ERECTILE DYSFUNCTION IN HAEMODIALYSIS PATIENTS

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Background and Objective: There is a very high prevalence of Erectile Dysfunction (ED) in dialysis patients. There is no as such available data on ED and factors affecting it in our patients. **Methods:** Analytical, cross-sectional, hospital based study conducted from January to March 2008, Haemodialysis unit of Shalimar and Mayo Hospital, Lahore. All male patients of end stage renal disease (ESRD) on maintenance haemodialysis therapy, whose spouses are alive and able to perform intercourse, were included in the study. Patient with cognitive and communication deficits were excluded from study. International index of erectile function-5 (IIEF-5), adopted in Urdu was used for the determination of prevalence of erectile function. Categorization of erectile dysfunction was done as mild, moderate and severe. Demographic data were collected and certain laboratory parameters (haemoglobin, haematocrit, urea, HBsAg and Anti HCV) were sent. **Results:** Total numbers of patient were fifty. Major cause of ESRD was diabetes mellitus 28 (56%). Most of the patients 33 (66%) have passed 10^{th} grade or they were under 10^{th} grade. Prevalence of ED was 86% with mean IIEF-5 score of 10.36±7.13. Majority of patients 33 (64.7%) were suffering from severe degree of ED. Factors responsible for ED are diabetes mellitus, age more than 50 year, high pre dialysis urea and Anti HCV positive patients. In this study, smoking, duration of dialysis and monthly spending is not related with ED. **Conclusion:** Majority of the patients suffering from ESRD, on maintenance haemodialysis are having ED. None of the patients suffering from ED were taking any treatment for it. Haemodialysis does not improve sexual dysfunction. Major factors responsible for ED are diabetes mellitus, age more than 50 years, high pre dialysis urea and Anti HCV positive patients.

Keywords: Haemodialysis, erectile dysfunction, diabetes mellitus, age, IIEF-5

INTRODUCTION

When patients develop chronic kidney disease, every organ of the body is affected including sexual function.[1–3] Sexual dysfunction includes erectile dysfunction, decreased libido and marked decrease in the frequency of intercourse. Amongst all sexual dysfunctions, erectile dysfunction is the most common in male dialysis patients. Erectile dysfunction (ED) is defined as the inability to attain and maintain an erection sufficient for satisfactory sexual performance, is associated with changes in quality of life. ED is present in up to 30 million men in the United States and approximately 100 million men worldwide.[4] Patients of chronic kidney disease have prevalence ranging from approximately 50 to over 90% within the group of patient having renal disease.[5,6] ED is caused by neurological, vascular, endocrinological, psychological, aging and certain medications. In Pakistan, due to paucity of indigenous data, the frequency of ED in dialysis patients is not known. So this cross-sectional study was conducted to check the prevalence of ED and factors affecting it in our centres.

MATERIALS AND METHODS

This study was conducted at haemodialysis unit of Shalimar Hospital and Mayo Hospital, Lahore. All male patients of end stage renal disease, who were on regular maintenance haemodialysis were included in the study from January to April 2008. Among males, only those patients were included who had alive spouses and able to perform sex. In traditional society of Pakistan, only marital sex is considered as an appropriate expression of sexuality. Patients of acute renal failure and with cognitive/communication deficits were excluded from the study. All patients were informed and consent about the study was taken. Each subject completed a self-administered 5-item validated questionnaire[7], the IIEF-5, adapted in Urdu[8], which is an abridged version of the 15-item International Index of Erectile Function[9]. We also compared intravaginal latency time in ESRD patients before and after the dialysis. On the basis of IIEF-5, categorisation of ED was done into mild (IIEF-5; 16–21), moderate (IIEF-5; 11–15) and severe (IIEF-5; <11). Data was analysed dividing the patients in to ED and Non ED groups. Demographic data was collected on a performa containing age, cause of ESRD, duration of dialysis, frequency of dialysis, history of smoking, education and financial status. At the same time pulse and blood pressure was checked and blood sample of these patients was drawn to measure haematological (haemoglobin) and biochemical parameters (urea, creatinine, sodium, potassium, calcium, phosphorus, calcium phosphorus product, albumin, HBsAg, Anti HCV).

