

The American College of Radiology, with more than 30,000 members, is the principal organization of radiologists, radiation oncologists, and clinical medical physicists in the United States. The College is a nonprofit professional society whose primary purposes are to advance the science of radiology, improve radiologic services to the patient, study the socioeconomic aspects of the practice of radiology, and encourage continuing education for radiologists, radiation oncologists, medical physicists, and persons practicing in allied professional fields.

The American College of Radiology will periodically define new practice guidelines and technical standards for radiologic practice to help advance the science of radiology and to improve the quality of service to patients throughout the United States. Existing practice guidelines and technical standards will be reviewed for revision or renewal, as appropriate, on their fifth anniversary or sooner, if indicated.

Each practice guideline and technical standard, representing a policy statement by the College, has undergone a thorough consensus process in which it has been subjected to extensive review, requiring the approval of the Commission on Quality and Safety as well as the ACR Board of Chancellors, the ACR Council Steering Committee, and the ACR Council. The practice guidelines and technical standards recognize that the safe and effective use of diagnostic and therapeutic radiology requires specific training, skills, and techniques, as described in each document. Reproduction or modification of the published practice guideline and technical standard by those entities not providing these services is not authorized.

1992 (Res. 13)
Amended 1995 (Res. 24, 53)
Revised 1996 (Res. 24)
Revised 2000 (Res. 38)
Revised 2005 (Res. 34)
Amended 2006 (Res. 17,35)
Effective 10/01/05

ACR PRACTICE GUIDELINE FOR THE PERFORMANCE OF ADULT CYSTOGRAPHY AND URETHROGRAPHY

PREAMBLE

These guidelines are an educational tool designed to assist practitioners in providing appropriate radiologic care for patients. They are not inflexible rules or requirements of practice and are not intended, nor should they be used, to establish a legal standard of care. For these reasons and those set forth below, the American College of Radiology cautions against the use of these guidelines in litigation in which the clinical decisions of a practitioner are called into question.

The ultimate judgment regarding the propriety of any specific procedure or course of action must be made by the physician or medical physicist in light of all the circumstances presented. Thus, an approach that differs from the guidelines, standing alone, does not necessarily imply that the approach was below the standard of care. To the contrary, a conscientious practitioner may responsibly adopt a course of action different from that set forth in the guidelines when, in the reasonable judgment of the practitioner, such course of action is indicated by the condition of the patient, limitations on available resources or advances in knowledge or technology subsequent to publication of the guidelines. However, a practitioner who employs an approach substantially different from these guidelines is advised to document in the patient record information sufficient to explain the approach taken.

The practice of medicine involves not only the science, but also the art of dealing with the prevention, diagnosis, alleviation, and treatment of disease. The variety and complexity of human conditions make it impossible to always reach the most appropriate diagnosis or to predict with certainty a particular response to treatment. Therefore, it should be recognized that adherence to these guidelines will not assure an accurate diagnosis or a successful outcome. All that should be expected is that the practitioner will follow a reasonable course of action based on current knowledge, available resources, and the needs of the patient to deliver effective and safe medical care. The sole purpose of these guidelines is to assist practitioners in achieving this objective.

I. INTRODUCTION

This guideline has been developed to assist radiologists performing cystography and urethrography in adult patients. Properly performed cystography and urethrography are diagnostic radiological imaging tests that can provide information about the urethra, bladder, and occasionally the ureters. Additional or specialized examinations may be required. Cystography and urethrography may not detect all lower urinary tract abnormalities, but adherence to the following guideline will maximize the probability of their detection.

II. DEFINITION

Cystography and urethrography consist of imaging the bladder and/or urethra before, during, and after administration of contrast via urethral or cystostomy catheter. Alternative terms for these studies include cystourethrography, voiding cystourethrography, and retrograde urethrography. One or more images are obtained before the infusion or injection of contrast. Following contrast administration, images are obtained. Abnormalities of the bladder or urethra may be detected, as well as extrinsic effects upon them by adjacent abnormalities. Fluoroscopy may enhance diagnostic accuracy.

