

Title: Assessment and Intervention To Facilitate Adoption of a Unified Grading System For Hydronephrosis

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Specific Educational Aims:

- 1) To assess the rationale behind current use of grading systems for hydronephrosis in maternal fetal medicine, pediatric urology, and pediatric radiology at Stanford.
- 2) To identify barriers to training in or adoption of a single grading system between all three specialties.
- 3) To propose adoption of a validated system (UTD) by the pediatric urology, maternal fetal medicine, and pediatric radiology divisions.
- 4) To train current physicians, advanced care practitioners, fellows and residents in the use and interpretation of the UTD grading system.
- 5) To develop visual aids and educational materials for use of current and future trainees.

Project Rationale:

Antenatal hydronephrosis is found in up to 2% of all prenatal obstetrical ultrasounds, and is one of the most common congenital abnormalities. In most cases this hydronephrosis is due to physiologic dilatation that resolves in the first year after birth. However, it can be associated with conditions such as ureteropelvic junction (UPJ) obstruction, vesicoureteric reflux (VUR) and posterior urethral valves, which can require significant follow-up and intervention. In many cases the differentiation between transient and clinically significant hydronephrosis cannot be made prenatally, and can be a source of significant parental anxiety.

However, the terminology used to describe and quantify hydronephrosis of the fetus and the child varies considerably. Some of this is due to technical limitations: for example, prenatal imaging may not be able to describe calyceal dilatation due to the anatomy being too small to resolve by fetal ultrasound. Therefore, what may be described as 'pyelectasis' prenatally may be described as 'pelviectasis,' 'pelvocaliectasis,' or 'hydronephrosis' postnatally. Surveys have found that even within pediatric radiology, obstetrics, pediatric nephrology and pediatric urology there is no standard method to describe antenatal and perinatal hydronephrosis.

At Stanford, discussion with other specialties has revealed that the most commonly used system in pediatric radiology is the mild/moderate/severe system, while in obstetrics it is the anterior-posterior renal pelvic diameter (APRPD), and in pediatric urology it is the Society for Fetal Urology (SFU) system. Different grading systems can lead to confusion not only in discussions during gestation, but in the care provided by pediatricians and other non-imaging specialties postnatally. Does pelviectasis require follow-up and imaging? Is SFU grade 1 the same as mild hydronephrosis? Does an APRPD of 1.5 mean obstruction? A unified grading system could allow for more seamless information transfer between both grading and non-grading specialties.

Several grading systems have been developed in order to better describe and quantify dilatation of the urinary tract. However, only one (the 2014 UTD system) attempts to make a direct correlation between prenatal dilatation and the likelihood of postnatal uropathy, as well as establishing norms for renal dilatation both prenatally and postnatally. It was developed by representatives from eight medical and surgical societies who care for pre- and postnatal hydronephrosis, and has in short-term follow-up been shown to correlate with resolution of hydronephrosis, development of UTI and future need for

surgery. It has been widely adopted by several major children's hospitals, including Boston Children's Hospital and Children's Hospital of Philadelphia.

However, it is notably more complex than other grading systems, including measurement or assessment of 6 features of the genitourinary tract. This may be a barrier to acceptance, especially given studies showing that most education in hydronephrosis is done through informal bedside training. Training in the SFU system for hydronephrosis using a combination of computer enhanced visual learning (CEVL) modules has been shown to be effective as an adjunct to clinical/small group training. It seems likely that the same would be true of the UTD system.

Approach/Implementation:

- 1) Distribution of an online survey using the Stanford Qualtrics online survey distribution tool. This survey will go through the distribution lists for pediatric urology, pediatric radiology, and obstetrics/maternal fetal medicine. It assesses the respondent's demographics, profession, division, current use of grading systems for hydronephrosis, how they were trained in that system, and changes in their choice of grading systems over their career.
- 2) Small group lecture training in UTD grading system during scheduled multidisciplinary academic time (Uroradiology conference, urology didactic conference, urology resident training conference, and fetal urology conference.)
- 3) Development of Computer Enhanced Visual Learning (CEVL) platform for self-education and review in the UTD system.
- 4) Creation of posters of grading system with examples – medium-sized posters in main pediatric urology, pediatric radiology, and maternal fetal medicine workstations, small laminated posters in ancillary outpatient sites.
- 5) Assessment of trainees' comfort and likelihood of implementation of UTD system.

Timeline:

October 2017 – distribution and collection of initial survey

November - February 2017 – small-group teaching sessions in monthly multidisciplinary educational time; creation and distribution of CEVL platform.

March 2018 – creation and posting of posters for workrooms and outpatient services

March-April 2018 – Completion survey

May-June 2018 – Grand Rounds and CTSS presentations; prepare Journal of Pediatric Urology submission.

Anticipated Work Product: A unified grading system has previously been shown to be beneficial to promote communication between different specialties, and would benefit workflow at Stanford. Furthermore, a standing CEVL module would be available for review and training after graduation of the PI and completion of the project. If successful, this study may also spur future studies on training and grading of hydronephrosis in non-imaging specialties such as nephrology and pediatrics.

Evaluation: Post-teaching Qualtrics online survey on comfort with current level of training in UTD, comfort with teaching UTD system to trainees, and likelihood of adoption and use of UTD system in the future. Gift card provided for participation in both pre- and post-survey.

Dissemination of Results: We anticipate Grand Rounds presentation for Pediatric Nephrology, and submission for educational publication in the Journal of Pediatric Urology. It will also be presented as a Clinical Teaching Seminar Series Honors project.

Budget:

Non-Compensation	Item	Justification	Amount
	40 gift cards at \$20 each	Gift cards to incentivize survey participation	\$800
	Food/drinks	Budget for food items/snacks for small group teaching sessions.	\$200
	Posters	Laminated posters of UTD grading system to be posted in appropriate clinics and workrooms	\$300
	Adobe license	AdobePremier Creative Cloud Suite license for creation of CEVL animations	\$100

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