



Shaping Tomorrow's Nephrology: Insight-Driven Kidney Care

KSN SEOUL, KOREA
2026

The 46th Annual Meeting of the Korean Society of Nephrology



Jun 11 (Thu) – 14 (Sun), 2026

COEX, Seoul, Korea

Abstract Type : Oral presentation

Abstract Submission No.: A-0898

Abstract Topic : Renal Conservative Care + Geriatric Nephrology + Sarcopenia

Assessment Of Frailty In Patients With Chronic Kidney Disease On Maintenance Hemodialysis

Shaurya Sisodia, Shivendra Singh, Nitin Bajpai

Department of Internal Medicine-Nephrology, Institute of Medical Sciences, Banaras Hindu University, India

Objectives : To assess frailty in patients of chronic kidney disease on maintenance hemodialysis.

Methods : This cross-sectional study assessed frailty in 99 patients of chronic kidney disease on maintenance hemodialysis, using the Short Physical Performance Battery (SPPB), categorizing them as frail (SPPB ≤ 6), pre-frail (7–9), or robust (≥ 10). Continuous parameters were compared across groups using Kruskal-Wallis tests, and categorical variables using chi-square tests. Medians (IQR) were reported for continuous data, with $p < 0.05$ considered significant.

Results : In this cross-sectional study of 99 patients with CKD on maintenance hemodialysis, 33 (33.3%) were frail (SPPB ≤ 6), 44 (44.4%) pre-frail (SPPB 7–9), and 22 (22.2%) robust (SPPB ≥ 10), with 77.8% showing frailty or pre-frailty. Frail patients were significantly older (median 56 [45–68] years) than pre-frail (32 [24–42] years) and robust (21 [18–26] years) groups ($p < 0.001$). They had higher BMI (22.9 [19.5–29.1] kg/m²), longer illness duration (3 [2–4] years), lower residual renal function (50 [50–200] mL), reduced handgrip strength (18.9 [15.1–22.7] kg), lower skeletal muscle index (5.5 [4.9–6.2] kg/m²), worse anemia (Hb 9.5 [8.9–10.0] g/dL), hypoalbuminemia (3.2 [2.9–3.5] g/dL), and severe vitamin D deficiency (15 [8–22] ng/mL) compared to other groups (all $p \leq 0.001$ except iPTH $p = 0.021$). Frailty was strongly associated with hypoalbuminemia (81.8%), recent hospitalization (66.7%), non-compliance (30.3%), almost no exercise (3.0%), thrice-weekly hemodialysis (42.4%), and vitamin D deficiency (< 20 ng/mL; 78.8%) (all $p \leq 0.017$). Hyperphosphatemia showed no association ($p = 0.277$).

Conclusions : Frailty and pre-frailty affect nearly 78% of maintenance hemodialysis patients and are strongly linked to older age, malnutrition, muscle wasting, vitamin D deficiency, hospitalization, and poor treatment adherence. Routine frailty screening using SPPB and targeted multimodal interventions addressing nutrition, exercise, and vitamin D status may improve outcomes in this vulnerable population.

Table 1 frailty.jpg



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Parameter	Frail (n=33)	Pre-frail (n=44)	Robust (n=22)	p-value
Age (years)	56 (45–68)	32 (24–42)	21 (18–26)	<0.001*
BMI (kg/m ²)	22.9 (19.5–29.1)	20.7 (19.3–23.1)	20.2 (19.0–21.8)	0.001*
Duration of illness (yrs)	3 (2–4)	2 (1–3)	1 (0.5–3)	<0.001*
RRF (mL)	50 (50–200)	500 (300–600)	550 (400–800)	<0.001*
Handgrip (kg)	18.9 (15.1–22.7)	26.3 (21.8–29.6)	28.5 (27.1–31.3)	<0.001*
SMI (kg/m ²)	5.5 (4.9–6.2)	7.0 (6.4–7.9)	8.1 (7.8–8.6)	<0.001*
Haemoglobin (g/dL)	9.5 (8.9–10.0)	10.0 (9.3–11.0)	10.7 (10.1–11.3)	<0.001*
Serum Albumin (g/dL)	3.2 (2.9–3.5)	3.8 (3.7–4.0)	4.1 (3.9–4.2)	<0.001*
Vitamin D (ng/mL)	15 (8–22)	28 (17–39)	40 (33–47)	<0.001*
iPTH (pg/mL)	232 (129–500)	466 (230–780)	594 (340–860)	0.021*

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Variable	Frail n (%)	Pre-frail n (%)	Robust n (%)	p-value
Hypoalbuminaemia	27 (81.8%)	4 (9.1%)	0 (0.0%)	<0.001*
Hospitalised	22 (66.7%)	11 (25.0%)	3 (13.6%)	<0.001*
Non-compliant	10 (30.3%)	8 (18.2%)	0 (0.0%)	0.017*
Exercising	1 (3.0%)	5 (11.4%)	18 (81.8%)	<0.001*
Thrice/week HD	14 (42.4%)	10 (22.7%)	0 (0.0%)	0.001*
VitD deficient (<20)	26 (78.8%)	12 (27.3%)	1 (4.5%)	<0.001*
Hyperphosphataemia	19 (57.6%)	21 (47.7%)	15 (68.2%)	0.277