

Effects of Hospitalization events before hemodialysis on Mortality in Dialysis Patients

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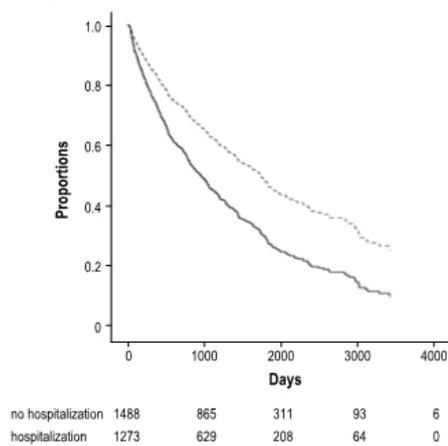
Background/Aims: Hospitalization of the elderly causes fragility, which increases subsequent hospitalization and mortality rates. In this study, we investigated whether dialysis in patients with a history of hospitalization before dialysis affects the mortality rate of dialysis patients.

Methods: We studied 2765 patients who visited hemodialysis clinics in 17 teaching hospitals, and analyzed the association of mortality with demographic factors, co-morbidity, laboratory findings, and drug and The HR was calculated through survival analysis to see if hospitalization increases the mortality rate of dialysis patients.

Results: 8.0% (n=222) of the subjects experienced hospitalization of 1 month or longer within 1 year of starting dialysis. There was no gender difference between the two groups, and the hospitalized group was older, and many patients started dialysis using a catheter. The prevalence of CVA, HTN, dementia, heart failure and atrial fibrillation was higher. Additionally this group showed higher plt and BUN and lower iPTH, Cr, alb ALP, and total cholesterol. Also, this group used less RAAS CCB antiplt agent. In multivariate analysis controlling for age, sex, access type, dementia, malignancy, ischemic heart disease, cerebrovascular accident, heart failure, atrial fibrillation, liver cirrhosis, fracture, ejection fraction, coronary artery disease, lymphocyte, platelet, BUN, Cr, albumin, phosphorus, total cholesterol, RAS blockade, B-blocker, Calcium channel blocker, warfarin, hyperlipidemia drugs, Calcium-based phosphate binder, sevelamer, anti-depressant, and dementia medication, the HR of group receiving dialysis with a history of admission was 1.686 [1.162, 2.447].

Conclusions: Patients with a history of hospitalization for more than one month before dialysis had a high overall mortality, therefore attention and intensive care are needed for this population.

• Figure 1. Survival analysis



Result			
* Table 1. Demographic information and medical history of patients according to Nursing facility residency			
Variables	No hospitalization (n=2041)	Hospitalization (n=222)	P value
Age, year, mean±SD	77.51 ± 6.47	78.76 ± 6.58	0.088
Sex, male, n (%)	1395 (68.4%)	122 (54.5%)	0.007
Weight, kg, mean±SD	58.19 ± 11.87	57.57 ± 10.27	0.122
Primary dialysis, n (%)			
HD	1215 (59.5%)	89 (40.1%)	
CA	307 (15.0%)	13 (5.8%)	
Trans vascular	618 (30.4%)	40 (18.2%)	<0.001
Other	492 (24.1%)	80 (35.9%)	
HD	19 (0.9%)	0 (0.0%)	
Access when starting dialysis, n (%)			
Catheter	3056 (85.7%)	169 (75.2%)	0.018
AVF	509 (14.3%)	55 (24.8%)	
AVG	381 (15.9%)	19 (8.5%)	
Access at maintenance, n (%)			
Catheter	69 (2.9%)	14 (6.3%)	<0.001
AVF	608 (23.9%)	26 (11.8%)	
AVG	1608 (77.2%)	87 (38.9%)	
Dementia	933 (45.7%)	93 (41.9%)	0.088
Malignancy, n (%)			
No	2151 (104.4%)	176 (79.2%)	
Yes	328 (16.1%)	46 (20.8%)	0.110
at treatment	58 (2.8%)	3 (1.4%)	
on conservative care	264 (12.8%)	43 (19.4%)	
Lymphoma, n (%)	22 (1.1%)	2 (0.9%)	0.647
Ischemic heart disease, n (%)	837 (41.0%)	82 (37.0%)	0.423
MI	103 (5.1%)	17 (7.7%)	0.472
MI history of fracture	505 (24.8%)	51 (23.0%)	0.038
Heart failure, n (%)	443 (21.7%)	49 (22.1%)	0.221
Atrial fibrillation, n (%)	284 (14.0%)	27 (12.2%)	0.219
Stroke, n (%)	1405 (69.1%)	123 (55.7%)	0.001
Hypertension, n (%)	2222 (108.6%)	200 (91.1%)	<0.001
Liver cirrhosis, n (%)	17 (0.8%)	10 (4.5%)	0.227
Rheumatic disease, n (%)	228 (11.2%)	11 (5.0%)	0.094
Fracture before hemodialysis, n (%)			
on history of fracture	2194 (107.0%)	166 (74.8%)	
Hip fracture within 1 year	94 (4.6%)	11 (5.0%)	0.572
Metatarsal compression fracture within 1 year	50 (2.4%)	3 (1.4%)	
Other fracture within 1 year	109 (5.3%)	5 (2.3%)	
* Table 2. Ejection fraction and laboratory findings of patients according to hospitalization			
Variables	No hospitalization	Hospitalization	P value
Ejection fraction, %, mean±SD	58.53 ± 11.29	57.83 ± 11.49	0.198
AWC, mean, mean±SD	4302.81 ± 14634.15	4618.71 ± 13961.17	0.267
Neutrophil count, mean, mean±SD	72.92 ± 12.20	73.89 ± 18.11	0.294
Lymphocyte count, mean, mean±SD	18.65 ± 8.83	18.52 ± 12.72	0.974
PLT, g/L, mean±SD	8.31 ± 2.17	9.26 ± 1.78	0.028
PLT count, mean, mean±SD	77140.41 ± 93113.69	108303.47 ± 91560.85	0.004
iPTH, ng/mL, mean±SD	194.96 ± 193.11	105.42 ± 158.76	0.008
BUN, mg/dL, mean±SD	73.86 ± 24.68	68.18 ± 18.88	0.037
Creatinine, mg/dL, mean±SD	5.78 ± 13.72	5.86 ± 5.38	0.928
Albumin, g/L, mean±SD	3.36 ± 0.40	3.19 ± 0.37	<0.001
ALP, IU/L, mean±SD	158.19 ± 138.39	193.81 ± 158.82	0.001
Phosphorus, mg/dL, mean±SD	6.65 ± 1.47	6.18 ± 1.57	0.145
Total Cholesterol, mg/dL, mean±SD	143.93 ± 48.55	156.94 ± 54.17	0.011

