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ACR PRACTICE GUIDELINE FOR THE PERFORMANCE OF EXCRETORY UROGRAPHY

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 by the American College of Radiology (ACR) with input from the Society of Uroradiology to assist physicians supervising the performance or interpretation of excretory urography. Properly performed excretory urography is a diagnostic radiologic imaging test that can provide information about the kidneys and urinary tract. It is not possible to detect all abnormalities using excretory urography, but adherence to the following guideline will maximize the probability of their detection. Additional specialized or modified examinations, such as Ultrasound, CT or MRI, may be necessary.

(For pediatric considerations, see Section IV.)

II. DEFINITIONS

Excretory urography consists of imaging the kidneys and urinary tracts before and after the administration of intravenous contrast material. One or more abdominal images, and tomograms when appropriate, are obtained before the injection of the intravenous contrast. After contrast injection, images, and tomograms when appropriate, are obtained to evaluate the renal parenchyma, collecting systems, ureters, and bladder. The anatomic appearance and the patterns of contrast concentration and excretion may reveal abnormalities of the kidneys and the remainder of the urinary tract. Occasionally, abnormalities of adjacent structures may be detected. Intravenous urography (IVU) and intravenous pyelography (IVP) are synonyms for excretory urography (EU).

III. GOAL

The goal of excretory urography is to detect anatomic and physiologic abnormalities of the urinary tract by producing a timed series of images of optimal diagnostic quality. It should be performed with the minimum radiation to the patient necessary to provide sufficient anatomic detail for diagnosis of normal or abnormal urinary tract findings.

IV. INDICATIONS

Common indications include the evaluation of hematuria, pain, or fever suggesting a renal or urinary tract origin, recurrent urinary tract infection, clinical suspicion of a renal mass, and lower urinary tract obstructive or voiding problems. There are many less common indications for excretory urography. An experience-based understanding of the relative merits of other imaging examinations such as sonography, computed tomography (CT), nuclear medicine, and magnetic resonance imaging (MRI) will result in the selection of the most appropriate test.

For suspected ureterolithiasis in young and/or thin children, sonography may be the initial imaging modality. For older children and/or large children, noncontrast CT may be the initial imaging study analogous to adult patient imaging. Excretory urography in pediatric patients may be clinically appropriate if sonography and CT cannot reasonably explain signs of urinary tract disease.

V. QUALIFICATIONS AND RESPONSIBILITIES OF PERSONNEL

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

Additionally, physicians performing this procedure should have documented formal training in the performance, interpretation, and reporting of excretory urograms. The

physician should supervise and interpret excretory urograms on a regular basis.

The supervising physician must:

1. Be familiar with the disease processes for which the patient is being evaluated and must understand the urographic manifestations of these diseases as well as variants of normal anatomy and congenital anomalies;
2. Have an understanding of and experience in proper film technique, film sequencing, and the use of tomography as well as the volume and concentration of appropriate intravenous contrast material (see the ACR Manual on Contrast Media). The physician should be familiar with the various contrast agents available and the indications for the use of each. The physician should also be familiar with patient preparation for the examination, including hydration and bowel preparation; and
3. Have training in the recognition and treatment of adverse reactions to intravenous contrast material. Training in cardiopulmonary resuscitation is required for those who attend to patients undergoing excretory urography. (See the ACR Manual on Contrast Media.)

VI. SPECIFICATIONS OF THE EXAMINATION

The written or electronic request for excretory urography 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. Patient Selection and Preparation

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

The supervising physician must be specifically aware of relative contraindications to excretory urography, including an appropriate allergic history, prior contrast reactions, and inappropriate indications in which the examination would not be expected to provide meaningful information, as well as circumstances in which it may be harmful.

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)

B. Injection of Contrast Material

After intravenous access is obtained, contrast material is injected. Care and preparation of intravenous access sites are the responsibility of the supervising physician and the healthcare professional who injects the contrast.

The physician or, if state and local regulations permit, the radiologic technologist or registered nurse may inject the contrast material.¹ This individual must be aware of the signs and symptoms of an adverse reaction and must monitor the patient for the development of these signs and symptoms during the examination. The supervising physician must monitor the examination, and appropriate personnel must be available to respond promptly to any adverse reactions.

Appropriate emergency equipment and medications must be immediately available to treat adverse reactions associated with administered medications. The equipment and medications should be monitored for inventory and drug expiration dates on a regular basis.

C. Image Acquisition

1. Preliminary image(s) should be evaluated prior to the injection of contrast to check positioning and technique. Significant radiographic abnormalities should be noted.
2. Postcontrast sequential images, and possibly tomograms, should be obtained to evaluate the kidneys, upper collecting systems, ureters, and urinary bladder. These images should be monitored to provide a study tailored to address the clinical question(s).
3. In some clinical circumstances (e.g., pregnancy), a limited examination may be more appropriate.

¹See the [ACR Practice Guideline for the Use of Intravascular Contrast Media](#). (2007 - ACR Resolution 38)

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 Technical Standards book.

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

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