Clinical Profile of Haemodialysis Patients with Diabetic Nephropathy Leading to End Stage Renal Disease

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Abstract

Background: The incidence of patients with end-stage renal failure and type 2 diabetes mellitus as a comorbid condition has increased progressively in the past decades. Causes of renal disease might vary from one population to another.

The aim of this study was to know the characteristics of the diabetic patients on regular dialysis at Al-noor Specialist Hospital, Makkah, Saudi Arabia.

Methodology: The data had been collected retrospectively in the month of Shawal 1425 corresponding to 13-11-2004----12-12-2004 from the diabetic patients directly that were on dialysis due to end stage renal disease (ESRD) and from their files.

Results: The mean age of Diabetics was (55.2years) showing male predominance 31(60.8%). All were Saudis. The mean duration of Diabetes mellitus & dialysis were (16.8years) and (22months), respectively. The mean age of start of Diabetes mellitus & dialysis was (37.4 years) & (53.5 years). The mean duration of onset of diabetes to dialysis was (16.1 years). Out of the total, 29(56.9%) were non-smoker. Patients with family H/O diabetes with other associated illnesses were 23(45%) followed by 15(29.4%) had family H/O only diabetes. Type II diabetics were 40(78.4%). Regarding metabolic profile, patients with high blood glucose level were 10(19.6%) while 3(5.9%), 50(98%) & 18(35.3%) patients had high cholesterol, low density lipoprotein & triglyceride levels, respectively.

Maximum patients were in sixth decade of life. Up to three fourth patients had family H/O diabetes. Most of the subjects had only diabetic nephropathy. Maximum patients had high low density lipoprotein level. Dialysis was main treatment to control diabetes.

Conclusion: Maximum patients were in sixth decade of life. Up to three fourth patients had family H/O diabetes. Most of the subjects had only diabetic nephropathy. Maximum patients had high low density lipoprotein level. Dialysis was main treatment to control diabetes.

Key words: Diabetes mellitus, dialysis, ESRD, diabetic nephropathy.

Introduction

The incidence of patients with end-stage renal failure and type 2 diabetes mellitus as a comorbid condition has increased progressively in the past decades, first in the United States and Japan, but subsequently in all countries with a western lifestyle. Causes of renal disease might vary from one population to another.e.g. in Saudi Arabia, renal disease had been reported to be relatively high and was thought probably to be due to a cultural practice that might increase the incidence of genetic renal disease, that was, the intermarriage among cousins and other close relatives similarly other factors of renal disease include hypertension, chronic glomerulonephritis, diabetes, and kidney stones. The prevalence of diabetes mellitus (DM) caused heavy economical burden to health-care providers, the annual mortality among dialysis patients remained high, reaching 22% in USA, 14.4% in Europe, and 11% in Saudi Arabia. There was no data available on the incidence of diabetic renal disease in Saudi diabetics. It was known that vast majority of Saudi diabetics entering dialysis (96%) were of Type II. In Saudi Arabia DM increased from 4.9% in 1985 to 7.4% in 1995, there were 700 patients on hemodialysis at the end of 2001, the annual rate of increase in number of these patients was 9.7% and it was projected that by the year of 2015 there will be more than 13,000 patients on dialysis in Kingdom.

In this article we have studied the clinical profile of diabetic patients with ESRD undergoing hemodialysis at the Al-noor Specialist Hospital, Makkah, with a view of identifying common clinical factors.

Materials and Methods

This descriptive study was done in the nephrology unit of Al-noor specialist hospital; it is a teaching tertiary care referral hospital in the Makkah region, Saudi Arabia. Its dialysis unit had been established on 1409hijra (1989), and started with only seven dialysis machines but now has eighty-one. The data had been collected in the month of Shawal of 1425hijra (corresponding to 13-11-2004----12-12-2004), from patients' files, dialysis charts and also from diabetic patients directly, who were on regular dialysis treatment.

Medical files and dialysis charts were reviewed for Socio-demographic data, duration of illnesses and clinical profile of subjects with associated macrovascular (coronary artery disease, cerebrovascular &
peripheral vascular disease, gastrointestinal i.e. gastropareses and diarrhoea, dermatological and genitourinary dysfunctions i.e. uropathy and sexual dysfunction and micro-vascular (eye i.e. retinopathy, macular edema, cataract, glaucoma, and neuropathy and nephropathy) complications. Subjects’ age groups were divided into decades. At the time of study, latest values of glucose level, lipid profile were collected from record. Blood sugar (random) level, total cholesterol level, low density lipoprotein level and triglyceride level, >200mg/dl, >200mg/dl, >130mg/dl and >165mg/dl respectively were considered as high. The information about History of smoking, family history and anti diabetic treatment had been collected from patients directly.

