

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.

1995 (Res. 33)
Revised 1999 (Res. 16)
Revised 2004 (Res. 31f)
Effective 10/1/04

ACR PRACTICE GUIDELINE FOR THE PERFORMANCE OF SCROTAL SCINTIGRAPHY

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. It should be recognized; therefore, 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) to guide physicians performing scrotal scintigraphy in adults and children. Properly performed imaging with radiopharmaceuticals that localize temporarily in the scrotal blood pool is a sensitive means of evaluating a number of conditions associated with acute and subacute scrotal pain (e.g., testicular torsion versus acute epididymitis/orchitis). Correlation with clinical findings, especially with the site of symptoms and with findings from other imaging procedures, particularly ultrasound with Doppler, is imperative for maximum diagnostic yield.

Application of this guideline should be in accordance with the [ACR Technical Standard for Diagnostic Procedures Using Radiopharmaceuticals](#).

II. GOAL

The goal of scrotal scintigraphy is to produce images of diagnostic quality that enable the interpreting physician to assess the cause of acute or subacute scrotal pain. Such studies should be performed as soon as possible, so that surgery, if necessary, can be performed in a timely fashion.

III. INDICATIONS

The clinical indication for scrotal scintigraphy is differentiation of specific causes of acute and subacute scrotal pain, especially testicular torsion and epididymitis/orchitis. The procedure is not indicated in evaluating cryptorchidism, tumors, or chronic inflammation.

IV. QUALIFICATIONS AND RESPONSIBILITIES OF PERSONNEL

See the [ACR Technical Standard for Diagnostic Procedures Using Radiopharmaceuticals](#).

V. SPECIFICATIONS OF THE EXAMINATION

A. Radiopharmaceuticals

The most commonly used radiopharmaceutical is technetium-99m sodium pertechnetate. The other acceptable agent is technetium-99m (stannous) diethylenetriamine pentaacetic acid (DTPA). The usual adult administered activity is 15-25 millicuries (555-940 MBq), given intravenously. Administered activity must be reduced for children on the basis of weight or body surface area. The minimum pediatric administered activity should be as low as practically achievable for appropriate image quality.

B. Patient

The patient should lie supine with his legs comfortably abducted. His penis should be positioned cephalad and secured in the midline to the lower abdomen. The scrotum should be suspended on a tape sling placed between the thighs or elevated on towels or similar material. Some advocate placing a lead marker on the scrotal raphe. A lead shield may be placed under the scrotum or over the thighs and lower abdomen to shield extraneous counts. Physician evaluation of the patient's scrotum and testicles may aid in interpretation of the images.

C. Examination

The gamma camera detector is positioned anteriorly over the scrotum. The radiopharmaceutical is injected intravenously as a bolus. As radioactivity appears in the

iliac and femoral arteries, a rapid-sequence series of images (one frame every 1 to 2 seconds) is acquired during the first minute. Simultaneous computer acquisition may serve as a backup in case of technical problems. Immediately thereafter, a static image (300,000-500,000 counts) is acquired. If a pinhole collimator is used for prepubertal boys, as many counts as possible should be obtained, up to a maximum imaging time of 10 minutes. Delays in obtaining images should be avoided because radioactivity accumulates in the bladder and in body background within 10 minutes, rendering evaluation of findings more difficult. An additional view with a cobalt-57 or technetium-99m marker to identify the location of the symptomatic site may be helpful. When possible, it is advised that the nuclear medicine physician or radiologist position such markers.

VI. EQUIPMENT SPECIFICATIONS

Any gamma camera may be used. A low-energy, all-purpose/general all-purpose (LEAP/GAP) or high-resolution collimator, converging collimator, or pinhole collimator can be used. If a large-field-of-view camera (>300 mm) is used, electronic magnification is desirable. Imaging in the neonate is impractical because of the small size of the testicles. If a computer is used, the matrix should be 128 x 128 or larger.

VII. DOCUMENTATION

Reporting should be in accordance with the [ACR Practice Guideline for Communication: Diagnostic Radiology](#).

VIII. 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 Medical Nuclear Physics Performance Monitoring of Nuclear Medicine Imaging Equipment](#).

ACKNOWLEDGEMENTS

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 Nuclear Medicine Commission.

R. Edward Coleman, MD, Chair
Gary L. Dillehay, MD
Michael J. Gelfand, MD
L. Stephen Graham, PhD
Kathryn A. Morton, MD
Sara M. O'Hara, MD
John O. Olsen, MD
Alice M. Scheff, MD
Kenneth M. Spicer, MD, PhD

Milton J. Guiberteau, MD, Chair, Commission

REFERENCES

1. Atkinson GO Jr, Patrick LE, Ball TI Jr, et al. The normal and abnormal scrotum in children: evaluation with color Doppler sonography. *AJR* 1992; 158:613–617.
2. Freitas JE. Scrotal imaging. In: Sandler MP, Coleman RE, Patton JA, et al, eds. *Diagnostic nuclear medicine*. 4th ed. Baltimore, Md: Williams & Wilkins, 2003:903–910.
3. Holder LE, Martire JR, Holmes ER, et al. Testicular radionuclide angiography and static imaging: anatomy, scintigraphic interpretation, and clinical indications. *Radiology* 1977; 125:739–752.
4. Lutzker LG, Zuckier LS. Testicular scanning and the applications of radionuclide imaging of the genital tract. *Semin Nucl Med* 1990; 20:159–188.
5. Melloul M, Paz A, Lask D, et al. The pattern of radionuclide scrotal scan in torsion of testicular appendages. *Eur J Nucl Med* 1996; 23:967–970.
6. Middleton WD, Siegel BA, Melson GL, et al. Acute scrotal disorders: prospective comparison of color Doppler ultrasound and testicular scintigraphy. *Radiology* 1990; 177:177–181.
7. Nussbaum AR, Bulas D, Shalaby-Rana E, et al. Color Doppler sonography and scintigraphy of the testis: a prospective, comparative analysis in children with acute scrotal pain. *Pediatr Emerg Care* 2002; 18:67–71.
8. Siegel MJ. The acute scrotum. *Radiol Clin North Am* 1997; 35:959–976.