Data was entered and analysed using SPSS 16.0. Mean±SD is given for normally distributed quantitative variables. Frequencies and percentages are given for qualitative variables. Independent sample *t*-test

is applied to observe group mean differences. Pearson Chi square and Fisher exact test was applied to observe correlations in qualitative variables. A $p<0.05$ was considered statistically significant.

RESULTS

In this study total number of patients was 50, who were male; their wives were alive and able to perform intercourse. Mean duration of the dialysis was 16±14.49 month with range of 3–60 months. Main cause of ESRD was Diabetes Mellitus 28 (56%) and Hypertension 14 (28%). Most of the patients 33 (66%) have passed 10th grade or they were under 10th grade. Majority of the patient were HBsAg and anti HCV negative. Forty percents patients were getting twice weekly dialysis. Prevalence of ED was 86% with mean IIEF-5 was 10.36±7.136. Most of the patients 33 (64.7%) were in sever category of ED and 10 patients (19.6%) were in mild to moderate degree of ED. Only 7 (15.7%) patients were normal. In this study, patients who were Anti HCV positive were having statistically significant ED than Anti HCV negative patients. In this study, smoking, duration of dialysis and monthly spending is not related with ED.

Table-1: Demographic data of dialysis patients

Parameter		n (%)
Cause of ESRD	Diabetes Mellitus	28 (56)
	Hypertension	14 (28)
	Other Causes	8 (16)
Education	≤10 Grade	33 (66)
	>10 Grade	17 (34)
Erectile Dysfunction	Normal	7 (16)
	Mild	6 (12)
	Moderate	4 (8)
	Severe	33 (64)
Frequency of dialysis	Once per week	2 (4)
	Twice per week	40 (80)
	Thrice per week	8 (16)
Smoking	No	34 (68)
	Yes	7 (14)
	Ex smoker	9 (18)
HBsAg	Positive	2 (4)
	Negative	48 (96)
Anti HCV	Positive	14 (28)
	Negative	36 (72)
Spending	<Rs.10.000	15 (30)
	>Rs.10,000	35 (70)

Table-2: Qualitative Variables of the Patients Found With and Without ED

Parameter		With ED N=43	Without ED N=7	p
Age	<50 yr	24	7	0.01*
	>50 yr	19	Nil	
Diabetes Mellitus		28	1	0.03*
Non Diabetes Mellitus		15	6	
Smokers (7)		5	2	0.92
Monthly Spending	<Rs.10,000	14	1	1.03
	>Rs.10,000	29	15	
HBsAg Positive (2)		1	1	0.04*
Anti HCV Positive (14)		13	1	

* Statistically significant value

Table-3: Quantitative Variables of the Patients found with and without ED

Parameter	With ED Mean±SD	Without ED Mean±SD	p
Erectile Function (IIEF-Score)	8.0±4.54	24.4±0.97	<0.05*
Age (years)	46.8±9.6	39.52±1.41	<0.05*
Spending (Rs)	11500±9200	16500±11200	>0.05
Duration of dialysis (months)	16.47±14.49	25.5±19.44	>0.05
Pulse (per min)	81.4±6.9	80.2±4.2	>0.05
Systolic BP (mmHg)	155.3±22	158.4±22.6	>0.05
Haemoglobin (gm/dl)	8.9±2.0	9.87±1.6	>0.05
Urea (mg/dl)	175±56.82	152.5±33.49	<0.05*
Creatinine (mg/dl)	9.2±2.4	10.2±3.21	>0.05
Albumin (gm/dl)	3.7±0.5	3.90±0.23	>0.05

