serum prolactin and sex hormones following successful renal transplantation. *Nephron*. 2002;92:735-7.
4. Akbari F, Alavi M, Esteghamati A, et al. Effect of renal transplantation on sperm quality and sex hormone levels. *BJU Int*. 2003;92:281-3.
5. Rosas SE, Joffe M, Franklin E, et al. Prevalence and determinants of erectile dysfunction in hemodialysis patients. *Kidney Int*. 2001;59:2259-66.
6. Milne JF, Golden JS, Fibus L. Sexual dysfunction in renal failure: a survey of chronic hemodialysis patients. *Int J Psychiatry Med*. 1977-1978;8:335-45.
7. Holdsworth SR, de Kretser DM, Atkins RC. A comparison of hemodialysis and transplantation in reversing the uremic disturbance of male reproductive function. *Clin Nephrol*. 1978;10:146-50.
8. Mahajan SK, Abbasi AA, Prasad AS, Rabbani P, Briggs WA, McDonald FD. Effect of oral zinc therapy on gonadal function in hemodialysis patients. A double-blind study. *Ann Intern Med*. 1982;97:357-61.
9. Grimm RH Jr, Grandits GA, Prineas RJ, et al. Long-term effects on sexual function of five antihypertensive drugs and nutritional hygienic treatment in hypertensive men and women. Treatment of Mild Hypertension Study (TOMHS) Hypertension. 1997;29:8-14.
10. Palmer BF. Sexual dysfunction in uremia. *J Am Soc Nephrol*. 1999;10:1381-8. Review.
11. Rebollo P, Ortega F, Valdes C, et al. Factors associated with erectile dysfunction in male kidney transplant recipients. *Int J Impot Res*. 2003;15:433-8.
12. El-Bahnasawy MS, El-Assmy A, El-Sawy E, et al. Critical evaluation of the factors influencing erectile function after renal transplantation. *Int J Impot Res*. 2004;16:521-6.
13. Wuerth D, Finkelstein SH, Ciarcia J, Peterson R, Kliger AS, Finkelstein FO. Identification and treatment of depression in a cohort of patients maintained on chronic peritoneal dialysis. *Am J Kidney Dis*. 2001;37:1011-7.
14. Rodger RS, Fletcher K, Dewar JH, et al. Prevalence and pathogenesis of impotence in one hundred uremic men. *Uremia Invest*. 1984- 1985;8:89-96.
15. Salvatierra O Jr, Fortmann JL, Belzer FO. Sexual function of males before and after renal transplantation. *Urology*. 1975;5:64-6.
16. Flechner SM, Novick AC, Braun WE, Popowniak KL, Steinmuller D. Functional capacity and rehabilitation of recipients with a functioning renal allograft for ten years or more. *Transplantation*. 1983;35:572-6.

17. Malavaud B, Rostaing L, Rischmann P, Sarramon JP, Durand D. High prevalence of erectile dysfunction after renal transplantation. *Transplantation*. 2000;69: 2121-4.
18. Diemont WL, Vrugink PA, Meuleman EJ, Doesburg WH, Lemmens WA, Berden JH. Sexual dysfunction after renal replacement therapy. *Am J Kidney Dis*. 2000;35:845-51.
19. Peskircioglu L, Tekin MI, Demirag A, Karakayali H, Ozkardes H. Evaluation of erectile function in renal transplant recipients. *Transplant Proc*. 1998;30:747-9.
20. Rosen RC, Cappelleri JC, Smith MD, Lipsky J, Pena BM. Development and evaluation of an abridged, 5-item version of the International Index of Erectile Function (IIEF-5) as a diagnostic tool for erectile dysfunction. *Int J Impot Res*. 1999;11:319-26.
21. Ali ME, Abdel-Hafez HZ, Mahran AM, et al. Erectile dysfunction in chronic renal failure patients undergoing hemodialysis in Egypt. *Int J Impot Res*. 2005;17:180-5.
22. El-Bahnasawy MS, El-Assmy A, Dawood A, et al. Effect of the use of internal iliac artery for renal transplantation on penile vascularity and erectile function: a prospective study. *J Urol*. 2004;172:2335-9.
23. Taylor RM. Impotence and the use of the internal iliac artery in renal transplantation: a survey of surgeons' attitudes in the United Kingdom and Ireland. *Transplantation*. 1998;65:745-6.
24. Hefty T. Complications of renal transplantation: the practicing urologist's role. AUA update series. Lesson 8, vol X. Linthicum, Md: American Urological Association; 1991.
25. Gittes RF, Waters WB. Sexual impotence: the overlooked complication of a second renal transplant. *J Urol*. 1979;121:719-20.
26. Nghiem DD, Corry RJ, Picon-Mendez G, Lee HM. Factors influencing male sexual impotence after renal transplantation. *Urology*. 1983;21:49-52.

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