Epidemiology of Sepsis-Associated AKI in Adolescent Patients Admitted to Adult ICUs

Chloe Braun[1], Tomonori Takeuchi[2], James Odum[1], Andrew Barbera[3], Lucas Liu[4], David Askenazi[3], Javier Neyra[2]

[1]Department of Pediatrics, Division of Pediatric Critical Care, University of Alabama at Birmingham (UAB), AL, [2]Department of Medicine, Division of Nephrology, UAB, AL, [3]Department of Pediatrics, Division of Nephrology, UAB, AL, [4]Department of Pharmacy Practice and Science, University of Kentucky College of Pharmacy, Lexington, KY

Background

- Sepsis associated acute kidney injury (SA-AKI) is associated with increased mortality in adults and children.
- Adolescents represent a unique population that can be served in either a pediatric or adult ICU.
- In similar ICU cohort, 15.8% of adults developed SA-AKI.
  - Late development of SA-AKI portended worse outcomes than Early SA-AKI (within 2 days of ICU admission).
- Little is known about the epidemiology of SA-AKI in adolescents admitted to adult ICUs.

Materials and Methods

- Multicenter, observational, cohort study (UAB and UK)
- Adolescent patients aged 10-19 years admitted to an ICU
- Exclusion: end stage kidney disease (ESKD), history of renal transplant, or no baseline serum creatinine (sCr)

Definitions:

- **AKI:** KDIGO sCr and urine output
- **Sepsis:** Adult Sepsis-3
- **Early SA-AKI:** AKI within +48 hours
- **Late SA-AKI:** AKI between days 2-7 of sepsis

Statistical Analysis

- Univariate comparisons:
  - SA-AKI vs Sepsis, No AKI
  - Early vs Late SA-AKI
- χ^2 test, t-test, Mann-Whitney U test

Results

Among 3398 adolescents admitted to adult ICUs, 3270 were included. Sepsis and SA-AKI developed in the following:

- Sepsis: 813 / 3,270 (24.9%)
- SA-AKI: 323 / 3,270 (9.9%)
  - Early: 231 / 323 (71.5%)
  - Late: 92 / 323 (28.5%)

Figure 1: Incidence of AKI and Sepsis by ICU Day

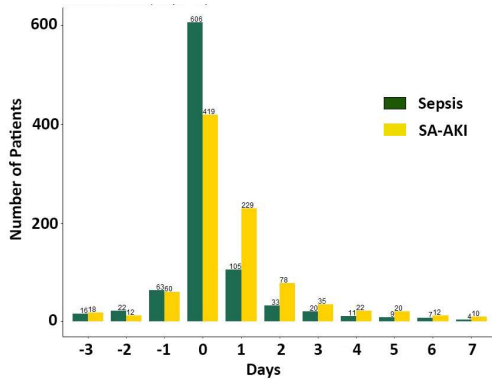
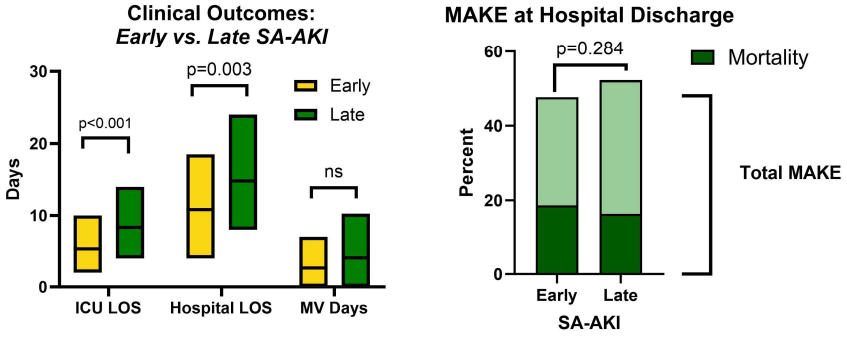


Table 1: Clinical Characteristics and Outcomes: SA-AKI vs. Sepsis, No AKI

		Overall (813)	SA-AKI (323)	Sepsis, No AKI (490)	p
Clinical Characteristics					
Location (%)	UAB	605 (74.4)	207 (64.1)	398 (81.2)	<0.001
	UK	208 (25.6)	116 (35.9)	92 (18.8)	
Age	Median [IQR]	18.00 [16.00, 19.00]	18.00 [16.50, 19.00]	18.00 [16.00, 19.00]	0.6
Sex (female)	n (%)	309 (38.0)	134 (41.5)	175 (35.7)	0.113
Race, n (%)	White	525 (64.6)	212 (65.6)	313 (63.9)	0.247
	Black	233 (28.7)	95 (29.4)	138 (28.2)	
	Other	55 (6.8)	16 (5.0)	39 (8.0)	
Chronic Kidney Disease	n (%)	17 (2.1)	10 (3.1)	7 (1.4)	0.169
Baseline sCr	Median [IQR]	0.74 [0.56, 0.94]	0.70 [0.50, 1.00]	0.80 [0.60, 0.90]	0.349
Baseline eGFR	Median [IQR]	131.56 [111.19, 140.21]	132.38 [101.04, 144.39]	131.56 [111.88, 139.25]	0.699
Septic Shock	n (%)	84 (10.3)	55 (17.0)	29 (5.9)	<0.001
Clinical Outcomes					
Hospital Death	n (%)	94 (11.6)	58 (18.0)	36 (7.3)	<0.001
Hospital LOS	Median [IQR]	9.0 [5.0, 17.0]	10.00 [5.0, 20.0]	9.0 [4.3, 16.0]	0.004
ICU LOS	Median [IQR]	4.0 [2.0, 10.0]	5.0 [2.0, 11.0]	4.0 [2.0, 10.0]	0.028
MV Free Days	Median [IQR]	28.0 [28.0, 28.0]	26.0 [3.5, 28.0]	28.0 [28.0, 28.0]	<0.001
RRT Free Days	Median [IQR]	28.0 [28.0, 28.0]	28.0 [27.0, 28.0]	28.0 [28.0, 28.0]	<0.001
Max AKI Stage	0	490 (60.3)	0 (0.0)	490 (100.0)	<0.001
	1	166 (20.4)	166 (51.4)	0 (0.0)	
	2	61 (7.5)	61 (18.9)	0 (0.0)	
	3	57 (7.0)	57 (17.6)	0 (0.0)	
	3 + Dialysis	39 (4.8)	39 (12.1)	0 (0.0)	
MAKE (Discharge)	n (%)	139 (17.1)	100 (31.0)	39 (8.0)	<0.001

Figure 2: Clinical Outcomes: Early vs. Late SA-AKI



Conclusion

- Smaller percentage of adolescents developed SA-AKI compared to adult ICU patients in a similar cohort
- Adolescents admitted to an adult ICU with SA-AKI had worse outcomes than patients with sepsis alone.
- Patients with Early SA-AKI had shorter hospital and ICU LOS, but no differences in mortality or MAKE at discharge compared to Late SA-AKI.

THE 29TH INTERNATIONAL CONFERENCE ON
ADVANCES IN CRITICAL CARE NEPHROLOGY
AKI & CRRT 2024
MARCH 12-15, 2024 SAN DIEGO, CALIFORNIA