Survival at 1, 3, and 5 Years in Diabetic and Nondiabetic Patients on Hemodialysis

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We analyzed survival of 185 adult patients on maintenance hemodialysis (9 h/wk to 12 h/wk) at Emam Khomini Hospital in Ahvaz, Iran. Patient survival at 1, 3, and 5 years was 89.2%, 69.2%, and 46.8%, respectively. There was no significant difference between diabetic and nondiabetic patients in 1-year survival (87.1% versus 89.7%, $P = .66$). But, 3- and 5-year survival rates of diabetic patients were significantly lower than those of nondiabetic patients (52.2% versus 73.8%, $P = .04$; zero versus 56.9%, $P < .001$; respectively). Based on our findings, the survival of diabetic patients undergoing hemodialysis was much worse than survival of nondiabetic patients. Thus, prevention of diabetic nephropathy should be more emphasized; and if end-stage renal disease is present, other renal replacement therapies such as kidney transplantation must be considered as soon as possible.

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BRIEF COMMUNICATION

Although the life expectancy of patients with end-stage renal disease (ESRD) has improved since the introduction of dialysis in the 1960s, it is still far below that of the general population. Nonetheless, some evidence suggests that mortality rates among patients on dialysis have decreased over the past few years, suggesting that improvements in therapy may provide beneficial results.[1] Some factors including dialysis adequacy, method of renal replacement therapy, etiology of kidney failure, and comorbid diseases such as left ventricular hypertrophy, coronary heart disease, and congestive heart failure affect survival of patients with ESRD.[2-4] Although, many studies on the survival of patients with ESRD have been done in developed countries, few reports are available from developing countries. In this study, we investigated survival of diabetic and nondiabetic patients on long-term hemodialysis in Ahvaz, Iran.

This retrospective study was conducted on 185 adult patients with ESRD receiving hemodialysis at Emam Khomini Hospital from January 2002 to December 2008, in Ahvaz, Iran. Hemodialysis was performed for 9 to 12 hours, 3 times a week, using semi-synthetic (cellulose diacetate), or synthetic (polysulphone) dialysis membranes, and the acetate-based dialysis solution till January 2000, and bicarbonate-based dialysis solution, thereafter, at a delivered bicarbonate concentration of 35 mEq/L. Blood flow rate was maintained at 250 mL/min to 400 mL/min, and the dialysis solution flow rate at 500 mL/min. We included patients on maintenance hemodialysis treatment for at least 1 month. The exclusion criteria were hemodialysis because of acute kidney failure and being referred for kidney transplantation or peritoneal dialysis. None of the patients had hepatitis B disease, but 4 patients (2.2%) had hepatitis C. Survival of the patients

was estimated by the Kaplan-Meier method, and the differences between diabetic and nondiabetic patients were tested using the log-rank test.

Overall, 185 hemodialysis patients, 110 men (59.5%) and 75 women (40.5%), were evaluated in the study. The mean age of the patients at the beginning of the studied time was 54.7 ± 15.0 years (range, 16 to 95 years; men, 55.9 ± 15.2 years; women, 52.9 ± 14.7 years; P = .18). The mean fallow-up period of the patients was 31.4 ± 23.8 months. Patient survival at 1, 3, and 5 years were 89.2%, 69.2%, and 46.8%, respectively. There was no significant difference between men and women in survivals at 1 year (89.7% versus 88.9%, P = .90), 3 years (69.8% versus 68.2%, P = .85), and 5 years (45.7% versus 48.1%, P = .87).

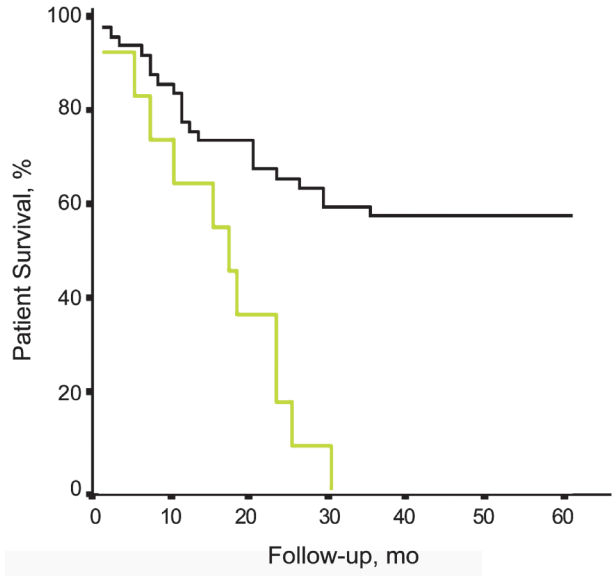
Diabetes mellitus (DM) was the second most frequent cause of ESRD after hypertension and 47 patients (25.4%) were diabetic. Healthcare costs were covered by the Social Security Insurance Organization in 96 patients (51.9%), the Medical Services Insurance Organization in 68 (36.8%), and by other insurance organizations in 21 (11.6%). Although, these insurance services provided different services to the patients, there was no significant differences in patient survival between patients with each of the insurance services (P = .50). Also, blood group was not associated with survival of the patients. The Table shows the mean age and follow-up of the patients with and without DM. The minimum follow-up period was 5 months in a 34-year-old man who was diabetic and died 5 months after entering the study. The maximum follow-up period was 89 months in a 56-year-old nondiabetic woman. After adjusting for age in both groups, there was no significant difference between diabetic and nondiabetic patients in 1-year survival (87.1% versus 89.7%, P = .66); however, the 3-year survival of diabetic patients was significantly lower than nondiabetic patients (52.2% versus 73.8%, P = .04). None of the diabetic patients remained in the 5-year survival analysis, whereas the 5-year survival of nondiabetic patients was 56.9% (P < .001; Figure).

