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Analysis of the relationship between permanent catheter patency and the nutrient score in patients over 75 years requiring renal replacement therapy

Moo Jun Kim[1], Yunkyeong Hwang[2], Hae Ri Kim[1], Jae Wan Jeon[1], Eu Jin Lee[2], Young Rok Ham[2], Ki Ryang Na[2], Hyerim Park[3], Dae Eun Choi[2]
[1]Department of Internal Medicine-Nephrology, Chungnam National University Sejong Hospital , Korea, Republic of
[2]Department of Internal Medicine-Nephrology, Chungnam National University Hospital, Korea, Republic of
[3]Department of Department of Medical Science, Chungnam National University, Korea, Republic of

Objectives : Malnutrition is common in patients undergoing hemodialysis and is a powerful predictor of morbidity and mortality. This study aimed to investigate the impact of nutritional status on permanent catheter patency in elderly patients over 75 years of age undergoing dialysis with tunneled dialysis catheters.
Methods : We retrospectively reviewed the records of 383 patients whose nutritional factors and BCM was measured at the same time as starting dialysis in the period between January 14, 2020 and September 31, 2023 at Chungnam National University Hospital. The relationships between permanent catheter patency at 180 days and BCM parameters, laboratory tests, age, sex, comorbidities, and medications at baseline were studied using Kaplan–Meier survival curves and multivariate cox proportional hazards analysis.
Results : Non-patency of dialysis catheter occurred at a higher rate in women (69.8%) than in men (30.2%). Age and sexual difference showed significant results of p value <0.05, and CRP and albumin in pre-dialysis blood tests were significant results of p value <0.05. Most of BCM parameters and BCM did not show significant results of p value <0.05 except ICW. There were more patients with VA creation in the patent group (86.4%) than in the non-patent group (50.8%), showing a statistically significant result of p value <0.05. Permanent catheter patency was observed to be superior at low CONUT score ($p < 0.05$). After adjustment for covariates, the CONUT score remained an independent factor associated with permanent catheter patency survival.
Conclusions : Nutritional scores measured before the start of dialysis are expected to play an important role in predicting the prognosis for permanent catheter patency survival. Identifying and managing a group of patients with very poor nutrient scores is expected to be of great help in improving the treatment and prognosis of maintenance hemodialysis patients in the future.

