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UP-091

Utility of Gravity Assisted Drainage Imaging on Diuretic Renography for Predicting Need for Pyeloplasty in Congenital Ureteropelvic Junction Obstruction

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Introduction: Diuretic renography helps identify children with ureteropelvic junction obstruction (UPJO) that might benefit from pyeloplasty. Patients are usually imaged supine which may underestimate drainage compared to the upright position where the effects of gravity may promote drainage. When imaged in the upright position some 'obstructed' kidneys show better drainage. 'Gravity assisted drainage' (GAD) imaging has been reported in the literature, but imaging protocols are variable. UPJO is suggested when time to half peak of the radiotracer is prolonged. At our institution a standardized protocol for assessment of possible UPJO is used and includes GAD imaging. Renal units with clearance of greater than 50% of residual tracer after GAD are considered non-obstructed. The purpose of this study is to assess the utility of GAD imaging as a tool to better select children who are at risk for renal deterioration and who would benefit from pyeloplasty. **Methods:** We retrospectively reviewed gravity assisted diuretic renal scans in 41 patients with 47 renal units referred for investigation of sonographically detected hydronephrosis. Dynamic renal function, time to half peak radiotracer activity, and percent change with GAD were calculated. 13 children and 15 renal units underwent pyeloplasty.

Results: 41 patients with 47 hydronephrotic renal units were analyzed. Left sided hydronephrosis was 2.1 times more common than right. 34 renal units (72%) had excretion phase greater than 20 minutes on conventional diuretic renography, suggesting obstruction. 5 of these renal units (15%) had drainage of greater than 50% of residual after the addition of GAD imaging. 24 renal units (71%) had drainage less than 30%. A total of 15 renal units underwent pyeloplasty. Of those with pre-op GAD drainage less than 30%, 5 had improvement in time to half peak and GAD after pyeloplasty. 1 patient with pre-op GAD of greater than 50% also underwent pyeloplasty, and had improved GAD and time to half peak. Split renal function improved in only 13% of renal units after pyeloplasty.

Conclusion: The GAD technique takes less than 5 minutes to perform and requires no special equipment. GAD imaging may add further clinical information to better identify kidneys with significant UPJO that might benefit from pyeloplasty. Approximately 15% of renal units which appear obstructed during conventional supine imaging may drain well in the upright position, and in such cases pyeloplasty may be unnecessary.

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Endoscopic Injection for Vesicoureteric Reflux with Simultaneous 3-Dimensional Ultrasound: A Novel Technique to Image Mound Formation in Real Time

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Introduction and Objective: Adequate mound formation and volume of injection are two of the factors that correlate with correction of vesicoureteric reflux (VUR) following endoscopic injection. 3D Ultrasound (3D-US) is a new imaging modality that allows for real-time 3-dimensional imaging

and has an increasing number of urologic applications. We present a novel method of visualizing mound formation during endoscopic injection using simultaneous 3D-US.

Methods: Institutional ethics board approval was obtained. Consecutive children undergoing endoscopic injection for VUR were included. A trans-rectal US probe was used to capture a 3D image of the ureterovesical junction (UVJ) before, during, and after injection. 4 children (mean age 8.25) underwent dextranomer/hyaluronic acid injections with simultaneous 3D-US in a total of 7 ureteral units (VUR grade II-III) using the double-HIT technique. 6 additional children will be undergoing the procedure in this pilot study. Success is defined as resolution of VUR on voiding cystourethrogram (VCUG) 2 or 3 months post-operatively.

Results: The technique was feasible, with no immediate or early post-operative complications. Using 3D-US, the mound can be seen forming along the course of the intramural ureter during injection, which cannot be seen cystoscopically. A 3D image of the UVJ guides injection and confirms satisfactory mound formation. Post-operative VCUG demonstrated resolution of VUR in 6 of 7 ureters.

Conclusions: 3D-US during endoscopic injection can be safely performed and offers additional information to the surgeon. A real-time and objective assessment of mound quality may improve injection success rates. Future aims would include using 3D-US to avoid unnecessary high volume injections, and potentially avoid follow-up VCUGs.

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A Significant Association between Sleep Disordered Breathing and Nocturnal Enuresis and Improvements with Successful Treatment

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Introduction and Objective: Nocturnal enuresis (NE) is a common pediatric complaint. Recent research suggests that sleep disordered breathing (SDB) or obstructive sleep apnea (OSA) is prevalent in the NE population, and management of OSA may resolve NE. We aim to determine how successful treatment of NE affects SDB and OSA symptom scores.

Methods: Children with NE who presented to the pediatric urology clinic were given three surveys pre and post intervention: 1) The OSA-18 Quality of Life Survey; 2) The Modified Pediatric Sleep Questionnaire (PSQ-22); and 3) The Dysfunctional Voiding and Incontinence Scoring System (DVISS). Case-based treatment options for NE were chosen. Scores were compared pre and 3 months post treatment.

