Microhematuria as an indicator of significant abdominal injury

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Background & Objectives: Trauma is one of the leading causes of morbidity and mortality in the pediatric population. In many centers, microhematuria is used as a screening tool for the presence of significant abdominal injury and as an indication for further imaging. Our objective was to evaluate the role of microhematuria by dipstick as an indicator of significant abdominal injury in children.

Method: A retrospective review of children aged 0-16 years admitted for MVA or a fall from 2007 to 2017, who had urinalyses performed.

Results: The charts of 655 children were reviewed. Microhematuria was found in 100 children, of whom 49 (49%), 28 (28%) and 23 (23%) had small, moderate and large amounts of hematuria respectively. Forty-one of the children who had microhematuria underwent a computed tomography (CT) scan. Positive findings were recorded in 16 of these patients (39%). There was clear association between microhematuria as detected by the urine dipstick and a significant finding on the CT scan (p =0.002). The sensitivity of microhematuria for significant abdominal pathology on imaging was 66.6% and the specificity was 68.3% (PPV = 39%, NPV 87.1%). Microhematuria was associated with increased length of stay (LOS) in the hospital (p<0.001), surgical interventions (p=0.036) and admission to the pediatric intensive care unit (ICU) (p<0.001).

Conclusion: The diagnostic role of dipstick urine analysis in the assessment of intra-abdominal injury has low sensitivity and specificity. Nevertheless, it is still a valuable screening tool for the evaluation of the severity of injury.

Figure 1 study population

Figure2 hematuria and imaging findings

¹ = p value 0.002, ² = p value 0.045
Positive finding on imaging: solid organ damage, hollow viscus damage or moderated to large amount of free fluid

Figure 3: Mechanism of injury

Table 1: patients' characteristics

	NH n=547	PH n=100	p value
Age (mean)	9.45±5.62	12.40±3.7	< 0.001 ¹
Gender			
Male n (%)	369 (67.3%)	54 (54%)	0.009 ²
Female n (%)	178 (32.5%)	46 (46%)	
Mechanism of injury			
MVA n (%)	286 (52.4%)	43 (43%)	
Fall n (%)	93 (17%)	21 (21%)	
PTS (0-12)	11.02	10.24	< 0.001 ¹
Characteristics of hospitalization			
LOS - days	0.92	2.85	< 0.001 ¹
Trauma team activation n (%)	238 (43.8%)	57 (57%)	0.012 ²
Administration of blood transfusion	1 (0.2%)	5 (5%)	< 0.001 ¹
PICU admission	9 (1.6%)	14 (14%)	< 0.001 ¹
Referral to a Rehabilitation center	1 (0.2%)	3 (3%)	< 0.001 ¹
Readmission	15 (2.7%)	4 (4%)	0.51 ²
Surgical intervention	5 (0.9%)	4 (4%)	0.036 ²

Table 2: intra-abdominal injury on imaging

Type of injury	NH n=547	PH n=100	Total	P value
Abdominal free fluid (Total):	27	13	40	0.002 ¹
Moderate amount of abdominal free fluid	16	8	24	0.012 ²
Large amount of abdominal free fluid	3	5	8	< 0.001 ¹
Liver injury	2	4	6	< 0.001 ¹
Spleen injury	2	7	9	< 0.001 ¹
Urogenital injury	2	3	5	0.0059 ²
Hollow viscus injury	1	2	3	0.0136 ¹
pelvic fracture	4	10	14	< 0.001 ¹