Table 1. Baseline characteristics.png

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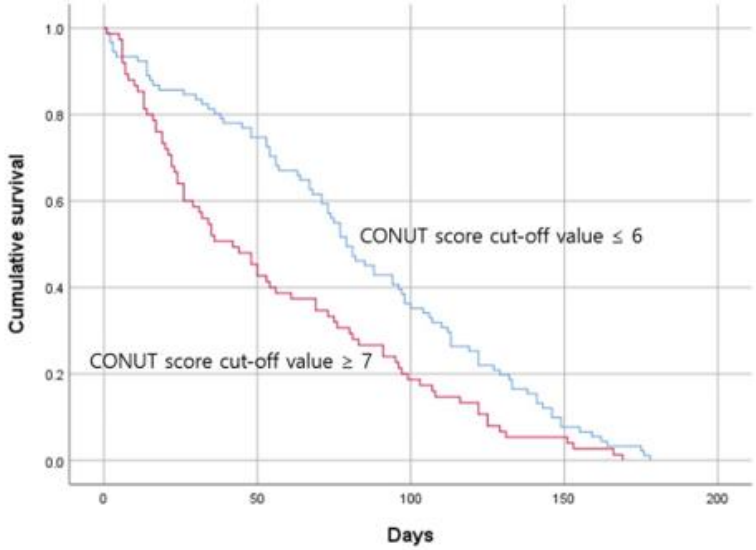
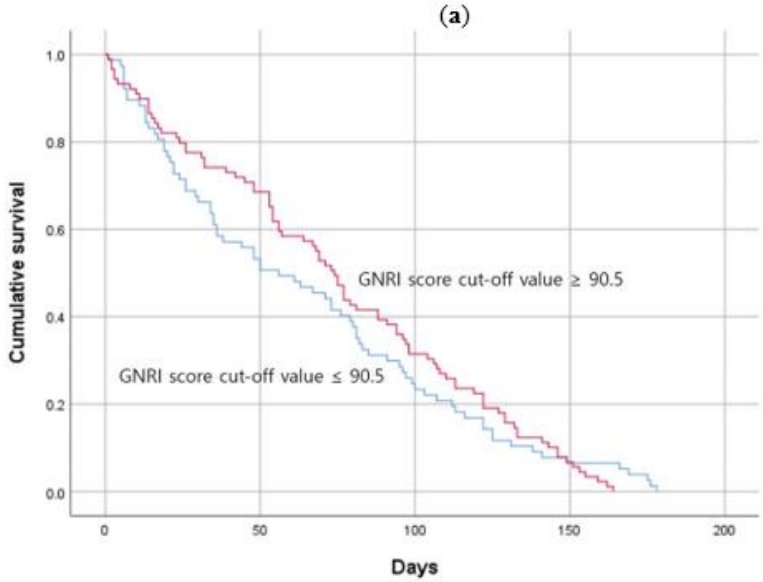
Characteristic	Overall (N = 166)	Catheter Group		*p* Value
		Patent group (N = 103)	Non-patent group (N = 63)	
Age (median [range] years)	82.0 [75–97]	81.0 [75-97]	83.0 [75-92]	0.016
Sex [n (%)]				
Men	74 (44.6)	55 (53.4)	19 (30.2)	0.003
Women	92 (55.4)	48 (46.6)	44 (69.8)	
Comorbidities [n (%)]				
Diabetes mellitus	93 (56.0)	62 (60.2)	31 (49.2)	0.168
Hypertension	141 (84.9)	85 (82.5)	56 (88.9)	0.269
Heart failure	67 (40.4)	42 (40.8)	25 (39.7)	0.890
Ischemic heart disease	45 (27.1)	32 (31.1)	13 (20.6)	0.144
Atrial fibrillation	41 (24.7)	23 (22.3)	18 (28.6)	0.369
Cerebral infarction	22 (13.3)	17 (16.5)	5 (7.9)	0.115
Liver cirrhosis	11 (6.6)	3 (2.9)	8 (12.7)	0.014
Medication [n (%)]				
Aspirin	50 (30.1)	28 (27.2)	22 (34.9)	0.295
Clopidogrel	36 (21.7)	23 (22.3)	13 (20.6)	0.799
Warfarin	9 (5.4)	6 (5.8)	3 (4.8)	0.771
Cilostazol	15 (9.0)	12 (11.7)	3 (4.8)	0.135
NOAC	12 (7.2)	11 (10.7)	1 (1.6)	0.028
Statin	70 (42.2)	48 (46.6)	22 (34.9)	0.141
Laboratory data (median [range])				
Hemoglobin (g/dL)	9.7 [5.5–13.2]	9.7 [5.5–13.2]	9.5 [6.3–11.9]	0.685
Total lymphocyte count (10^3/μL)	1100.0 [120–4620]	1160.0 [120–3700]	940.0 [130–4620]	0.233
Platelet (000s)	166.0 [12–520]	165.0 [12–445]	140.0 [20–520]	0.224
CRP (mg/dL)	2.5 [0.1–40]	1.4 [0.1–40.0]	6.8 [0.2-37.8]	<0.001
Total protein (g/dL)	6.0 [3.9–7.9]	6.1 [4.2–7.6]	5.9 [3.9–7.9]	0.340
Albumin (g/dL)	3.0 [1.6–4.3]	3.1 [2.2–4.3]	2.8 [1.6–4.1]	<0.001
BUN (mg/dL)	51.9 [13.0–184.5]	53.3 [13.0–184.5]	51.0 [17.4–118.0]	0.708
Creatinine (mg/dL)	4.3 [0.5–16.2]	4.5 [0.7–16.2]	3.8 [0.5–10.8]	0.051
Total cholesterol (mg/dL)	127.5 [50–290]	129.0 [50–239]	121.0 [50–290]	0.526
Total calcium (mg/dL)	8.0 [5.5–11.1]	8.0 [5.5–10.2]	8.0 [5.7–11.1]	0.292
Phosphorus (mg/dL)	4.0 [0.3 –10.7]	4.1 [1.2–10.7]	3.9 [0.3–7.4]	0.175
Sodium (mEq/L)	138.0 [121–153.6]	138.0 [126–147.0]	137.8 [121–153.6]	0.821
Potassium (mEq/L)	4.4 [2.8–7.8]	4.5 [2.8–7.0]	4.3 [2.8–7.8]	
Body composition (median [range])				