Results: Twenty-one children have complete follow-up data. Before treatment, the mean OSA-18 score was 49, indicating a generalized mild impairment of quality of life related to SDB. The mean score of the cohort did not change after treatment.

Five patients achieved continence overnight. These patients had a statistically significant decrease in scores from 40 to 30 ($p < 0.05$). Overall, patients whose NE was cured had significantly lower pre-treatment OSA-18 scores than those who did not achieve dryness ($p < 0.05$) and had significantly improved OSA-18 scores after treatment than those whose NE persisted ($p < 0.01$).

Thirteen (62%) patients presented with a positive PSQ-22, with only 2 achieving resolution of NE. Furthermore, of those patients who achieved

dryness, only 1 had a positive PSQ score. Seven patients had a decrease in either sleep related or daytime behavioral symptoms.

Eight patients were referred to otolaryngology for management of SDB. Patients with SDB had OSA-18 scores of 59 vs 42 for those without SDB symptoms. After treatment, scores did not change significantly (56 vs 39).

Conclusions: Although our follow-up is very short, and complete resolution rates low, there is a definite association with SDB and OSA. Those patients with more significant SDB are less likely to achieve dryness quickly overnight. Furthermore, if complete dryness is achieved overnight, there is an improvement in the quality of sleep.

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Predictors of Complications in Children with Duplicated Renal Collecting Systems

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Introduction: Renal abnormalities are often found on prenatal ultrasound and lead to further imaging. Patients with duplication are often asymptomatic, however long term complications can include hydronephrosis, urinary tract infection (UTI), vesico-ureteric reflux and dysuria.

Objectives:

1. To identify which factors are correlated with UTIs and decreased renal function in children with antenatally diagnosed duplicated renal collecting systems.
2. To provide suggestions as to early management in asymptomatic children with duplication.

Methods: Medical records were searched for patients diagnosed with hydronephrosis and obstruction. The 453 patients identified were narrowed to 40 with duplex systems. Data was collected on factors which may predispose to infection including gender, presence of vesicoureteral reflux, obstruction, ureterocele and/or ectopic ureteric orifice.

Other data collected included presence of foreskin, sidedness of duplication, constipation, infrequent voiding, surgical history, antibiotic use, family history and past medical history.

The primary and secondary outcomes were UTI and new renal scarring. UTIs were confirmed by positive cultures and presence of leukocytes in the urine. New renal scarring was investigated by nuclear medicine studies.

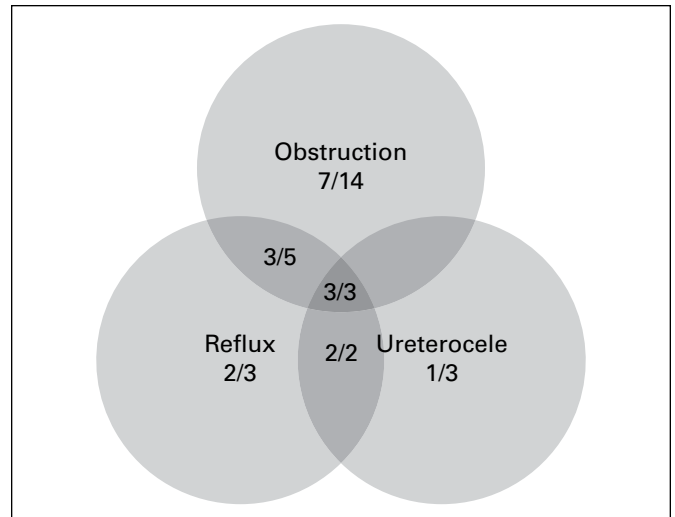


Fig. 1. Infection based on anatomy. UP-094

Results: Forty patients had duplex systems: 20 males and 20 females between 6 months and 8 years old. Of the 40, 19 (48%) had febrile UTIs. Within the group of boys, 35% developed UTIs versus 70% of girls. Detailed results on infection by anatomy are summarized in Figure 1.

Logistic regression analysis was performed to determine which variable(s) predicted the likelihood of a child having a UTI. Gender was the only factor found to be predictive of UTI. Girls were 5.6 times more likely to have a UTI than boys ($p=0.01$, 95% CI 1.4, 21.9). No patients developed new renal scarring.

Conclusions: While these UTIs may not cause ongoing scarring, they do contribute to morbidity. As such, antibiotic prophylaxis in all children with duplex systems may warrant consideration in the first year of life.

Future studies may include following the patients in the current database to track their progression with respect to UTIs, renal scarring, antibiotic use and other relevant variables.