



Composite Comorbidity Scoring System to Predict Mortality in a Saudi Dialysis Population.

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Introduction

- The use of common comorbidity indices and more specific scores were proposed as predisposing factor of the outcome in dialysis population but did not unanimously applied to summarize comorbid status .
- Few studies described the development and the validation of adapted scores as predictors of both morbidity and mortality in such patients. Establishment of such scores should aim to guide clinicians towards patients' personalized interventional care.

Objective

- Our aim was to establish and evaluate a personal scoring system where we included associated comorbidities and other factors known to predict mortality in HD patients.
- Identification of high risk groups can guide medical teams to implement specific preventive measures on the aim to reduce fatal events.

Methods (1)

- We included all patients referred to DaVita-KSA clinics to continue renal replacement with HD from October 2014 to December 2019.
- Baseline data, including demographics and clinical characteristics recorded at admission, were compiled from monthly reports elaborated by DaVita-KSA clinics as well as the main events occurring during the follow-up period.
- Patient survival was analysed from the date of starting dialysis in DaVita-KSA clinics to endpoint corresponding to kidney transplantation, or patient transfer to another dialysis facility, or death, or December 31, 2019 (end of the study).

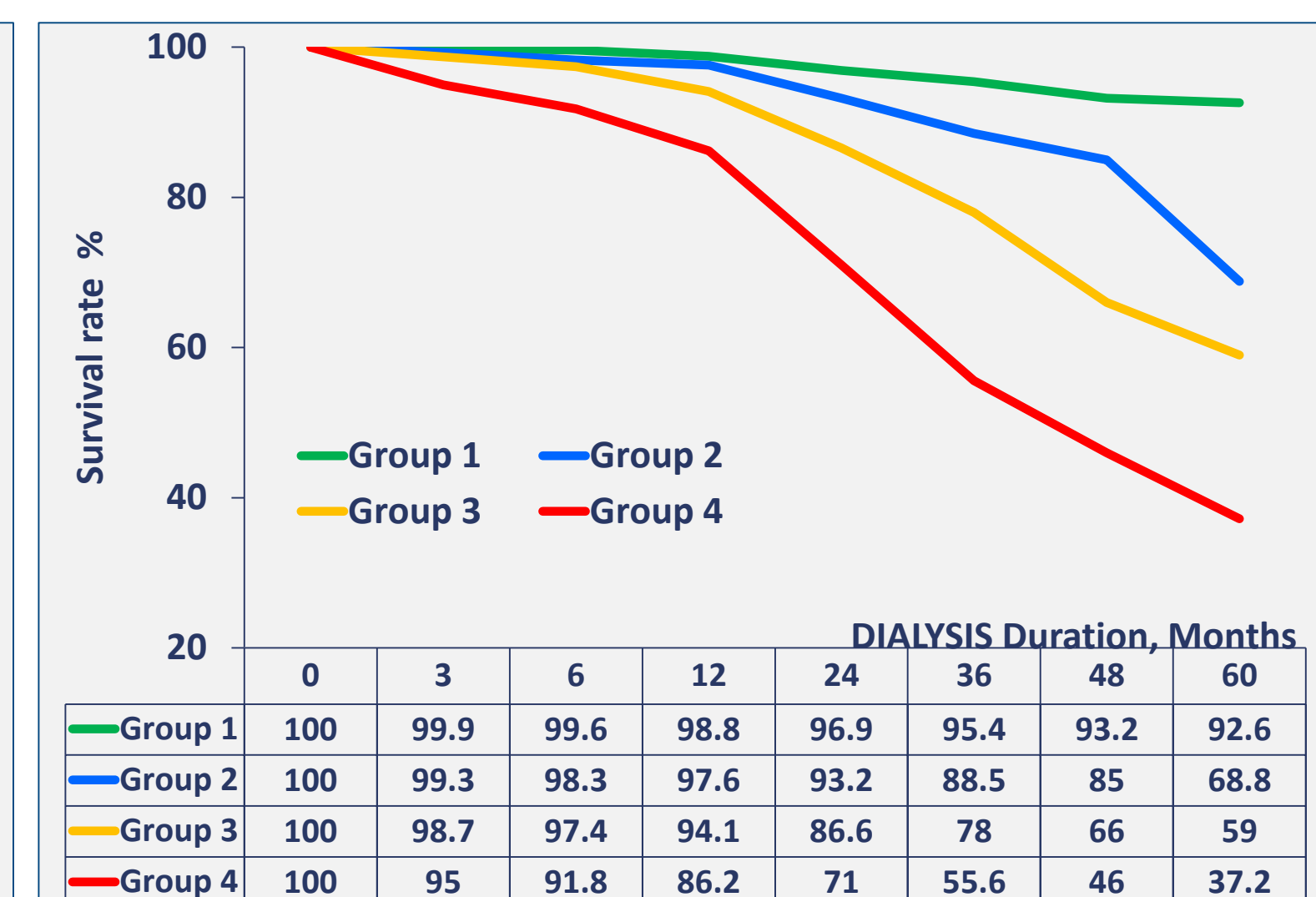
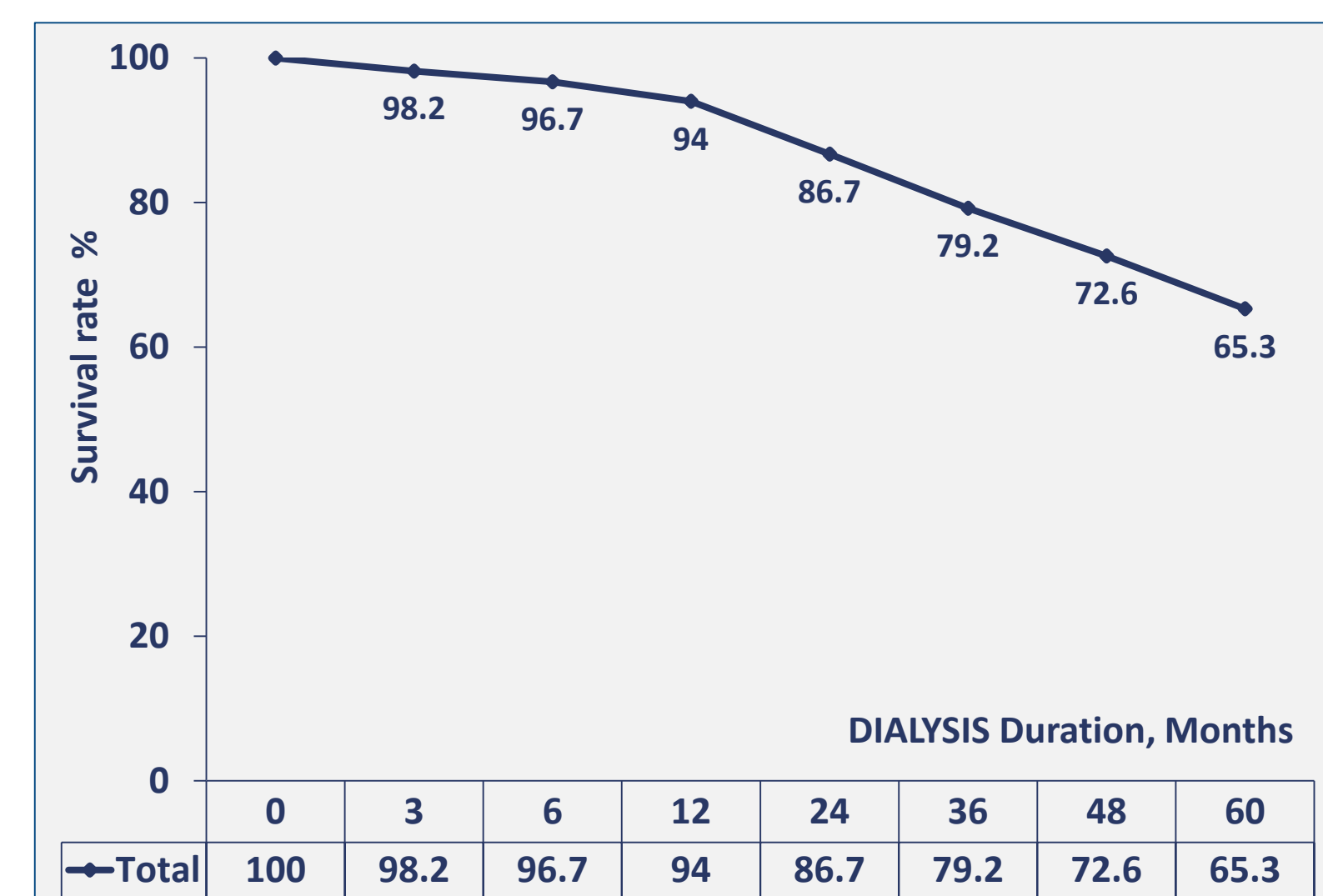
- Cox proportional hazards model was used to identify factors influencing mortality. Among 25 potential parameters (Table 1A), we identified 18 predictors of death in the preliminary univariate analysis (Table 1B). A personal scoring system was established (Table 1C) on the basis of the score assigned to each factor according to its weight as death predictor judged on the value of the relative risk generated by the preliminary analysis (Table 1D). An index of co-morbidity was calculated for each patient that corresponded to the sum of scores assigned to each factor.
- Included patients were divided into 4 groups according to percentile rank of their final comorbidity index (Group1: low risk, Group 2: moderate, Group 3: high, Group 4: very high). These groups were compared in terms of global and annual mortality rates and survival using Log rank analysis. The level of statistical significance was set at 5%.

