

Pediatric urologists, radiologists team up to devise standard protocol for VCUGs

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To improve patient safety and standardize data obtained from a voiding cystourethrogram (VCUG), the AAP Section on Radiology and Section on Urology have established a standard protocol for performing the test.

Establishing a Standard Protocol for the Voiding Cystourethrography, a new clinical report, is available at <http://dx.doi.org/10.1542/peds.2016-2590> and will be published in the November issue of *Pediatrics*.

Need for standard protocols

Pediatric urologists base many of their treatment plans and diagnoses on images obtained by their local radiology department. Protocols ensure that the same region of the body is imaged with the same technique each time to allow observation of disease, set surgical indications or judge postoperative results. Standard protocols play an important role in comparing results among institutions and facilitate multicenter studies. Therefore, most imaging studies are required to be performed according to national, and often international, agreed-upon protocols to compare results and ensure patient safety.

In 2014, a standard protocol was formulated by the American College of Radiology and the Society for Pediatric Radiology in their practice parameters for the performance of the VCUG. However, in practice, VCUG protocols differ significantly among institutions.

Impact of differences

A survey of 65 pediatric radiology chairs at national children's hospitals demonstrated that the VCUG protocols are very different throughout the U.S. and Canada. Statistically significant differences were reported concerning the amount of bladder filling, whether immobilization and sedation were used, the formula by which to predict bladder capacity and the height of contrast above the patient. Differences in individual test parameters can have a significant effect on the outcome of the test and have the potential to influence management protocols of individual patients.

In a study on 183 patients after Deflux injection (substance injected around the opening of one or both ureters to prevent urinary reflux), 60% of patients with a postoperative positive VCUG result did not show vesicoureteral reflux (VUR) until the bladder was filled over the age-adjusted bladder capacity. If an alternative protocol had been used that filled the bladder just to the age-adjusted capacity, those patients would have had a negative VCUG, and their surgery would have been labeled successful. Therefore, the postoperative success rates would be a function not only of the surgical technique and skill of the surgeon but also of the specific VCUG imaging technique.

Recent AAP guidelines recommend a VCUG for children between 2 and 24 months of age under certain conditions such as after recurrence of a febrile urinary tract infection, but they do not specify how this test should be performed (*Urinary Tract Infection: Clinical Practice Guideline for the Diagnosis and Management of the Initial UTI in Febrile Infants and Children 2 to 24 Months*, <http://bit.ly/2cZTbx4>).

Different VCUG protocols undoubtedly impact the detection and grade of VUR but also may have a direct effect on the reporting of postoperative results. The complexity of the VCUG makes it difficult to compare two protocols that are different in several aspects of the test.

All of these factors prompted a consensus group of pediatric urologists and radiologists to formulate a standard protocol (see box) for the VCUG to be recognized and followed by both societies. The protocol serves as guidance for the clinician in rendering pediatric care.

Template for voiding cystourethrogram

Patient name; date of birth; medications; medical record number;

Date of study:

Reason for examination: Information provided by ordering physician

Comparison: Previous studies

Technique:

Informed consent is obtained and documented in the patient's record.

1. Observe ALARA (As Low As Reasonably Achievable for minimizing radiation exposure) and Image Gently principles.
2. Observe recommendations for possible sedation.
3. Observe recommendations for possible immobilization.
4. Toilet trained: Allow patient to void in private bathroom immediately before the study.
5. After voiding and for non-toilet-trained individuals: Insert a small age-appropriate (3.5-8 French) nonballoon catheter using sterile technique.
6. Measure postvoid residual (PVR) urine in mL.
7. Obtain a single anterior-posterior (AP) scout image covering the kidneys, ureters and bladder.
8. Retrograde fill the bladder (bladder filling) with radiographic contrast at body temperature.
9. During filling, obtain multiple spot images in AP, right and left oblique, and lateral position.
10. Fill bladder until voiding occurs and stop contrast flow.
11. Obtain voiding images of the urethra.
12. Refill bladder until voiding occurs.
13. Obtain voiding and postvoid images of the kidneys and bladder.
14. Record maximum amount of contrast instilled.

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