ECW (L)	13.9 [7.8–31.1]	14.4 [7.8–31.1]	13.7 [8.4–23.7]	0.137
ICW (L)	13.3 [7.9–30.4]	14.3 [7.9–30.4]	11.9 [8.2–20.7]	0.012
TBW (L)	27.3 [16.3–53.5]	28.4 [16.3–53.5]	26.0 [18.3–43.7]	0.028
ECW/ICW ratio	1.10 [0.53–1.90]	1.07 [0.53–1.90]	1.13 [0.75–1.56]	0.101
LTI (kg/m^2)	10.3 [5.3–26.1]	11.3 [5.8–26.1]	9.7 [5.3–23.3]	0.089
FTI (kg/m^2)	10.8 [0.1–33.8]	10.2 [0.1–33.8]	11.2 [4.3–25.0]	0.180
LTM (kg)	25.16[2.2–69.4]	27.6 [2.2–69.4]	23.2 [13.8–49.4]	0.097
ATM (kg)	24.9 [0.2–56.2]	24.2 [0.2–52.2]	25.1 [2.4–56.2]	0.162
FAT (kg)	19.0 [0.3–41.3]	18.3 [0.3–38.4]	19.1 [7.2–41.3]	0.133
Dry weight (kg)	52.8 [24.8–92.5]	53.3 [24.8–89.3]	51.5 [32.8–92.5]	0.641
BMI (kg/m^2)	23.6 [15.1–44.3]	23.5 [15.1–34.2]	23.8 [15.3-44.3]	0.255
Information of initiating hemodialysis (median [range])				
Ultrafiltration volume (L)	1.5 [0.2–4.0]	1.5 [0.3–4.0]	1.5 [0.2–4.0]	0.268
Further management [n (%)]				
VA creation	121 (72.9)	89 (86.4)	32 (50.8)	<0.001
VA abandonment	45 (27.1)	14 (13.6)	31 (50.2)	
Nutrient score (median [range])				
CONUT score	6.0 [0-12]	5.0 [0-12]	7.0 [0-12]	0.001
GNRI score	91.5 [64.6-125.0]	93.7 [68.0-118.7]	87.8 [64.6-125.0]	0.018
Permanent catheter use date (median [range])	69.0 [1-178]	88.0 [6-178]	63.0 [1-141]	<0.001

NOAC: non-vitamin K antagonist oral anticoagulant; CRP: C-reactive protein; BUN: blood urea nitrogen; BMI: body mass index; ECW: extracellular water; ICW: intracellular water; TBW: total body water; LTI: lean tissue index; FTI: fat tissue index; LTM: lean tissue mass; ATM: adipose tissue mass; FAT: fat mass; VA: Vascular access; CONUT: Controlling Nutritional Status; GNRI : Geriatric Nutritional Risk Index

Table 1. Baseline characteristics.png



(a)



(b)

Figure 1. Kaplan–Meier survival curves showing the 180 days permanent catheter survival for patients in the patent and non-patent groups using the cut-off values obtained for the nutrient score by receiver operating characteristic curve analysis. (a) CONUT score (n = 166) log-rank χ 2 = 10.466, p = 0.001, (b) GNRI score (n = 166) log-rank χ 2 = 0.231, p = 0.231
CONUT: Controlling Nutritional Status; GNRI : Geriatric Nutritional Risk Index