**Audit on Image Adequacy and Structured Reporting of Postnatal Ultrasound Urinary System in Paediatric Population**

**Descriptor:**

Audit of image adequacy and report documentation for postnatal ultrasound screening of urinary tract dilation in paediatric population.

**Background:**

Ultrasound is a non-invasive and radiation-free imaging technique for screening of urinary tract dilation in the paediatric population. Urinary tract dilation is sonographically detected in 1-2% of foetuses, among which 70-80% could be transient and physiological, while the rest could represent a spectrum of possible uropathies2. Postnatal ultrasound is crucial to identify clinically significant cases to prompt early workup and management to prevent development of long term complications.

The urinary tract dilation (UTD) classification system was proposed in 2014 with the collaborations from eight societies (American College of Radiology, American Institute of Ultrasound in Medicine, American Society of Pediatric Nephrology, Society for Fetal Urology, Society for Maternal-Fetal Medicine, Society for Pediatric Urology, Society for Pediatric Radiology, and the Society of Radiologists in Ultrasound). This consensus statement strives to achieve a unified description of urinary tract dilation that could be applied both prenatally and postnatally, and a standardised scheme for the perinatal evaluation of these patients based on sonographic criteria2. An update on the UTD classification has been published in 2022 in which clarifications have been provided.

Since 2014, UTD classification system has been validated by several clinical studies to correlate with clinical outcome. The higher the UTD grades are, the lower the probability of spontaneous resolution and the longer time to resolution. There is also a higher risk of urinary tract infection and need of surgical intervention2. Many studies have shown that the inter-rater reliability is higher for UTD classification system than Society of Fetal Urology (SFU) hydronephrosis grading system, with similar intra-rater reliability2.

Six categories in ultrasound findings are included: anterior-posterior renal pelvic diameter (APRPD), calyceal dilation, renal parenchymal thickness, renal parenchymal appearance, bladder abnormalities and ureteral abnormalities. For APRPD 10 to <15mm or central calyceal dilation, it is classified as UTD P1 and considered low risk for postnatal uropathies. With APRPD ≥15mm or presence of peripheral calyceal dilation, or when there is distal ureteral dilation ≥ 4mm (with APRPD ≥10mm or calyceal dilation), it is classified as UTD P2 and considered intermediate risk. If the APRPD is ≥10mm or there is presence of any calyceal dilation, along with renal parenchymal thinning, increased renal parenchymal echogenicity, decreased corticomedullary differentiation, presence of cortical cyst or bladder abnormalities, it is classified as UTD P3 and considered high risk1,2.

## The Cycle

**The standard:**

The first postnatal ultrasound should be done more than 48 hours after birth to ensure it does not underestimate dilation1.

Imaging and documentation the followings:

1. Measurement of the widest intrarenal anterior-posterior renal pelvic diameter (APRPD) in the transverse plane1,2.

2. Any presence of central or peripheral calyceal dilation1,2.

3. Normal or abnormal renal parenchymal thickness1,2

4. Normal or abnormal renal parenchymal appearance (including its echogenicity, corticomedullary differentiation and any presence of cortical cyst)1,2.

5. Any dilation of the distal ureters (i.e. >4mm)1,2.

6. Any presence of bladder wall thickening, ureterocele and posterior urethral dilation1,2.

7. Assign specific UTD category accordingly (normal, UTD P1, UTD P2 or UTD P3)1,2.

**Target:**

100% of ultrasound scans and reports for paediatric patients should meet these standards.

## Assess local practice

**Indicators:**

The percentage of ultrasound scans and reports which adhere to each of the standards.

**Data items to be collected:**

1. Is the urinary system screened on both transverse and sagittal planes?

2. Is the APRPD correctly measured and documented?

3. Is the presence or absence of calyceal dilation documented?

4. Is there documentation of renal parenchymal thickness as normal or abnormal?

5. Is there documentation of renal parenchymal appearance as normal or abnormal (e.g. parenchymal echogenicity, corticomedullary differentiation or presence of cortical cyst)?

6. Is there documentation of whether the distal ureters are normal or dilated?

7. Is there documentation of bladder appearance as normal or abnormal (e.g. bladder wall thickening, presence of ureterocele or posterior urethral dilation)?

8. Is a specific UTD category assigned accordingly?

**Suggested number:**

Ultrasound scans of the urinary system for paediatric patients (from 0 to 17 years old) should be collected and reviewed. All cases performed during the preceding three months, or the most recent 50 consecutive cases (whichever number is greater). Cases of non-congenital cause of UTD such as stone or tumour, isolated hydroureter, multicystic dysplastic kidney or postoperative kidney should be excluded1,2.

**Suggestions for change if target not met:**

1. Publicise the standards for paediatric urinary system ultrasound scanning technique and reporting, through in-person departmental radiology meetings and dissemination of written material to radiologists and sonographers.

2. Create an automated urinary system ultrasound report template for use during electronic report transcription, in order to improve standardisation of scanning techniques and comprehensive reports.

3. Re-audit six months after intervention, to assess for improvement in practice. Continue the audit spiral, to ensure sustained compliance with the standards.

**Resources:**

1. Radiology information system (RIS) to review administrative details and reports.

2. Picture archiving computer system (PACS) to review saved ultrasound images.

3. Statistical computer software, such as Microsoft Excel, for recording and analysing data.

[**utd\_reporting\_template\_rcr\_audit\_3.5.2022.pdf**](https://www.rcr.ac.uk/sites/default/files/audit_template/utd_reporting_template_rcr_audit_3.5.2022.pdf)PDF - 221.09 KB

**References:**

1. Nguyen, H., Benson, C., Bromley, B., Campbell, J., Chow, J., & Coleman, B. et al. (2014). Multidisciplinary consensus on the classification of prenatal and postnatal urinary tract dilation (UTD classification system). Journal Of Pediatric Urology, 10(6), 982-998. doi: 10.1016/j.jpurol.2014.10.002
2. Nguyen, H., Phelps, A., Coley, B., Darge, K., Rhee, A., & Chow, J. (2022). 2021 update on the urinary tract dilation (UTD) classification system: clarifications, review of the literature, and practical suggestions. Pediatric Radiology, 52(4), 740-751. doi: 10.1007/s00247-021-05263-

**Submitted by:**

Dr. EH Chan

**Co-authors:**

Dr. HM Kwok

Dr. NY Pan

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