This study showed that regardless the cause of ESRD, the 5-year survival of patients in the hemodialysis center of Emam Khomini Hospital in Ahvaz, was 46.8%. Although, survival of our patients was lower than that reported from many centers in the United States, Europe, Japan and France,[5-8] our results was similar to the report of the United States Renal Data System (USRDS) in 2009.[4] For example, the 5-year survival of patients on hemodialysis in Tassin, France, was 87%, which is much longer than that of almost all other countries.[8] However, the USRDS reported in 2009 that the 5-year survival of nondiabetic patients with ESRD was between 30% to 50% and it was 25% in diabetic patients.[1] While survival of our nondiabetic patients is comparable to that of the nondiabetics in the United States, our diabetic patients' chance of survival was significantly lower.

Free hemodialysis for patients and affordable costs of medical therapy in Iran are the advantages that might have a positive impact on the survival of patients on hemodialysis. On the other hand, the average hemodialysis time of 9 h/wk to 12

Age and Follow-up Duration of Diabetic and Nondiabetic Patient on Hemodialysis

Parameter	Diabetic Patients (n = 47)	Nondiabetic Patients (n = 138)
Age, y		
Men	58.3 ± 13.7	55.2 ± 15.6
Women	59.1 ± 10.7	51.1 ± 15.2
All	58.6 ± 12.5	53.5 ± 15.5
Follow-up, mo		
Men	24.6 ± 16.3	33.2 ± 24.1
Women	21.5 ± 17.1	34.8 ± 26.8
All	23.3 ± 16.5	33.8 ± 16.5



Survival of diabetic and nondiabetic patients on hemodialysis patients. None of the diabetic patients remained in the 5-year survival analysis, whereas 5-year survival of nondiabetic patients was 56.9% (P < .001).

h/wk, albeit acceptable worldwide, is the main difference of our dialysis conditions with those of the patients in Charra and colleagues' study from Tassin; they performed 24 h/wk dialysis protocol.[8] Hemodialysis adequacy is an essential factor for foreseeing survival in these patients. Increasing hemodialysis time leads to increase in hemodialysis adequacy, and increase in survival.[8-10] Charra and colleagues also reported that after 6 months of their hemodialysis program, 98% of the patients had a normal blood pressure, and they did not continue antihypertensive drugs.[8]

This study indicated that although some factors such as sex, blood group, and level of insurance coverage did not affect survival of our patients on hemodialysis, DM significantly decreased their survival. In short-term (1 year), we did not observe a significant difference in survival of those with and without DM, but the difference grew significantly after 3 years. Lower survival of diabetic patients with ESRD compared with nondiabetics has been demonstrated in other studies, as well.[1,11-13] In Canada for example, Fenton and associates reported that 5-year survival of nondiabetic patients in the age ranges of 15 to 44 years and more than 65 years was 85% and 20%, respectively, whereas survival of diabetic patients in these age ranges was 58% and 10%, respectively.[11]

The prevalence of DM is increasing in the world. Diabetes mellitus is the most common cause of ESRD in the United States, Japan, and some European and Latin American countries.[14,15] Thus, there should be more emphasis on prevention of DM, early diagnosis, and thigh control of its complications.[16,17] Many factors play their roles in poor prognosis of diabetic patients with ESRD, including cardiovascular diseases, problems with vascular access and arteriovenous fistula, infections, foot ulcer, weighting during hemodialysis intervals, higher decrease in blood pressure during hemodialysis.[18-20]

Using other replacement therapies, including kidney transplantation or simultaneous kidney and pancreas transplantation, should be considered in diabetic patients.[21] Today, kidney transplantation is suggested as the best replacement therapy in all diabetic and nondiabetic patients with ESRD. Mazzuchi and colleagues indicated that 10-year survival of patients on hemodialysis was similar to that of kidney transplant recipients; however, they also showed that diabetic kidney transplant recipients have a better chance of survival than diabetic patients on hemodialysis.[22]

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CONFLICT OF INTEREST

None declared.

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