



BACKGROUND

- Imaging follow-up for persistent post-natal hydronephrosis is variable
- Unknown if variability is due to hydronephrosis severity
- Hypothesized that mild hydronephrosis would have less postnatal imaging



Image courtesy of @dhranandh

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KEY FINDINGS

Number of scans in 1 st year of life	Initial Hydronephrosis Grade			p < 0.001
	Mild (n=990)	Moderate (n=230)	Severe (n=160)	
MAG3				
0	81	36	9	
1	17	48	57	
2+	2	16	34	
VCUG				
0	51	19	5	
1	48	80	92	
2+	1	1	2	
RBUS				
1	44	27	34	
2	40	48	41	
3+	16	24	26	

On multivariate analysis, patients with moderate (RR 1.57 [95% CI 1.42 – 1.74]) or severe (RR 2.09 [95% CI 1.88 – 2.32]) hydronephrosis had higher imaging utilization than those with mild hydronephrosis

“ Patients with moderate and severe hydronephrosis had a higher rate of imaging ”



METHODS

- Retrospective cohort study, 2005 – 2013
- Intermountain electronic data warehouse
- ICD-9 codes for hydronephrosis
- Outcome = total imaging in 1st year of life



TAKE-AWAY

- Imaging use for post-natal hydronephrosis is proportional to hydronephrosis grade
- Clinicians are using a risk stratified approach to imaging

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Frequency of imaging in infants with uretero-pelvic junction-like hydronephrosis

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Background

Imaging strategies vary for the postnatal workup and surveillance of antenatally diagnosed and postnatally persistent hydronephrosis (PNH). It is unclear whether known imaging variability is due to PNH severity, practice variation, or both. The aim of this study is to describe the frequency of imaging studies for PNH diagnosis and surveillance within the first year of life, stratified by ultrasound (U/S) grade. We hypothesize that those with mild hydronephrosis (HN) would have less postnatal imaging, whereas those with more severe disease would have more imaging.

Methods

Study design and Data source: Retrospective cohort using Intermountain Healthcare (IH) Enterprise Data Warehouse (EDW), which incorporates laboratory, imaging, pharmacy, and other data from 22 hospitals and 185 clinics. It covers 85% of Utah's children.

Inclusion criteria: (1) Children born between 1/1/2005 and 12/31/2015, (2) Current Procedural Terminology (CPT) code for HN (591.x, 591.4, 593.5, 753.29, 753.21, 753.1x, and 593.7x), and (3) U/S confirmed HN within 4 months of birth.

Exclusion criteria: (1) Children with <2 year of follow-up, and (2) secondary causes for HN (stone, posterior urethral valves, myelomeningocele, bladder exstrophy, prune belly syndrome, congenital megaureters, ureterocele, or primary vesicoureteral reflux).

Data collection: Grade (mild/moderate/severe) of HN on initial postnatal U/S, gender, race/ethnicity, public or private insurance, urban or rural residence, premature or term birth, presence of any non-GU comorbidity, presence of UTI, and whether a pyeloplasty was performed.

Primary outcome: Sum of renal U/Ss, voiding cystourethrograms (VCUGs), and diuretic renal scans within the first year of life or prior to surgical pyeloplasty to correct ureteropelvic junction obstruction. If surgery occurred before the first birthday, patient censored on the day of surgery. Studies could be ordered by any IH provider, not just subspecialists.

Statistical analysis: Poisson regression to analyze association between the primary outcome and the initial grade of PNH, controlling for gender, race/ethnicity, insurance type, place of residence, prematurity, comorbidity, and UTI.

Results

Of 1,380 subjects (993 male and 387 female), 990 (72%), 230 (17%), and 160 (12%) had mild, moderate, and severe HN, respectively. 2,529 U/S, 838 VCUGs, and 597 diuretic renal scans were performed in the first year of life or before surgery (Table 1). Compared to those with mild HN, patients with moderate (RR: 1.57; 95% CI: 1.42-1.73) and severe (RR: 2.09; 95% CI: 1.88-2.32) HN had a significantly higher rate of imaging use over 12 months (or prior to surgery) after controlling for potential confounders (Table 2). These results were consistent when considering only U/S use as the outcome (data not shown).

Conclusion

In a large regional healthcare system, imaging use for PNH is proportional to HN grade. This suggests that within our system clinicians treating this condition are using a risk-stratified approach to imaging.