III. GOAL

The goal of cystography and/or urethrography is to detect the presence or absence of anatomic and/or functional abnormalities of the lower urinary tract by producing a series of diagnostic quality images.

IV. INDICATIONS

Indications for cystography include, but are not limited to, evaluation of:

1. Recurrent urinary tract infections.
2. Vesicoureteral reflux.
3. Bladder contour.
4. Bladder diverticula.
5. Suspected rupture.
6. Fistulae.
7. Integrity of postoperative anastomoses or suture lines.
8. Bladder outlet obstruction.
9. Incontinence.
10. Hematuria.
11. Neoplasia.

Indications for urethrography include, but are not limited to, evaluation of:

1. Urethral diverticula.
2. Urethral strictures.
3. Bladder outlet or urethral obstruction.
4. Trauma.
5. Recurrent urinary tract infection.

For each patient, the expected gain of diagnostic information should outweigh any potential risk to the patient.

All imaging facilities should have policies and procedures to reasonably attempt to identify pregnant patients prior to the performance of any examination involving ionizing radiation. If the patient is known to be pregnant, the potential radiation risks to the fetus and clinical benefits

of the procedure should be considered before proceeding with the study. (1995, 2005 - ACR Resolution 1a)

V. QUALIFICATIONS AND RESPONSIBILITIES OF PERSONNEL

See the [ACR Practice Guideline for General Radiography](#).

VI. SPECIFICATION OF THE EXAMINATION

The written or electronic request for a cystography and/or urethrography examination should provide sufficient information to demonstrate the medical necessity of the examination and allow for its proper performance and interpretation.

Documentation that satisfies medical necessity includes 1) signs and symptoms and/or 2) relevant history (including known diagnoses). Additional information regarding the specific reason for the examination or a provisional diagnosis would be helpful and may at times be needed to allow for the proper performance and interpretation of the examination.

The request for the examination must be originated by a physician or other appropriately licensed health care provider. The accompanying clinical information should be provided by a physician or other appropriately licensed health care provider familiar with the patient's clinical problem or question and consistent with the state scope of practice requirements. (2006 - ACR Resolution 35)

A. Appropriate history and preprocedure screening should be performed by personnel familiar with the various risk factors, preparations, and premedication strategies.

B. If a urinary catheter is not in place, the urethra or bladder should be catheterized using aseptic technique. An appropriate volume of contrast should be administered to demonstrate the anatomic structures of interest. The examination should be tailored to the needs of the individual patient. Fluoroscopy can optimize diagnostic yield, especially during voiding studies. Clinical judgment should guide decisions about contrast quantity and use of infusion or injection technique.

C. Appropriate images should be produced to demonstrate normal and abnormal findings with the minimum radiation dose necessary to achieve an optimal study.

VII. DOCUMENTATION

Reporting should be in accordance with the [ACR Practice Guideline for Communication of Diagnostic Imaging Findings](#).

VIII. RADIATION SAFETY IN IMAGING

Radiologists, medical physicists, radiologic technologists, and all supervising physicians have a responsibility to minimize radiation dose to individual patients, to staff, and to society as a whole, while maintaining the necessary diagnostic image quality. This is the concept “As Low As Reasonably Achievable (ALARA)”.

Facilities, in consultation with the medical physicist, should have in place and should adhere to policies and procedures, in accordance with ALARA, to vary examination protocols to take into account patient body habitus, such as height and/or weight, body mass index or lateral width. The dose reduction devices that are available on imaging equipment should be active or manual techniques should be used to moderate the exposure while maintaining the necessary diagnostic image quality. Patient radiation doses should be periodically measured by a medical physicist in accordance with the appropriate ACR Technical Standard. (2006 - ACR Resolution 17)

IX. QUALITY CONTROL AND IMPROVEMENT, SAFETY, INFECTION CONTROL, AND PATIENT EDUCATION CONCERNS

Policies and procedures related to quality, patient education, infection control, and safety should be developed and implemented in accordance with the ACR Policy on Quality Control and Improvement, Safety, Infection Control and Patient Education Concerns appearing elsewhere in the ACR Practice Guidelines and Standards book.

