

# ACUTE KIDNEY INJURY IN EXTRACORPOREAL MEMBRANE OXYGENATION PATIENTS: A SINGLE-CENTRE RETROSPECTIVE STUDY

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## BACKGROUND

Extracorporeal membrane oxygenation (ECMO) provides life-saving support for patients with severe cardiac and/or respiratory failure. Acute kidney injury (AKI) is a common complication in this population. This study aims to determine the incidence of AKI and its associated clinical outcomes in patients receiving ECMO therapy at Hospital Sultan Idris Shah, Serdang.

## METHODS

We conducted a retrospective study of all patients treated with ECMO between January 2019 and December 2024. Demographic, clinical, and laboratory data were extracted from medical records. AKI was defined using Kidney Disease: Improving Global Outcomes (KDIGO) 2012 criteria.

## RESULTS

A total of 20 patients received ECMO therapy during study period. Baseline characteristics are summarized in Table 1. AKI was observed in 85% of patients, all of whom required CKRT while on ECMO. Of these, 58.8% developed AKI after ECMO initiation. The mean serum creatinine at the time of CKRT initiation was 288.9 ± 103.9 µmol/L. The sole survivor in the AKI group achieved complete renal recovery.

Figure 1

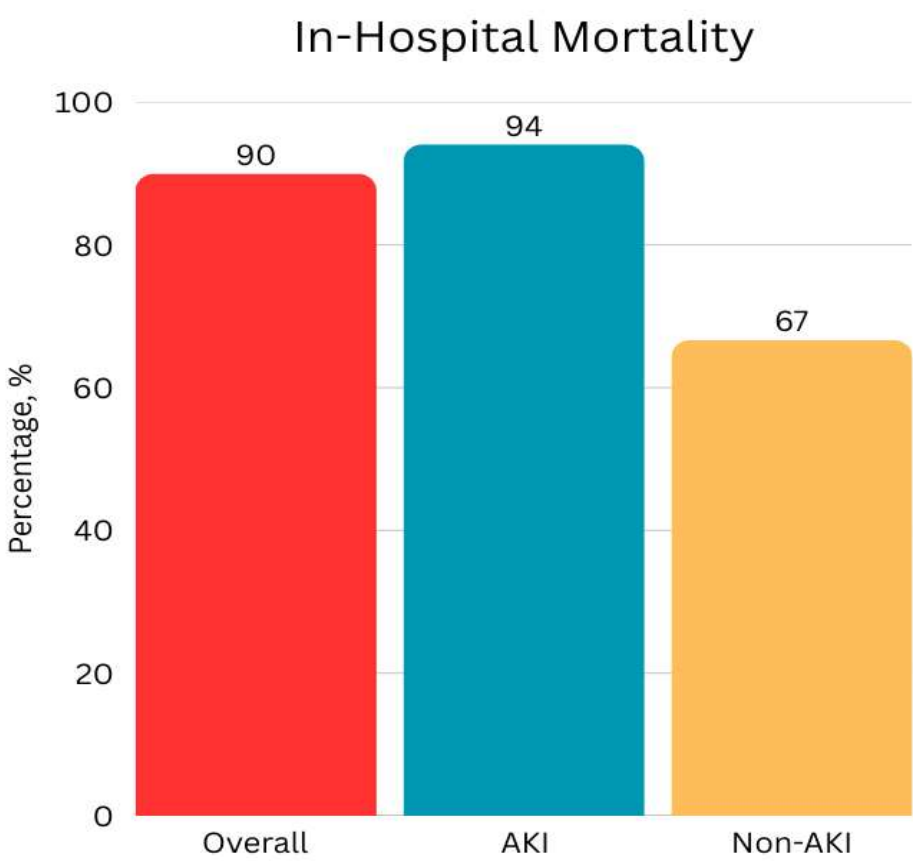


Figure 2

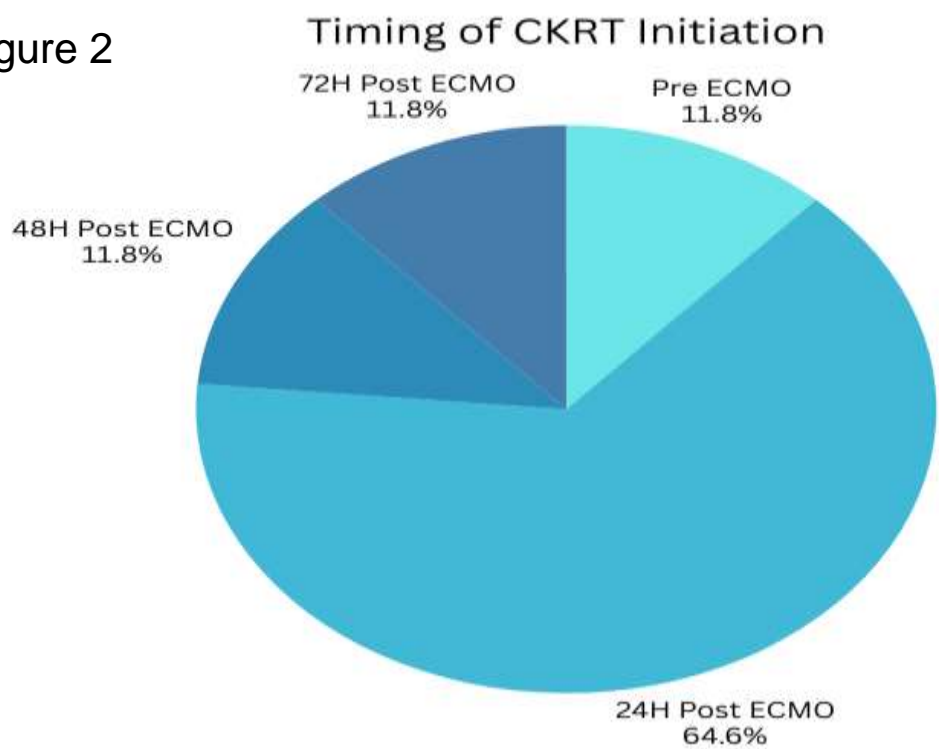


Figure 3

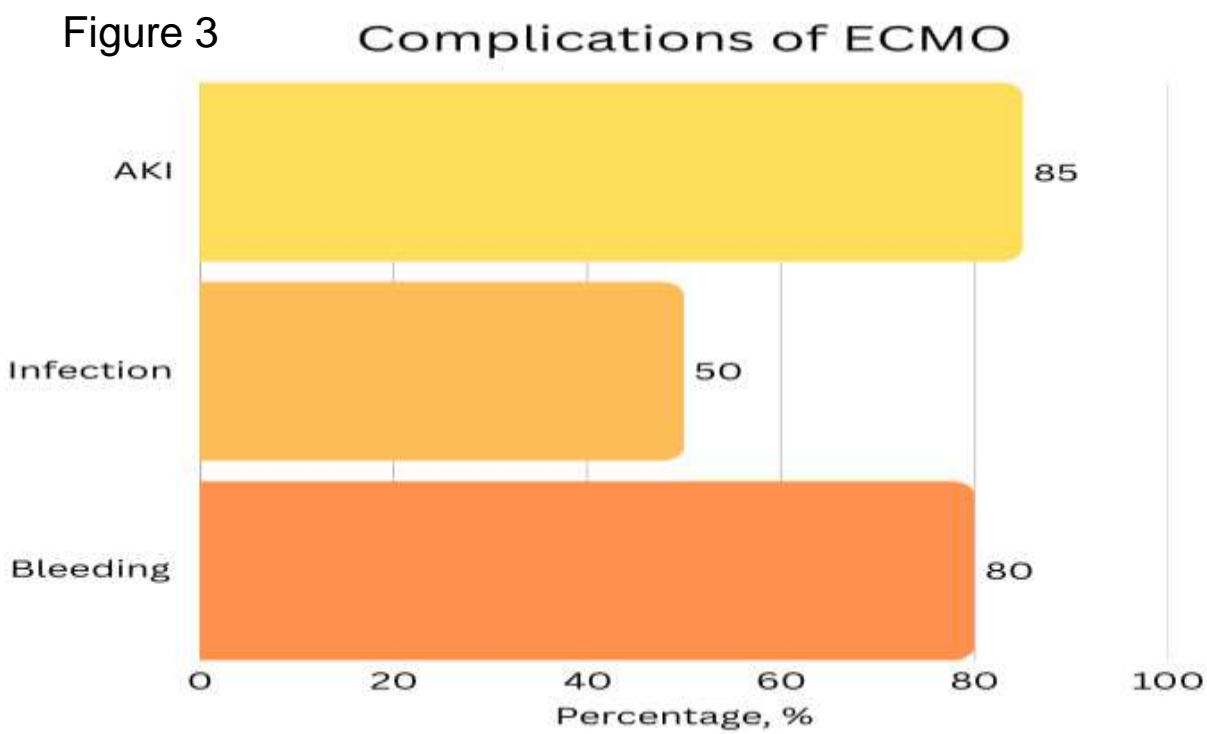


Table 1: Baseline Characteristics of Study Population

Variable, n (%)	Total (N=20)	AKI (N=17)	Non-AKI (N=3)	P-value
Age(years)	34.4±14.9	36.1±15.4	24.3±5.9	0.214
Male	14 (70.0)	12 (70.6)	2 (66.7)	1.000
Race				0.473
Malay	13 (65.0)	11 (64.7)	2 (66.7)	
Chinese	4 (20.0)	4 (23.5)	0 (0.0)	
Indian	3 (15.0)	2 (11.8)	1 (33.3)	
Diabetes	2 (10.0)	2 (11.8)	0 (0.0)	1.000
Hypertension	5 (25.0)	5 (29.4)	0 (0.0)	0.539
Coronary artery disease	5 (25.0)	5 (29.4)	0 (0.0)	0.539
Chronic kidney disease	2 (10.0)	2 (11.8)	0 (0.0)	1.000
Baseline Creatinine, µmol/L	99.2±33.3	105.0±31.9	66.3±21.6	0.061
SOFA Score	14.6±2.3	15.0±2.2	12.0±1.0	0.032
Indication for ECMO support				0.880
Post cardiac surgery	14 (70.0)	12 (70.6)	2 (66.7)	
Pulmonary embolism	4 (20.0)	3 (17.6)	1 (33.3)	
Trauma	1 (5.0)	1 (5.9)	0 (0.0)	
Heart failure	1 (5.0)	1 (5.9)	0 (0.0)	
VA ECMO	19 (95.0)	16 (94.1)	3 (100)	1.000
ECMO Duration, days	8.7±5.5 (2-20)	8.9±5.8	7.3±4.7	0.656

## DISCUSSION

The mortality rate among patients receiving ECMO in our cohort was notably higher than that reported in the literature, where survival typically ranges between 40–50%. Patients with AKI had worse outcomes, with mortality exceeding 90% compared to 67% in the non-AKI group. Several factors may explain this discrepancy. First, the incidence of AKI was very high in our cohort, and all AKI patients required CKRT, both of which are associated with poor outcomes. Second, selection bias may have played a role, as ECMO was more likely to be offered to the sickest patients, as reflected by their high SOFA scores. Finally, the limited case volume and resource constraints of our centre may also have contributed to the higher mortality observed.

## CONCLUSION

AKI is highly prevalent among patients receiving ECMO in our cohort and is associated with extremely poor outcomes, particularly when CKRT is required. The overall high mortality likely reflects the severity of illness and centre-specific factors. These findings highlight the need for careful patient selection, optimization of resources and multicentre collaboration to improve survival in this high-risk population.

## REFERENCES

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- Ostermann M, Lumlertgul N. Acute kidney injury in ECMO patients. Crit Care. 2021 Aug 31;25(1):313. doi: 10.1186/s13054-021-03676-5. Erratum in: Crit Care. 2024 Apr 5;28(1):110