*Statistically significant value

DISCUSSION

Erectile dysfunction (ED) is a major health issue in modern life and is often under-diagnosed and underestimated due to patient embarrassment and the physician's unawareness about its high prevalence and impact on quality of life[10]. In this study there is very high prevalence (86%) of ED in haemodialysis patients. The similar prevalence of ED was observed in Iran (87.5%)[11], Turkey (82.9%)[12], Egypt (82.5%)[13] and Brazil (86.4 %)[14]. Factors responsible for such a high rate of ED in dialysis patients in this study is related with diabetes mellitus, age more than fifty years, very high pre dialysis urea level and Anti HCV positive patients. Moreover the cultural myths and attitude of the people about sexuality in this subcontinent play an important role in ED. They believe that sexual activity is inimical to kidney function. We assumed that with initiation of dialysis and improvement in uraemic milieu, there would be some improvement in orgasmic function. But practically there was further deterioration in both intravaginal latency time (IVLT) and intensity of the orgasm. With advancing age mostly intravaginal latency time improves. However in dialysis patients sharp decline of erectile function has been noted. The patient with ED needs more stimulation for attaining the erection. This higher level of stimulation before gaining appropriate erection reduces their IVLT. In this study, most of the patients do not feel an improvement in ED after starting dialysis. Prevailing myths about sexuality is that sexual activity causes weakness in the body. The uraemic patients are already suffering from easy fatigue and generalized weakness, so the fear of further deterioration in the health leads to avoid sexual activity. Frequency of intercourse is occasional in patients with renal failure which is usually eight to thirteen times per month prior to starting dialysis. Avidness for sexual activity further deteriorates erectile function. Similar thing was observed by Kashimaki *et al.*[15] According to him, regular intercourse protects against development of erectile dysfunction among men aged 33–75 years.

Diabetes mellitus is one of the most important

factors responsible for ED in dialysis patients. ED is three time more prevalent in diabetic patients than non diabetics. In this study patients with diabetes were having statistically significant relationship with ED than non diabetics. In diabetics, 21 patients were having severe ED than 11 patients in non diabetics. Erectile function was normal in 6 non diabetics than one in diabetics. In this study, mean total score of IIEF-5 in diabetic haemodialysis patients (9.5±4.2) was significantly lower than in non diabetic haemodialysis patients (13.5±5.7). The prevalence of severe ED was 42.4% in diabetic than 18.4% in non diabetics. Similar thing is observed by Miyata Y *et el*.[16] Diabetes effect ED in many ways. Large vessel atheromatous disease is 40 times more prevalent amongst men with diabetes compared to non-diabetics. Diabetes mellitus causes ultrastructural changes in cavernosal tissues. These changes include reduction in smooth muscle content, increased collagen deposition, thickening of basal lamina and loss of endothelial cells.[17] Endothelial and neurogenic relaxant responses mediated by NO are impaired in diabetes.[18]

Age is an important risk factor for ED.[19] In this study, patients more than fifty years were having severe ED than patients less than fifty years. All patients of more than 50 years were having ED. In this study mean age of the patients with ED was 48 years which was statistically significant than 39 years in Non ED patients (p<0.05).The Massacheesetts Male Aging (MMA) study[20] showed the prevalence of ED in apparently healthy individuals up to the age of 55 was 8% and for those over seventy, it was 75%. Rodger *et al*[21] and Chun–Fu Lia *et al*[22] found a strong association between age and prevalence of ED. The average age of the patient with ED was 50 and the average age of those without ED was 38 (p<0.001). Age causes gradual changes in sexual organs. These changes do not occur suddenly like women but occurs gradually during a process called andropause. There is progressive reduction in hypothalamic pituitary gonadal (HPG) axis function. Testosterone level declines through both central (pituitary) and peripheral (testicular) mechanisms. According to Tobias *et al*[23], and abrupt increase in hypogonadism prevalence occurred in men aged 45 to 50 years beyond which a plateau of prevalence was maintained until older than 80 year of age. With progressive age free testosterone decreases and similar observation was observed by Yavuz BB *et al*.[24] In this study, 120 patients participated and mean age was 73±5.9 year. A significant decrease in testosterone and free testosterone levels with increasing age was determined (p=0.021) and IIEF (r=0.66, p<0.001) was significantly associated with low free testosterone level.

In third world country like Pakistan, where per capita/income is 500 US Dollar. Dialysis cost is 350–400 US Dollar/month for three times/week dialysis. Due to financial reasons patient cannot afford three times/week dialysis. This leads to inadequate dialysis. Urea is usually used in measuring the quantification of the dialysis. Very high urea shows inadequate dialysis. In this study, patients were divided into two groups on the basis of urea, i.e., 200 mg/dl. Patients with urea more than 200 mg/dl were having very low IIEF score which is directly related with ED. Patients with ED having high urea, i.e., 175±56.8 mg/dl than without ED, i.e., 152.5±33.43 mg/dl which were statistically significant. Increased urea level leads to decreased synthesis of NO and super saturation of the O_2 free radicals. These O_2 free radicals lead to increased consumption of NO, which is a relaxing factor for penile smooth muscles. There is need to do a study to see the effect of adequacy of dialysis on overall sexual function including ED.

