Impact of Frailty and Quality of Life on Long-term Survival in Critically Ill Patients after Severe Acute Kidney Injury

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Introduction

Critically ill patients with severe acute kidney injury (AKI) frequently exhibit frailty and reduced quality of life (QoL). However, the association between frailty, QoL, and long-term survival outcomes, particularly in resource-limited settings, remains uncertain. This study aimed to evaluate the impact of frailty and QoL on long-term survival in critically ill patients with severe AKI.

Methods and Materials

We analyzed data from the India and Southeast Asia Renal Replacement Therapy (InSEA-RRT) registry, a multicenter prospective cohort study conducted between April 2019 and December 2023 across 24 hospitals in Southeast Asia and India. Critically ill patients with AKI stage 3, as defined by the Kidney Disease Improving Global Outcomes (KDIGO) criteria, were enrolled. Frailty severity was assessed with the clinical frailty scale (CFS) and EuroQol-5 Dimensions-5 Level (EQ5D5L) index for assessed QoL. Patients were classified as having clinical frailty (CFS ≥ 5) and EQ5D5L index ≤ 0 (bad health with death = 0) at 3 months after enrollment.

The primary outcome was two-year survival. The survival analysis was performed using a mixed model adjusted for correlation within country, age, sex, comorbidities, AKI etiology, and renal recovery status at hospital discharge.

Results

A total of 2,315 patients were enrolled, 1,033 (47%) died during hospitalization. At 3 months post-AKI, clinical frailty was present in 134/472 (28.4%) surviors, and 49/474 (10.3%) had an EQ5D5L index ≤ 0. Overall 2-year mortality was significantly higher in patients with clinical frailty versus non-frail patients (37% vs. 11%, p<0.001) and those with an EQ5D5L index ≤ 0 versus an EQ5D5L index > 0 (51% vs. 15%, p<0.001).

Both clinical frailty and an EQ5D5L index ≤ 0 were associated with shorter survival (adjusted hazard ratio [aHR], 3.73; 95% CI, 2.28-6.11; p<0.001 and aHR, 3.41; 95% CI, 2.14-5.44; p<0.001, respectively).

Table 1 Frailty as measured by the clinical frailty score and frailty index at 3, 6, 9, 12, 18, 24 months

	3 months	6 months	9 months	12 months	18 months	24 months
Clinical frailty score (CFS)						
N	472	458	443	424	388	359
Median (IQR)	3 (2-5)	2 (2-4)	2 (2-4)	2 (1-3)	2 (1-3)	2 (1-3)
CFS ≥ 5, n (%)	134 (28)	96 (21)	81 (18)	72 (17)	64 (16.5)	54 (15)
EQ-5D-5L						
N	474	460	448	428	394	360
Median (IQR)	0.61 (0.33-0.81)	0.72 (0.44-1)	0.72 (0.47-1)	0.73 (0.46-1)	0.73 (0.48-1)	0.78 (0.51-1)
Index ≤ 0, n (%)	49 (10)	40 (9)	29 (6.5)	35 (8)	28 (7)	27 (7.5)

Table 2 Proportions and incidence rates for MAKE, New CKD, and CKD progression at 2 years of follow-up by Frailty (CFS).

Outcomes	Overall	CFS < 5 at 3 months	CFS ≥ 5 at 3 months	p-value
Mortality, n (%)	88/472 (19)	38/338 (11)	50/134 (37)	<0.001
2-year MAKE, n (%)	195/472 (41)	118/338 (15)	77/134(57)	<0.001
KFRT, n (%)	86/472 (18)	57/338 (17)	29/134 (22)	0.225

Conclusions

Clinical frailty and poor QoL were independently associated with long-term mortality among critically ill patients after severe AKI. Assessing clinical frailty and QoL may be essential to identify potential targets for intervention. Further research is needed to identify effective strategies to improve long-term outcomes in this high-risk population.

Table 3 Proportions and incidence rates for MAKE, New CKD, and CKD progression at 2 years of follow-up by Quality of life (EQ5D5L).

