Survival of Hemodialysis Patients in Saudi Arabia: A Large 4-Year Observational Analysis

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Introduction

- In patients receiving maintenance hemodialysis, the prevalence of common risk factors such as peripheral and cardiovascular disease, other comorbidities (e.g. secondary hyperparathyroidism, diabetes) and other medical conditions (e.g. use of dialysis catheter) is high, which synchronously result in a high risk of mortality.
- In Saudi Arabia, published studies of the survival of patients on dialysis are rare and mostly consist of monocentric observations with limited numbers of patients.
- Few of these studies have analyzed predictors that might influence the survival of such patients.

Objective

- The aim of this study was to:
  - analyze survival rates in a large cohort of patients receiving hemodialysis in 22 outpatient clinics all over Saudi Arabia (KSA)
  - identify factors influencing the risk of mortality during a cumulative follow-up period of 5584 years

Methods

- We included all patients referred to DaVita-KSA clinics to continue renal replacement with hemodialysis from October 2014 to December 2018 (n=3508).
- Baseline data, including demographics and clinical characteristics were recorded at admission and were compiled from monthly reports elaborated by Davita-KSA clinics along with the main events occurring during the follow-up period.
- Patient survival was analyzed from the date of starting dialysis in DaVita-KSA clinics to endpoint corresponding to:
  - kidney transplantation,
  - patient transfer to another dialysis facility,
  - death date,
  - December 31, 2018 (end of the study)
- Survival rates were calculated according to the actuarial method and Cox proportional models were used to identify factors influencing mortality.
- Comparative analyses were performed using Student's unpaired-test for quantitative variables and χ^2 test for qualitative variables. The level of statistical significance was set at 5%.

Results

Table 1: Baseline and Outcome Characteristics of the Study Population by Period of Dialysis Referral

	2014-2016 n= 1515	2017-2018 n= 1993	Total n=3508	P-Value
Sex, n (%)				
Male	750 (49.5)	1147 (57.6)	1897 (54.1)	<0.0001
Female	765 (50.5)	846 (42.4)	1611 (45.9)	
Age, years, n (%)				
< 40	375 (24.8)	495 (24.9)	870 (24.8)	
[40-60]	621 (41)	760 (38.2)	1381 (39.4)	NS
≥60	517 (34.2)	735 (36.9)	1252 (35.7)	
Cause of ESRD, n (%)				
Diabetes	584 (38.5)	828 (41.6)	1412 (40.2)	
Hypertension	548 (36.2)	706 (35.4)	1254 (35.7)	
Glomerulonephritis	77 (5.1)	50 (2.5)	127 (3.6)	
Congenital/Hereditary	70 (4.6)	74 (3.7)	144 (4.1)	<0.002
Interstitial/Obstructive	42 (2.8)	58 (2.9)	100 (2.9)	
Other/Unknown	194 (12.8)	277 (13.9)	471 (13.5)	
Dialysis Duration before DaVita-Clinic Admission, months, n (%)				
≤3	388 (25.6)	908 (45.6)	1296 (37)	
[3-12]	229 (15.2)	291 (14.6)	520 (14.8)	
[12-60]	504 (33.3)	495 (24.9)	999 (28.5)	<0.0001
≥60	392 (25.9)	296 (14.9)	688 (19.7)	
Initial Vascular Access n (%)				
Autogenous	649 (42.8)	642 (32.2)	1291 (36.8)	
Prosthetic	16 (1.1)	33 (1.7)	49 (1.4)	
Tunnelled catheter	788 (52)	1164 (58.4)	1952 (55.7)	<0.0001
Non-tunnelled catheter	62 (4.1)	153 (7.7)	215 (6.1)	
Body Mass Index, kg/m², n (%)				
< 18.5	188 (12.6)	265 (13.6)	453 (13.1)	
[18.5-25]	601 (40.3)	801 (40.9)	1402 (40.7)	NS
[25-30]	384 (25.8)	482 (24.6)	866 (25.1)	
≥30	317 (21.3)	409 (20.9)	726 (21.1)	
Hemoglobin, g/dL, n (%)				
<10	764 (50.6)	1093 (55)	1857 (53.1)	
[10-12]	538 (35.7)	666 (33.5)	1204 (34.5)	<0.02
>12	207 (13.7)	227 (11.5)	434 (12.4)	
Hepatitic C Antibodies, n (%)				
HCV (+)	149 (9.8)	181 (9.1)	330 (9.4)	NS
HCV (-)	1366 (90.2)	1811 (90.9)	3177 (90.6)	
Hepatitic C PCR, n (%)				
Positive	54 (3.6)	86 (4.4)	140 (4)	NS
Negative	1442 (96.4)	1883 (95.6)	1969 (96)	
Hepatitis B, HbS Antigen, n (%)				
Positive	54 (3.6)	72 (3.6)	126 (3.6)	NS
Negative	1460 (96.4)	1918 (96.4)	3378 (96.4)	
Overall Outcome, n (%)				
Transplantation	146 (9.6)	99 (5)	245 (7)	
Transfer	186 (12.3)	275 (1.8)	461 (13.2)	
Death	276 (18.2)	122 (6.1)	398 (11.3)	<0.0001
Active	907 (59.9)	1497 (75.1)	2404 (68.5)	