• Table 3. Medication of patients according to hospitalization

Variables	No hospitalization	Hospitalization	P value
RAAS blockade, n (%)	1296 (63.0%)	87 (38.7%)	0.001
Beta blocker, n (%)	671 (32.9%)	34 (15.3%)	0.010
Calcium channel blocker, n (%)	1488 (73.0%)	101 (45.0%)	0.001
Alpha blocker, n (%)	261 (12.8%)	18 (8.1%)	0.147
Diuretic, n (%)	1478 (72.5%)	128 (56.8%)	0.237
Statins, n (%)	961 (47.1%)	17 (7.4%)	0.001
Antiplatelet agent, n (%)	1311 (64.2%)	81 (36.0%)	0.001
Warfarin, n (%)	36 (1.7%)	12 (5.4%)	0.233
Calcium based phosphate binder, n (%)	989 (48.5%)	18 (8.0%)	<0.001
Sevelamer, n (%)	140 (6.8%)	9 (4.0%)	0.267
Lithium, n (%)	78 (3.8%)	1 (0.4%)	0.001
Depressive drug, n (%)	284 (13.9%)	13 (5.8%)	0.001
Dementia drug, n (%)	184 (9.0%)	13 (5.8%)	0.211

• Table 4. Multivariate Cox regression model of hospitalization

Factorial result	HR (95% CI)	P value
Hospitalization history more than 1 month	1.686 (1.162, 2.447)	0.006
Age at dialysis	1.028 (1.016, 1.056)	<0.001
Sex	0.823 (0.666, 1.023)	0.078
Access when starting dialysis		
Catheter	0.954	
AVF	0.875 (0.525, 1.438)	0.607
AVG	0.987 (0.743, 1.316)	0.168
Dementia	1.049 (0.673, 1.638)	0.832
Malignancy	1.028 (0.759, 1.522)	0.851
Ischemic heart disease	1.045 (0.613, 1.718)	0.848
Heart failure	1.286 (0.865, 1.946)	0.004
Atrial fibrillation	1.471 (0.853, 2.096)	0.001
Deep vein thrombosis	1.799 (1.075, 2.722)	0.024
Fracture	1.345 (0.803, 2.201)	0.002
Coronary artery disease (significant stenosis ≥75% involving any artery)	0.985 (0.638, 1.516)	0.927
Lymphocyte count (%)	0.983 (0.970, 0.996)	0.001
Platelet (count)	1.000 (0.999, 1.001)	0.001
iPTH (ng/mL)	0.999 (0.998, 1.001)	0.019
BUN (mg/dL)	0.997 (0.995, 1.001)	0.138
Creatinine (mg/dL)	0.960 (0.917, 1.006)	0.004
albumin (g/L)	0.876 (0.841, 0.911)	0.001
phosphorus	0.977 (0.899, 1.062)	0.583
Total Cholesterol	1.000 (0.999, 1.001)	0.001
RAAS blockade	0.796 (0.647, 0.976)	0.021
Beta blocker	0.660 (0.404, 1.056)	0.145
Calcium channel blocker	0.781 (0.630, 0.961)	0.027
Statins	0.760 (0.595, 0.968)	0.021
warfarin	0.853 (0.454, 1.477)	0.578