Mean duration of the dialysis was 16 months. In this study, duration of the dialysis does not have statistically significant relationship with ED. Similar findings were observed by Steele *et al*.[29] He studied 68 patients undergoing peritoneal dialysis and there was no association between duration of dialysis and start of ED. The mean duration was similar for both groups (24 months vs 27 months). A prospective study has shown that complaint of intensification of sexual dysfunction occurred within the first three months of dialysis treatment, with stabilization of symptoms after this adaptation period. In this study, when comparing patients who had been on dialysis fewer than three months with those who had been on dialysis for more than three months, no difference in ED complaint was found.[25]

In this study, monthly spending have no statistically significant relationship with ED. Initially we hypothesized that affluent class might show more tendencies towards sexual activity than middle class. Because they are more health conscious and have spare money to spend on sexual health. But in this study, we could not find any correlation with the ED. The reason could be could be that after the initiation of renal failure and dialysis, renal dysfunction became primary phenomenon and sexual function were pushed into background.

In this study academic education and smoking does not have statistically significant relationship with ED. Academic education does not impart information about sexuality. For that reason factor of education becomes insignificant in this study. Number of smoking patients is very small 7 (14%) so they do not have statistically significant relationship with ED. Hepatitis C infection effects sexual function in males and females. In male patients it leads to decreased libido, erectile dysfunction and diminished sexual satisfaction. In this study, Anti HCV positive patients were having

statistically significant ED as compared to Anti HCV negative patients. There were 13 HCV positive patients with ED (mean IIEF score 8.30±5.42) than only one HCV positive patient without ED (IIEF score 25). Similar observations were made by Steel TE in 1996 who reported that ED was present in 39% HCV positive patients on the basis of IIEF score.[26]

LIMITATIONS

1. We have not included controls in this study to compare the effect of dialysis on ED.
2. Follow up was not done which would have been useful to determine the success rate of any prescribed treatment for ED.
3. Small sample size is another limitation. However, there is need to do it on mass level.