Similarly type of diabetes had also been confirmed by inquiring from patients the age of diagnosis of diabetes as well as mode of treatment started at the time of diagnosis and current medication at the time of data collection. The whole data had been analyzed manually to show the age of onset of diabetes as well as dialysis, duration of diabetes as well as dialysis, and the time spent from start of diabetes to dialysis.

Simple Chi-squared test was applied to nominal, ordinal and binary categorical data. Measurement data was subjected to descriptive analysis as well as two sample t-Test assuming equal variance to find significance of difference in mean values of metabolic profile between two sexes. P-value ≤0.05 was considered significant.

Results
Total of 253 patients with ESRD was on regular dialysis in the study period. Out of them 57(22.5%) were diabetic (X²=75.2, p<0.001). Six diabetics were pulled out from study because four had lack of follow up, one was expired and one had lack of required data. Males were 31(60.8%) and all were Saudis. Maximum patients 23(45.1%) were in 6th decade of life. Non-smokers were 29(56.9%). Almost 38(74.5%) patients had family H/O diabetes.

In Table I, most of the subjects 23(45.1%) developed diabetes mellitus in 4th decade of life (mean=37.4+SD1.6). Thirty six (70.6%) were belonged to 11-20 years of duration of diabetes mellitus (mean=16.8+SD0.83). Mostly patients 22(43.1%) developed ESRD requiring dialysis in 6th decade of life (mean=53.5+SD1.7). More than half of subjects 36(70.6%) had duration of dialysis ≤24 months (mean=22.8+SD2.4). Eighteen (35.3%) patients developed dialysis after 16-20 years of diabetes (mean=16.1+SD1.5). No patient was on dialysis more than six years. In table II, IV, clinical profile showed that 27(52.9%) subjects had only diabetic nephropathy without any other complications. Patients of Type 11 DM were (78.4%). Only one male patient had low density lipoprotein (LDL) level <130mg/dl while 41(80%) had glucose level <200mg/dl. Dialysis was the only management of diabetic control in 30(58.8%) patients.
Discussion

End-stage renal failure requiring dialysis is one of the most serious complications of diabetes mellitus, and diabetes is the most common cause of end-stage renal failure. The average annual incidence rate of dialysis was 12 times greater in persons with diabetes than without diabetes. By 1999-2000, diabetic patients comprised 51% of the incident dialysis population. The average annual prevalence rate was 10 times greater in the diabetic cohort. Patients with diabetes had more co-morbidity at the start of dialysis and poorer three year survival (55 vs. 68%; P < 0.0001). The incident and prevalent rates of dialysis for patients with diabetes mellitus are many times the rates of those without diabetes. Patients with diabetes mellitus often start dialysis with significant co-morbidities, which may contribute to the relatively high rate of mortality on dialysis. A number of cross-sectional studies have confirmed that the susceptibility to ESRD due to non-diabetic renal disease is increased in subjects of African and Indo-Asian descent.

In our unit during the study period 253 patients were on dialysis while in 1982, according to Jondeby, there were 370 patients receiving dialysis in KSA, in 1999 the number increased to 5706, with 2084 new patients entering dialysis in 1999 alone. The mean age increased from 37.9 to 51.3 years, respectively. In the early 1980s, Jondeby reported DM as a cause of end-stage renal disease in only (4%) of the patients but in our unit (22.5%) patients developed ESRD due to DM also contrary to Qari, Brazda12 and al-Muhanna but Foucan showed it (22%) and El-Rashaid had shown (21.1%).

Of all diabetics entering dialysis, non-insulin dependent DM accounted for (78.4%) in our unit compared to (96%) in the study of Ismail and Sunagawa while Brazda had shown (28.6%). Our study showed male predominance similar to the studies of Qari, Sunagawa and Whorra but contrary to the study of Foucan.

Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger Type 2 Hypertension was a most common comorbid stat in our study like in studies of Choi & Perneger
outcome of subjects were not followed as more complications occurred due to catheterization which could worse the condition.

**Conclusion**

In conclusion, diabetes is an important cause of ESRD in Saudi patients undergoing chronic HD at al-noor hospital. This may be attributed to poor control of diabetes, hypertension as well as inadequate early screening.

Improved care of diabetes and aggressive management of hypertension with good follow up on out patient bases can reduce or delay prevalence and improve good prognosis of diabetic nephropathy.

This report confirms the association of DM with ESRD and other micro & macro vascular complications, and also the enhancing factors, which are responsible for ESRD due to diabetic nephropathy.

**References**

1. Ritz E, Rychlik I, Locatelli F, Halimi S. End-stage renal failure in type 2 diabetes: a medical catastrophe of worldwide dimensions. Am J Kidney Dis 1999; 34:795-808.

2. Takruri HR, Hamzeh YS, Sweiss A. Hemodialysis Patients in Jordan: A Comprehensive Survey. Dialysis & Transplantation 1995 Dec; 24(12):678.

