



High-grade pediatric renal trauma: prognostic value of ureteral contrast

¹Phillip J Kim, ¹Hansen T Lui, ²Lisa H Kang, ³Blythe P Durbin-Johnson, ⁴Eric A Kurzrock

¹Department of Urologic Surgery, UC Davis, ²Department of Radiology, UC Davis, ³Public Health Services, UC Davis, ⁴Department of Urology, UC Davis

INTRODUCTION: Although non-operative management is encouraged for children with low-grade renal injury, there are no universally accepted guidelines for management of high-grade injury. We sought to determine if any patient variable, in particular the presence of contrast in the ureter on delayed images, was associated with intervention.

METHODS: A retrospective review of pediatric patients presenting with grade IV or V renal injury between 2003 and 2021 at a Level 1 trauma center was performed. Renal injury grade was verified and updated, if necessary, based upon the 2018 American Association for the Surgery of Trauma (AAST) injury scale. In addition, we determined if the injury was vascular or collecting system or both. Multivariable logistic regression analyses were performed.

RESULTS: Seventy-five patients (mean age 12.4 years old) with Grade IV (n=53) or Grade V (n=22) injury were identified. Twenty-five patients (33%) had immediate renal intervention within 24 hours of admission, whereas 50 patients were observed. The mean age of observed patients was 11.2 years of age and 15 (30%) had intervention. Delayed images on CT showed ureteral contrast was present in 44 (88%) of observed patients. Multivariable analysis demonstrated that presence of contrast in the ureter is associated with significantly lower odds of intervention, OR 0.06 [0.004-0.456, 95% CI, ($P < 0.01$)].

DISCUSSION/CONCLUSIONS: After high-grade renal injury in children, the presence of contrast in the ureter on delayed CT imaging is associated with lower odds of procedural intervention. Despite the large size, this study is limited by the retrospective nature. After grade IV or V renal injury, presence of ureteral contrast may suggest a less severe renal collecting system defect and better odds that intervention can be avoided.

Table 1: Logistic Regression Analyses of Any Intervention by Patient and Imaging Characteristics

Variable	Multivariable Analysis	
	Odds Ratio (95% CI)	P-Value
Contrast in Ureter: Yes vs. No	0.063 (0.004, 0.456)	0.00497
Injury: Collecting System vs. Vascular	1.799 (0.301, 18.79)	0.53860
Injury: Both vs. Vascular	1.452 (0.161, 18.104)	0.74099
Injury Mechanism: Penetrating vs. Blunt	2.687 (0.197, 28.466)	0.42004
Age (Years)	0.979 (0.827, 1.164)	0.80182
Non-Renal AIS Score	0.858 (0.555, 1.252)	0.43835