

ACUTE KIDNEY INJURY IN TAIWANESE CHILDREN: AKIN DEFINED INCIDENCE, CLINICAL CHARACTERISTICS, AND MORTALITY RATE

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INTRODUCTION & OBJECTIVES

- Acute kidney injury (AKI) is common in hospitalized children, but the incidence and severity distribution are unclear, particularly for community-acquired AKI (CA-AKI).
- The aims of this study were to determine pediatric AKI incidence using Acute Kidney Injury Network (AKIN) criteria, clinical characteristics and mortality outcomes in a large pediatric cohort.

METHODS

- Study design:** Retrospective cohort study with analysis of electronic medical records (EMRs)
- Setting & Participants:** We assessed 102,198 hospital admissions and 1,014,669 outpatient visits during 2010 and 2014 at a large pediatric medical center in Taiwan.
 - Patients aged >28 days and <18 years with ≥ 2 serum creatinine (SCr) measures were included.
- Factors:** Patient demographic characteristics, clinical conditions and nephrotoxic medications exposure (16 classes).
- Outcomes & Statistical Analysis:** Prevalence and incidence of HAAKI and CAAKI were determined according to changes in SCr, as outlined in the AKI Network classification.
 - Hospitalized patients directly admitted from outpatient or emergency settings were categorized as hCAAKI in order to identify patient-specific characteristics for AKI.
 - All-cause in-hospital mortality, intensive care rate, and length of stay (LOS) were compared for stage and type of AKI groups.
 - Multivariate logistic regression was employed to explore AKI associated factors.

Table. Factors associated AKI development in Taiwanese youths

	CAAKI	HAAKI*
	aOR (95% CI)	aOR (95% CI)
Age at admission, years		
<2	1.09 (0.83, 1.43)	1.02 (0.84, 1.24)
2 to <6	Ref	Ref
6 to <13	0.54 (0.41, 0.71)	0.82 (0.66, 1.03)
13 to <18	0.39 (0.30, 0.52)	0.68 (0.53, 0.86)
Prior CKD diagnosis	2.86 (1.94, 4.22)	1.54 (1.06, 2.23)
Concomitant conditions by system (Ref=No)		
Infections	1.52 (1.10, 2.09)	1.36 (1.15, 1.61)
Malignancies	4.73 (3.62, 6.17)	3.53 (2.84, 4.39)
Hematologic disorders	2.31 (1.62, 3.30)	1.38 (1.14, 1.68)
CNS and sensory system	0.88 (0.67, 1.17)	1.48 (1.22, 1.79)
Circulatory system	1.44 (0.97, 2.13)	2.50 (2.00, 3.11)
Respiratory system	1.01 (0.83, 1.24)	1.26 (1.08, 1.47)
Digestive, liver system	2.13 (1.71, 2.66)	1.45 (1.24, 1.71)
Kidney-urinary, genital	0.80 (0.60, 1.06)	1.98 (1.65, 2.39)
Congenital diseases	2.43 (1.88, 3.12)	2.14 (1.77, 2.59)
Injury	2.82 (2.00, 3.97)	2.52 (1.97, 3.23)
Prior use of drugs with renal function concerns by class		
1 vs 0	1.04 (0.54, 1.98)	1.09 (0.92, 1.28)
≥ 2 vs 0	1.27 (0.33, 4.84)	1.45 (1.18, 1.78)
Prior hospitalizations		
1 vs 0	2.08 (1.65, 2.62)	1.22 (1.03, 1.45)
≥ 2 vs 0	2.34 (1.69, 3.25)	4.33 (3.47, 5.40)
Prior number of outpatient visits		
≥ 3 vs <3	1.19 (0.97, 1.46)	1.15 (0.98, 1.35)

Note: HAAKI* (including hCAAKI); Comorbid conditions insignificant to both CA- and HA-AKI are not listed.

RESULTS

- Over the 5-year study period, 87,007 patients with a total of 1,014,669 outpatient visits, and 57,879 patients with 102,198 hospital admissions were assessed.
- Prevalence of CAAKI was 4/1000 outpatient visits, 17/1000 hospital admissions for hCAAKI, and 9.69/1000 hospital admissions for HAAKI.
- Incidence of CAAKI was 5.6/100 outpatient visits (722/12,891), hCAAKI was 12.1/100 hospital admissions (945/7,790) and 13.9/100 hospital admissions of HAAKI (308/2,209).
- median LOS: HAAKI, 24 days (IQR, 13–51) > hCAAKI, 7 days (IQR, 5–12), and increased as more severe AKIN stage

FIGURE 1. (A) Pediatric AKI in inpatient setting. (B) Pediatric AKI in outpatient setting.