3. Berneith B, Boobes Y. Clinical profile of pre-end Stage Renal Disease in the United Arab Emirates: One Center Experience. Saudi J Kidney Dis Transplant 2002; 13(2):199-202.

4. Al-Khader AA. Impact of diabetes in renal diseases in Saudi Arabia. Nephrol Dial Transplant 2001; 16:2132-2135.

5. Qari FA. Profile of Diabetic Patients with End-stage Renal Failure Requiring Dialysis Treatment at the King Abdulaziz University Hospital, Jeddah. Saudi J Kidney Dis Transplant 2002; 13(3):380-386.

6. Faisal AM, Basri S, Basri NA. Pre-End Stage Chronic Renal Failure: The Jeddah Kidney Center Experience. Saudi J Kidney Dis Transplant 2002; 13(3):371-375.

7. Jameson JL. Endocrinology and metabolism. In: Braunwald E, Hauser SL, Longo DL, Fausi AS, Kasper DL, Jameson JL, Fausto N, editors. Harrison's principles of internal medicine. 15th ed. New York, USA: McGraw Hill Medical Publishing Division; 2001. p. 2111, 19, 24-25. [BOOK]

8. Howard BV, Howard WJ. The pathophysiology and treatment of lipid disorders in diabetes mellitus. In: Kahn CR, Weir GC, editor. Joslin's Diabetes Mellitus. 13th ed. Philadelphia, USA: Lea & Febiger, A Waverly Company; 1994. p. 381. [BOOK]

9. Lok C, Oliver M, Rothwell D, Hux J. The growing volume of diabetes-related dialysis: a population-based study. Nephrol Dial Transplant 2004; 19(12):3098-3103.

10. Roderick PJ, Jones I, Raleigh VS, Mcgowen M, Mallick N. Population need for renal replacement therapy in Thames regions: ethnic dimension. Brit Med J 1994; 309:111114.

11. Jondeby MS, Delos Santos GG, Al-Ghamdi AM, Al-Hawas FA, Mousa DH, Al-Sulaiman MH, Al-Khader AA. Caring for haemodialysis patients in Saudi Arabiapast, present and future. Saudi Med J 2001; 22:199204.

12. Brazda E, Makowicz J, Jansen J. Experience with chronic hemodialysis in diabetic patients with kidney failure. Orv Hetil 1995 Dec 10; 136(50):2715-20. [English Translation]

13. Al-Muhanna FA, Saeed I, al-Muelo S, Larbi E, Rubaish A. Disease profile, complications and outcome in patients on maintenance haemodialysis at King Faisal University Hospital, Saudi Arabia. East Afr Med J 1999 Dec; 76(12):664-7.

14. Foucan L, Merault H, Deloumeaux J, Ekouevi DK, Kangambega P, Messerchmitt C, Gabriel JM. Survival analysis of diabetes patients on dialysis in Guadeloupe. Diabetes Metab 2000 Sep; 26(4):307-13 [English Translation]

15. Ismail N, Becker B, Strzelczyk P, Ritz E. Renal diseases and hypertension in non-insulin-dependent diabetes mellitus. Kidney Int 1999; 55:128.

16. Sunagawa H, Iseki K, Nishime K, Uehara H, Toma S, Kinjo K, Fukiyama K. Epidemiological analysis of diabetic patients on chronic dialysis. Nephron 1996; 74(2):361-6

17. Choi SR, Lee SC, Kim BS, Yoon SY, Park HC, Kang SW, Choi KH, Kim YS, Ha SK, Park KL, Han DS, Lee HY. Comparative study of renal replacement therapy in Korean diabetic end-stage renal disease patients: a single center study. Yonsei Med J 2003 Jun 30; 44(3):454-62.

18. Whorra PC. Seven years experience with haemodialysis treatment for end stage renal disease in Dehradun. J Indian MedAssoc 2001 Jul; 99(7):359,361-3.

19. Perneger TV, Brancati FL, Whelton PK, Klag MJ. End-stage renal disease attributable to diabetes mellitus. Ann Intern Med 1994; 121:912-918.

20. El-Reshaid K, Johny KV, Sugathan TN, Hakim A, Georgous M, Nampoory MR. End-stage renal disease and renal replacement therapy in Kuwait--epidemiological profile over the past 4 1/2 years. Nephrol Dial Transplant 1994; 9(5):532-8.

21. Turner R, Holman R, Stratton I, Cull C, Frighi V, Manley S, et al. Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: UKPDS. BMJ 1998 Sep 12; 317:703-713.

22. Ma KW, Masler DS, Brown DC. Hemodialysis in diabetic patients with chronic renal failure. Ann Intern Med 1975 Aug; 83(2):215-7.

23. Faisal AM, Shaheen A, Al-khadeer AA. Preventative strategies of renal failure in the Arab world. Kidney International 2005 Sep; 68(98):37.