Methods (2)

Table 1: List of tested parameters and their weight in the scoring system

Table 1A: Parameters				Table 1B:			Table 1C:		
Parameter	Variable	Score	Parameter	Variable	Score	Relative Risk	Weight score		
Gender			10	Dementia	Yes	3			
Age					No	0			
HD duration before Joining DaVita	1	HD duration before Joining DaVita	11	Smoking	Yes	1			
		< 3 months			No	0			
Vascular Access		>= 3 months	12	Stroke-Immobilized-Amputation	Yes	2			
Body mass index (BMI)		< 50 years			No	0			
Hypertension (HTN)		50-60 years	13	Malignancy	Yes	1			
Diabetes	2	60-70 years			No	0			
Congestive heart failure (CHF)		70-80 years	14	Vascular Access	Catheter-Catheter	2			
Coronary artery disease (CAD)		> 80 years			Other	0			
Peripheral vascular disease (PVD)		Under weight & Normal	15	Hemoglobin	< 10	1			
Arrhythmia	3	Obese & over weight			>=10	0			
Dementia		Yes	16	Transferrin saturation	< 20	1			
Chronic obstructive pulmonary disease (COPD)	4	No			>= 20	0			
Stroke-Immobilized-Amputation		Yes	17	Ferritin	< 800	0			
Liver-Virology	5	No			>= 800	1			
Malignancy		Yes	18	Albumin	<= 35	1			
Hx. of GIT bleeding	6	No			> 35	0			
Hemoglobin		Yes	Total Score			0 - 28			
Transferrin saturation	7	No	Table 1C:						
Ferritin		Yes							
Calcium	8	No							
Phosphorus		Yes							
Calcium-phosphorus product		No							
Parathyroid hormone (PTH)	9	Yes							
		No							

Results (1)



Results (2)

Table 2: Mortality parameters in 4 groups categorized according to their comorbidity score

Groups	Total	Group 1	Group 2	Group 3	Group 4	
Number	3983	882	867	1237	997	
Comorbidity Score	[0-22]	[0-3]	[4-5]	[6-8]	≥ 9	
Mortality*, %	Rate [CI,95%]	14.5 [13.3-15.7]	3.6 [2.4-4.9]	8.4 [6.5-10.3]	14.5 [12.3-16.6]	29.4 [26-32.7]
Annual Mortality*, %	Rate [CI, 95%]	7.6 [6.9-8.2]	1.5 [1-2]	4.3 [3.3-5.2]	8.2 [7-9.4]	18.1 [16.1-20.2]
Survival Rate*,	3	98.2	99.9	99.3	98.7	95.0
	12	94.0	98.8	97.6	94.1	86.2
	24	86.7	96.9	93.2	86.6	71.0
	60	65.3	92.6	68.8	59.0	37.2
RR for Mortality *	Rate [CI, 95%]	1 [Reference]	2.9 [1.9-4.4]	5.7 [3.9-8.3]	12.9 [8.9-18.5]	

Comments & Conclusions

- Patients on maintenance HD are at increased risk of mortality. Most of them started HD with multiple comorbidities and have numerous risk factors exposing them to cardiovascular complications. Other specific conditions make these patients very vulnerable.
- Few studies described the development and the validation of adapted scores as predictors of both morbidity and mortality in such patients. Establishment of such scores should aim to guide clinicians towards patients' personalized interventional care.
- Few published studies from Saudi Arabia, which consisted in the most on mono-centric and limited series, have analyzed predictors that might influence the outcome and no study assessed the relevance of the use of new index combining classic and specific risk factors.
- The scoring system we used herein was easily established taking into account in addition to common comorbidities, age and, other specific parameters related to dialysis treatment.
- Our results demonstrated its relevance as a good predictor for mortality in our HD population but it need an external validation since by HD patients with high comorbidity index are excluded to be treated in outpatient facilities.

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Acknowledgments: The authors thank Drs. Maciej Drozd & Stefan Jacobson for their kind abstract review.

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