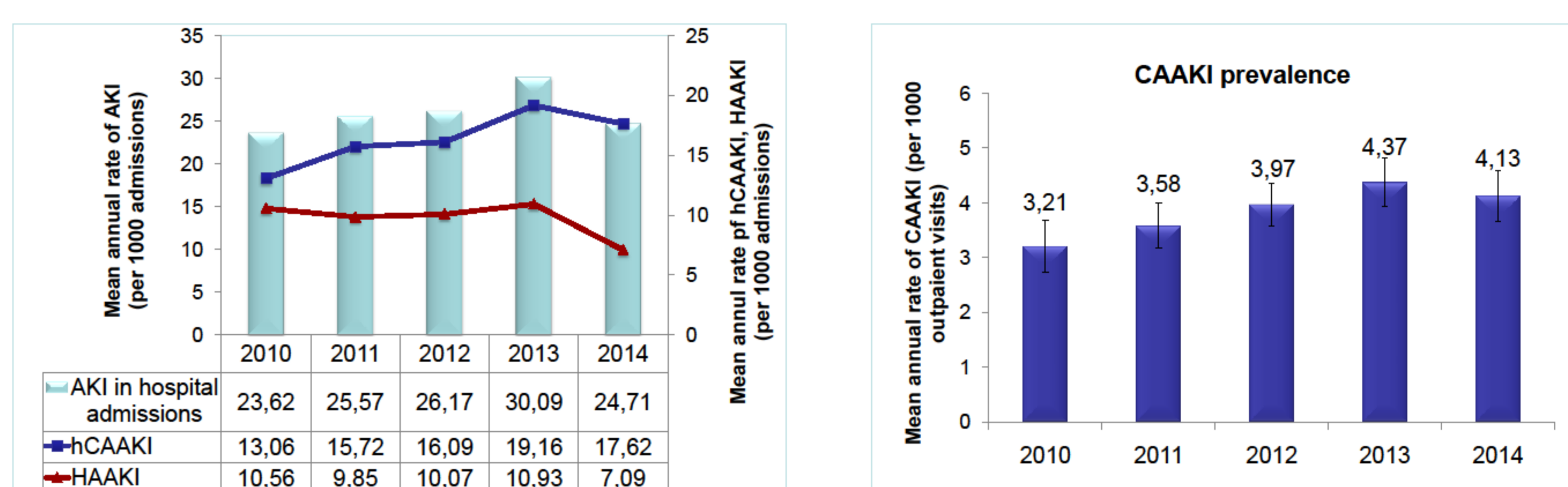
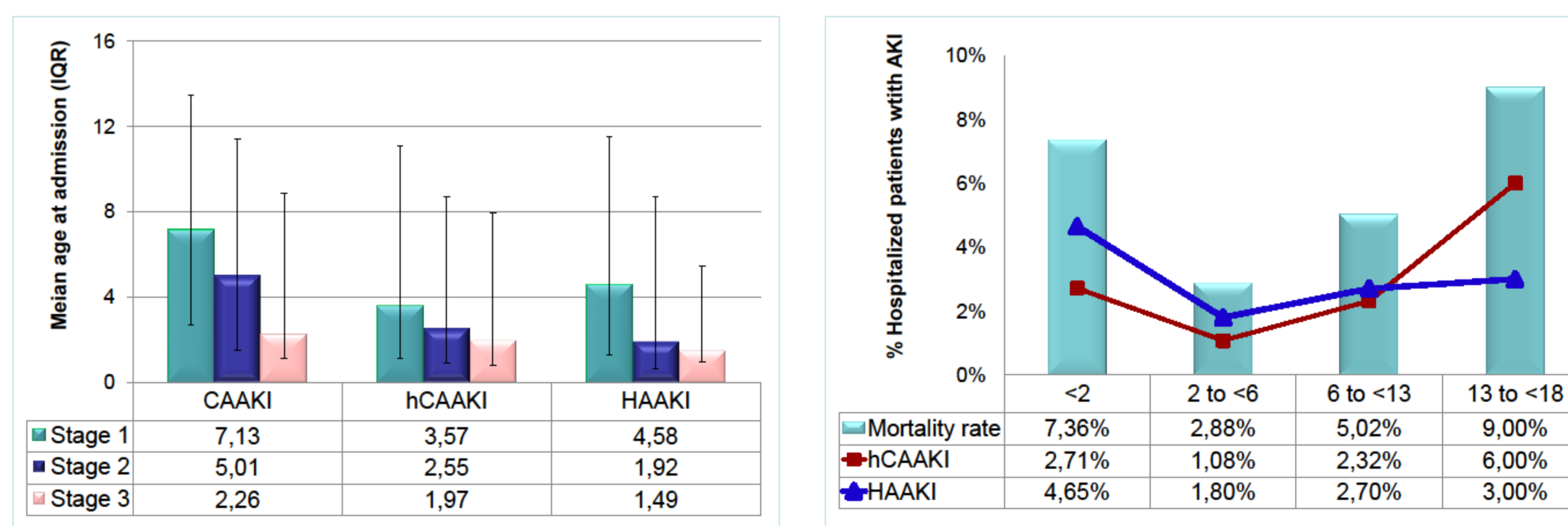


FIGURE 2. (A) AKIN stage and types of AKI. (B) In-hospital mortality rate and age.



- More severe AKI episode was likely to occur in patients with younger age (Fig 2A).
- Fig 2B shows a V-shaped association between age and in-hospital mortality in patients with AKI. Although the mortality rate was 7.36% in children age <2 years, the highest mortality rate was seen in children aged 13 to <18 years (9%).

DISCUSSION & CONCLUSIONS

- The association between AKI and high mortality rate is confounded by primary disorders, cause of hospitalization, and procedures and nephrotoxic medication during hospitalization
- Pediatric AKI development in the community was more prevalent than hospitalization. Both CA- and HA-AKI increased mortality rate and resource utilization, but HAAKI were more severe than hCAAKI.
- An increasing incidence of AKI in the community and its risk profile underscored the need to increase awareness of AKI among policy makers and health professionals, to recognition of at-risk children and vigilant SCr monitoring so that modifiable risk factors can be managed properly.

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