REFERENCES

1. Palmer BF. Sexual dysfunction in men and women with chronic kidney disease and end-stage idney disease. Adv Ren Replace Ther. 2003 2003;10(1):48–60.
2. Diemont WL, Vruggink PA, Meuleman EJ, Doesburg WH, Lemmens WA, Berden JH. Sexual dysfunction after renal replacement therapy. Am J Kidney Dis 2000;35:845–51.
3. Finkelstein FO, Shirani S, Wuerth D, Finkelstein SH. Therapy Insight: sexual dysfunction in patients with chronic kidney disease. Nat Clin Pract Nephrol 2007;3:200–7.
4. Leu TF. Erectile Dysfunction. N Eng J Med 2000;342:1802–13.
5. Roses SE, Joffe M , Franklin E, Strom BL, Kortzher W, Brensinge C, *et al*. Prevalence and determinants of ED in hemodialysis patients. Kidney Int 2001;59:2259–66.
6. Turks, karallezlib, Tonbultiz, Yildiz M, Altintepec, Yildiz A. Erectile Dysfunction and the effects of sildenafil treatment in patients of hemodialysis and continuous ambulatory peritoneal dialysis. Nephro Dial Transplant 2001;6:1818–22.
7. Rosen R, Cappelleri J, Smith M, Lipsky J, Peña BM. Development and evaluation of an abridged, 5-item, version of the IIEF as a diagnostic tool for erectile dysfunction. Int J Impot Res 1999;11:319–26.
8. Khan MH. Standardization and Validation of Urdu version of International Index of Erectile Function presented at first congress of world association of sexual health held at Sydney in April 15–19, 2007. Published in abstract book reference OPI-14 p115.
9. Rosen RC, Riley A, Wagner G, Osterloh IH, Kirkpatrick J, Mishra A. The International Index of Erectile Function (IIEF): A multidimensional scale for assessment of erectile dysfunction. Urology 1997;49:822–30.
10. Rosas SE, Jeffe M, Franklin E, Kotzker W, Brensinger C, Grossman E, *et al*. Association of decreased quality of life and erectile dysfunction in hemodialysis patients. Kidney Int 2003; 64:232–8.
11. Mehrsai S, Mousai M, Xthoobonkt T, Khanlarpoor L, Shekarpoor, Pourmand. Improvement of erectile dysfunction KTP. Urology Journal. 2006;3(4):240–3.
12. Inci k, Hazirolan T, Ati FT, Oruc O, Tombul T, Tasar C,Erkan L, *et al*. Coronary artery calcification in HD patients and their correlation with the prevalence of ED. Transplant Proc 2008;40(1):77–80.
13. Ali ME, Abdel-Hafeez HZ, Mahran AM, Mohammad HZ, Mohammad ER, EL-Shazalay AM. Erectile function in chronic renal failure patients undergoing hemodialysis in Egypt. Int J Impoten Res 2005;17(2):180–5.
14. Neto AF, de Freitac Rodrigness MA, Saraira Fitti pal di JA, Moreirer ED Jr. The epidemiology of ED and its correlation in men with chronic renal failure on hemodialysis in Londrina, Southern Brazil. Int J Impot Res 2002;14(2):S19–26.
15. Kashimaki J, Shiri R, Tammela T, Hakkinen j, Hakkama M. Regular intercourse protects against erectile dysfunction: Tempere Aging Male Urologic Study. Am J Med. Med 2008;121(7): 592-6.
16. Miyata Y, Shindo K, Matsuya F, Noguchi M, Nishikido M, Koga S, *et al*. Erectile dysfunction in hemodialysis patients with diabetes mellitus: association with age and hemoglobin a1c levels. Intewrnational J Urol 2004;11(7):530–4.
17. Mersdorf A, Goldsmith PC, Diederichs W, Padula CA, Lue TF, Fisherman U, *et al*. Ultrastructural changes in impotent penile tissues. A comparison of 65 patients. J Urol 1991;145:749–58.
18. Cartledge JJ, Eardley L, Morrison JFB. Nitric oxide mediated corpus cavernosal smoth muscle relaxation is impaired in ageing and diabetes. BJU Int 2001;87:394–401.
19. Klein R, Klein Bek Lee, Moss SE, Cruickshanks KJ. Prevalence of self reported erectile dysfunction in people with long term IDDM. Diabetes Care 1996;19:135–41.
20. Feldman HA, Goldstein I, Hatzichristen DC, Krane RJ, McKinlay JB. Impotence and its medical and psychological correlates. Results of the Massacheesetts Male aging study. J Urol 1994;151:54–61.
21. Rodger RS, Fletcher K, Dewar JH, Genner D, McHugh M, Wilkinson R, *et al*. Prevalence and pathogenesis of impotence in one hundred uremic men. Uremia Invest 1985;8:89–96.
22. Chun Fu Lia, Yu- Ting Wamg, Kuan-Yu Hung, Yu-Sen Peng, Yih-Ron Lien, Ming-Chion Wu, *et al*. Sexual Dysfunction in peritoneal dialysis patients. Am J Nephrol 2007;27(6):615–21.
23. Tobias S. Kohler, Johnnykim, Kendall Feia, Josh Bodie, Nick Johnson, Antonine Makhloul, *et al*. Prevalence of androgen deficiency in men with Erectile Dysfunction. Urology 2008;71(4):693–7.
24. Yavuz BB, Ozkayar N, Halil M, Cankurtaran M, Ulger Z, Tezlan E, *et al*. Free testosterone levels and implication in clinical outcomes in elderly man. Aging Clinical Exp Rest 2008;20(3):201–6.
25. Paolo ND, Capotonodo L, Gaggiotti F, Rossi P. Sexual Function in uremic patients. Contrib Nephrol. 1990;77:34–44.
26. Steele TE, Wuerth D, Finkelstein S, Juergensen D, Juergensen P, Kliger AS, *et al*. Sexual experience of the chronic peritoneal dialysis patients. J Am Soc Nephrol 1996;7:1165–8.

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