Outcomes	Overall	EQ-5D-5L > 0 At 3 m	EQ-5D-5L ≤ 0 At 3 m	p-value
Mortality, n (%)	88/474 (19)	63/425(15)	25/49 (51)	<0.001
2-year MAKE, n (%)	198/474(42)	165/425 (39)	33/49 (67)	<0.001
KFRT, n (%)	89/474 (19)	77/425 (18)	12/49 (24.5)	0.279

Figure 1 Kaplan–Meier curves for 2-year MAKE divided by CFS and EQ5D5L.

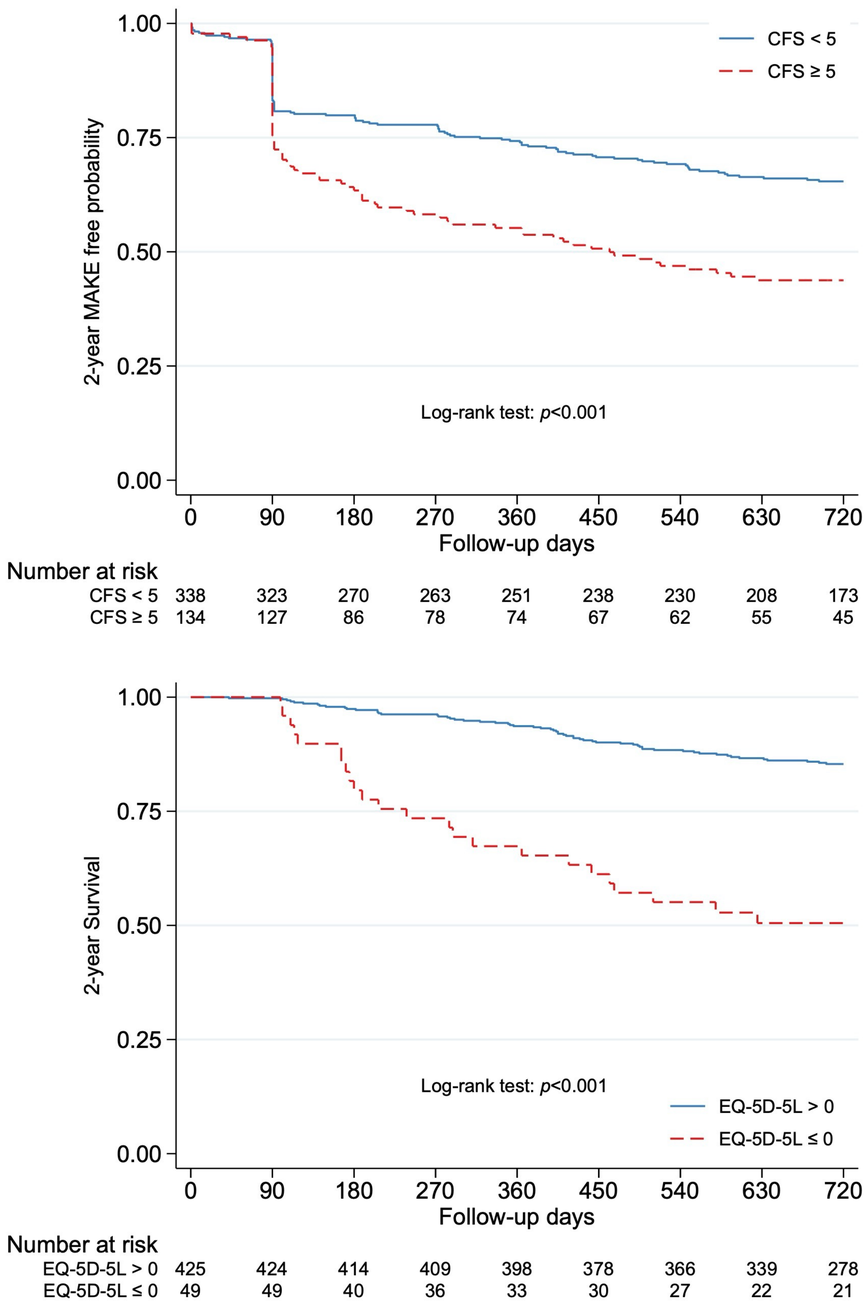

Figure 2 Kaplan–Meier curves for 2-year survival divided by CFS and EQ5D5L.