

Leukapheresis and Organ-Support Burden in Critically Ill Adult Acute Leukemia Admissions: A National Inpatient Sample Study, 2016–2022

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Background

- Therapeutic leukapheresis is used for acute leukemia (AL) admissions with suspected hyperleukocytosis or leukostasis.
- National data on organ-support burden and outcomes associated with leukapheresis are limited.

Objective

To quantify leukapheresis utilization, critical illness burden, and outcomes among adult acute leukemia admissions.

Methods

- Design: retrospective cohort study of the HCUP National Inpatient Sample, 2016–2022; adult admissions with any-listed AL diagnosis.
- AL and leukapheresis identified using ICD-10-CM/PCS codes.
- Critical illness defined by IMV, shock, renal replacement therapy, tracheostomy, ECMO, or cardiac arrest.
- Sensitivity cohort used a hyperleukocytosis/leukostasis proxy: leukapheresis, respiratory failure plus neurologic dysfunction, or elevated WBC with organ dysfunction.
- Survey-weighted models adjusted for demographics, payer, ZIP-code income, hospital characteristics, AL subtype, COVID era, and concurrent organ dysfunction.
- Outcomes: leukapheresis utilization, organ-support burden, mortality, survivor non-home discharge, length of stay, and total charges.

Limitations

- Administrative coding cannot confirm severity, laboratory values, or treatment intent.
- The NIS counts admissions, not unique patients; no outpatient or post-discharge follow-up.
- White blood cell count and leukapheresis timing are not captured in the NIS.

Findings

0.42%

Of 677,905 weighted AL admissions (n=2,835)

2.33%

Utilization in acute monocytic leukemia

32.8%

Mortality among leukapheresis admissions

\$364,981

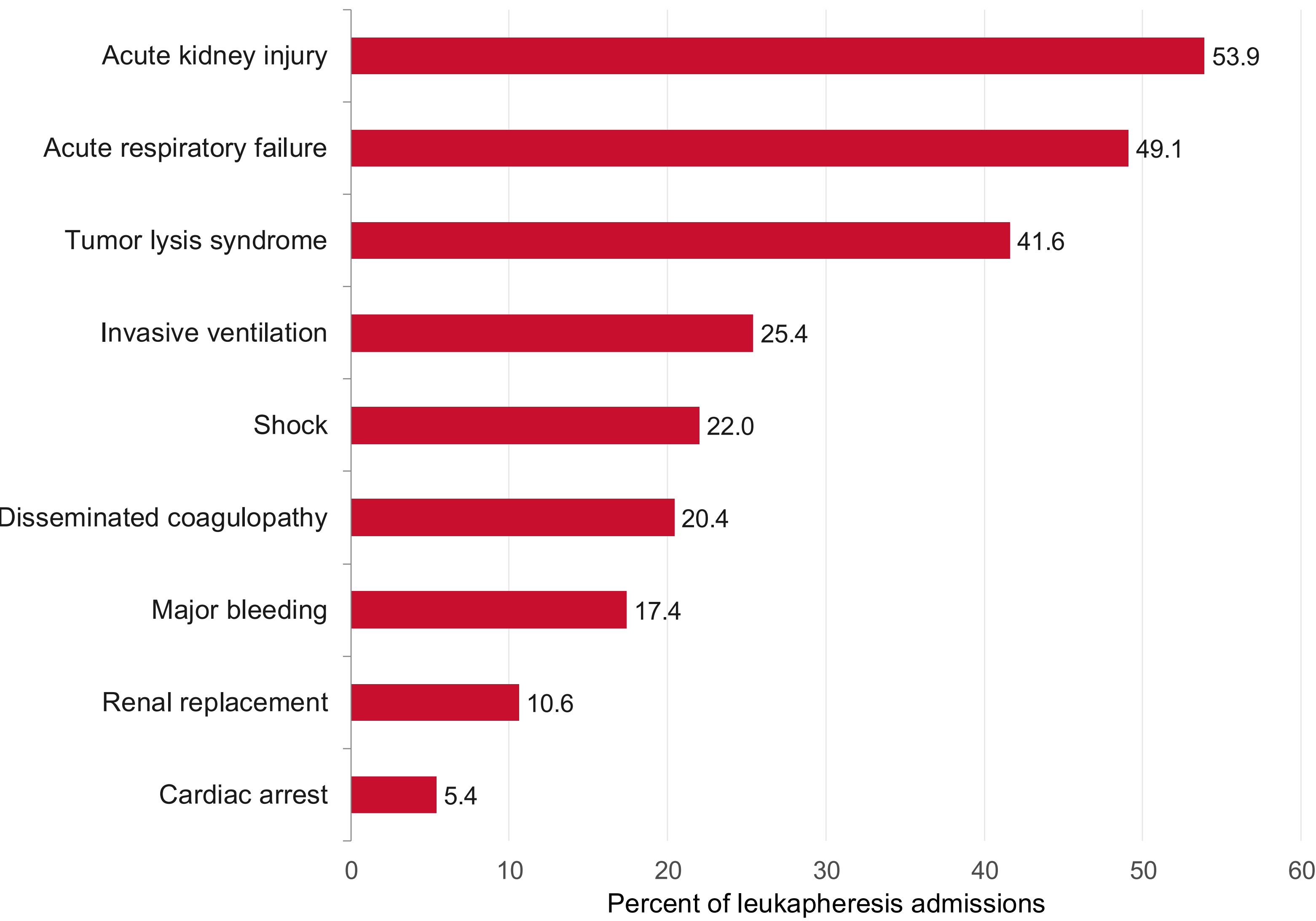
Mean charges; length of stay 20.4 days

Critical

Outcome	Apheresis	None
Invasive ventilation	71.0%	49.2%
Renal replacement	29.5%	16.7%
Tumor lysis syndrome	56.0%	10.8%
Major bleeding	31.5%	14.3%
In-hospital mortality	69.5%	45.3%
Total charges	\$444,245	\$350,077

Crude comparisons within the strictly critically ill AL cohort.

Figure



Organ-support and complication burden among admissions receiving leukapheresis.

Adjusted

Cohort	Mortality OR (95% CI)	P
Strict critical illness	1.37 (0.93–2.01)	.110
Hyperleukocytosis proxy	0.95 (0.74–1.24)	.726

Utilization was higher in AML/APL/myeloid-lineage than non-AML AL (0.49% vs 0.26%).

Conclusions

Leukapheresis was uncommon but identified acute leukemia admissions with substantial organ-support burden. Adjusted mortality associations attenuated after critical-illness restriction, supporting cautious interpretation given confounding by indication.