Figure 1: Quarterly Evaluation of Annual Mortality Rates

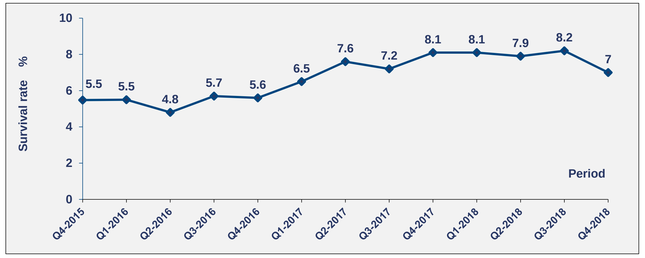

Figure 2: Actuarial Survival Curves

(A: Total Population, B: By Age Category, C: By Initial Vascular Access, D: By Cause of ESRD)

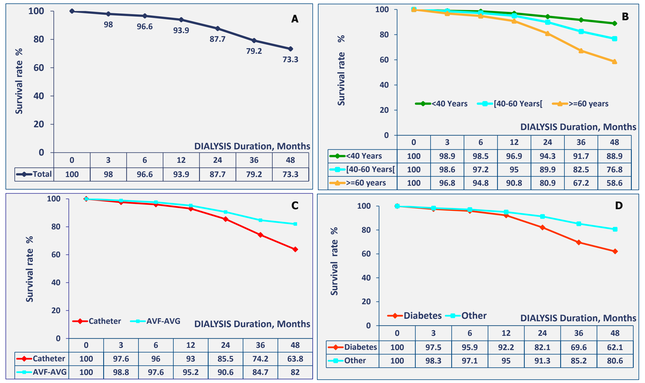

Figure 3: Causes of Death

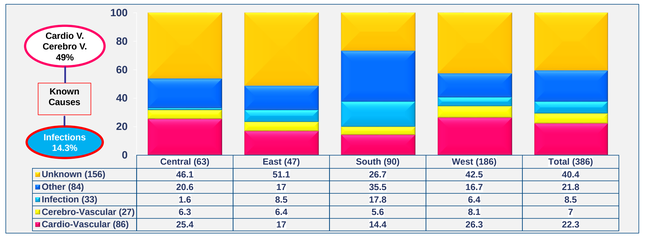

Table 2 : Independent Factors Influencing Mortality

	Relative Risk (RR)	95% Confidence Interval (RR)	P-Value
Age Category, Years			
<40	1	Reference	-
[40-60]	1.85	[1.29-2.65]	<0.001
≥60	3.48	[2.46-4.94]	<0.0001
Dialysis Duration before Joining DaVita Clinic			
≥ 3 Months	1	Reference	-
< 3 Months	1.4	[1.13-1.74]	<0.003
Cause of ESRD			
Others	1	Reference	-
Diabetes	1.5	[1.22-1.84]	<0.0001
Initial Vascular Access			
Autogenous/Prosthetic	1	Reference	-
Catheter	1.46	[1.16-1.84]	<0.002

Conclusions

- Survival rates of hemodialysis patients were 88% and 73% at 2 and 4 years, respectively with an overall annual mortality rate of 7.1%.
- According to the last published reports, including those of USRDS, European, and Australian registries, annual mortality ranged from 16.9 to 14.4 % (1-3).
- In Saudi Arabia, the annual SCOT reported that 7% of patients undergoing hemodialysis died each year (4). Other published studies, which consisted mostly of monocentric and limited series, reported similar rates (5).
- These differences could be explained by the difference in the criteria to continue hemodialysis in outpatient facilities in KSA excluding those with high comorbidity index.
- ESRD was attributed to presumed diabetic nephropathy in 40.2% of cases: those were identified as a group at high risk of mortality, as were elderly patients, those on hemodialysis for less than 3 months, and those treated through a central catheter.
- 50% of causes of death remained unknown; cardio and cerebrovascular complications accounted for about half of the known causes.
- Although survival rates recorded in our cohort are lower than reported by National and regional registries, efforts should be increased toward improving the quality of medical care of our patients with special focus on an early creation, and a shift to, an AV fistula in view of its impact on mortality of our patients.

References

1. US Renal Data System 2018 Annual Data Report: Epidemiology of Kidney Disease in the United States. Chapter 5: Mortality. Am J Kidney Dis 2019; 73(3), Supplement 1: S412-S426.
2. https://www.era-edta-reg.org/files/annualreports/pdf/AnnRep2016.pdf
3. http://www.anzdata.org.au/anzdata/AnzdataReport/41streport/c03_mortality_2017v1.0_20181122.pdf
4. SCOT Data Dialysis in the Kingdom of Saudi Arabia. Saudi J Kidney Dis Transpl 2018;29(4):1012-1020
5. Al Wakeel JS, Mitwalli AH, Al Mohaya S, Abu-Aisha H, Tarif N, Malik GH, Hammad D. Morbidity and mortality in ESRD patients on dialysis. Saudi J Kidney Dis Transpl. 2002;13(4):473-7.

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