Equipment performance monitoring should be in accordance with the [ACR Technical Standard for Diagnostic Medical Physics Performance Monitoring of Radiologic and Fluoroscopic Equipment](#).

ACKNOWLEDGEMENT

This guideline was revised according to the process described in the ACR Practice Guidelines and Technical Standards book by the Guidelines and Standards Committee of the Commission on General and Pediatric Radiology, with assistance from the Society of Uroradiology.

Principal Reviewer: Philip Kenney, MD

Guidelines and Standards Committee

Kimberly E. Applegate, MD, MS, Chair
Richard A. Carlson, MD
Kevin M. Cawley, MD
Ronald E. Cordell, MD

Eric N. Faerber, MD
Bob W. Gayler, MD
Sam Kottamasu, MD
Arnold C. Merrow, MD
Diane C. Stollo, MD
Susan L. Voci, MD
Edward Weinberger, MD

J. Bruce Hauser, MD, Chair, Commission

Comments Reconciliation Committee

Jon D. Shanser, MD, Co-Chair, CSC
Julie K. Timins, MD, Co-Chair, CSC
Paul H. Ellenbogen, MD
Paul A. Larson, MD
G. David Dixon, MD
Bob W. Gayler, MD
Robert R. Hattery, Jr., MD
Philip J. Kenney, MD
Philip L. Lund, MD

REFERENCES

1. Amis ES Jr, Blaivas JG. The role of the radiologist in evaluating voiding dysfunction. *Radiology* 1990;175:317-318.
2. Barbaric ZL. Autonomic dysreflexia in patients with spinal cord lesions: complication of voiding cystourethrography and ileal loopography. *AJR* 1976;127:293-295.
3. Byrne DJ. Re: double balloon positive pressure urethrography is a more sensitive test than voiding cystourethrography for diagnosing urethral diverticulum in women. *J Urol* 2000;163:1891.
4. Gallentine ML, Morey AF. Imaging of the male urethra for stricture disease. *Urol Clin North Am* 2002;29:361-372.
5. Giannantoni A, Di Stasi SM, Scivoletto G, et al. Autonomic dysreflexia during urodynamics. *Spinal Cord* 1998;36:756-760.
6. Golomb J, Leibovitch I, Mor Y, et al. Comparison of voiding cystourethrography and double-balloon urethrography in the diagnosis of complex female urethral diverticula. *Eur Radiol* 2003;13:536-542.
7. Hertz M. Cystourethrography. In: Pollack HM, ed. *Clinical Urography*. Philadelphia, Pa: W.B. Saunders; 1990:256-295.
8. Morey AF, Iverson AJ, Swan A, et al. Bladder rupture after blunt trauma: guidelines for diagnostic imaging. *J Trauma* 2001;51:683-686.
9. Morgan DE, Nalamalla LK, Kenney PJ, et al. CT cystography: radiographic and clinical predictors of bladder rupture. *AJR* 2000;174:89-95.
10. Pelsang RE, Bonney WW. Voiding cystourethrography in female stress incontinence. *AJR* 1996;166:561-565.

11. Peng MY, Parisky YR, Cornwell EE, et al. CT cystography versus conventional cystography in evaluation of bladder injury. *AJR* 1999;173:1269-1272.
12. Summitt RL Jr, Stovall TG. Urethral diverticula: evaluation by urethral pressure profilometry, cystourethroscopy, and the voiding cystourethrogram. *Obstet Gynecol* 1992;80:695-699.
13. Yoder IC, Papanicolaou N. Imaging the urethra in men and women. *Urol Radiol* 1992;14:24-28.