ACR–AIUM–SPR–SRU PRACTICE PARAMETER FOR THE PERFORMANCE OF SCROTAL ULTRASOUND EXAMINATIONS

PREAMBLE

This document is an educational tool designed to assist practitioners in providing appropriate radiologic care for patients. Practice Parameters and Technical Standards are not inflexible rules or requirements of practice and are not intended, nor should they be used, to establish a legal standard of care[1]. For these reasons and those set forth below, the American College of Radiology and our collaborating medical specialty societies caution against the use of these documents 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 practitioner considering all the circumstances presented. Thus, an approach that differs from the guidance in this document, 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 this document when, in the reasonable judgment of the practitioner, such course of action is indicated by variables such as the condition of the patient, limitations of available resources, or advances in knowledge or technology after publication of this document. However, a practitioner who employs an approach substantially different from the guidance in this document may consider documenting in the patient record information sufficient to explain the approach taken.

The practice of medicine involves the science, and 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 the guidance in this document 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 purpose of this document is to assist practitioners in achieving this objective.

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1 *Iowa Medical Society and Iowa Society of Anesthesiologists v. Iowa Board of Nursing, 831 N.W.2d 826 (Iowa 2013) Iowa Supreme Court refuses to find that the "ACR Technical Standard for Management of the Use of Radiation in Fluoroscopic Procedures (Revised 2008)" sets a national standard for who may perform fluoroscopic procedures in light of the standard's stated purpose that ACR standards are educational tools and not intended to establish a legal standard of care. See also, Stanley v. McCarver, 63 P.3d 1076 (Ariz. App. 2003) where in a concurring opinion the Court stated that "published standards or guidelines of specialty medical organizations are useful in determining the duty owed or the standard of care applicable in a given situation" even though ACR standards themselves do not establish the standard of care.*

I. INTRODUCTION

The clinical aspects contained in specific sections of this practice parameter (Introduction, Indications, Specifications of the Examination, and Equipment Specifications) were developed collaboratively by the American College of Radiology (ACR), the American Institute of Ultrasound in Medicine (AIUM), the Society of Radiologists in Ultrasound (SRU), and the Society for Pediatric Radiology (SPR). Recommendations for Qualifications and Responsibilities of Personnel, Written Requests for the Examination, Documentation, and Quality Control and Improvement, Safety, Infection Control, and Patient Education vary among the four organizations and are

addressed by each separately.

These practice parameters are intended to assist practitioners performing ultrasound studies of the scrotum. In some cases, additional and/or specialized examinations may be necessary. Although it is not possible to detect every abnormality, adherence to the following practice parameters will maximize the probability of detecting most of the abnormalities that occur in the scrotum.

II. INDICATIONS

Indications for scrotal ultrasound include, but are not limited to [1, 2], the following:

1. Evaluation of scrotal pain resultant from any etiology, including, but not limited to, trauma, ischemia, infection, and inflammation [3-11]
2. Evaluation of a palpable inguinal, intrascrotal, or testicular mass [1, 2, 12-15]
3. Evaluation of scrotal asymmetry, swelling, or enlargement [1, 2, 16]
4. Evaluation of potential intrascrotal hernia [17]
5. Detection/evaluation of varicoceles [18, 19]
6. Evaluation of male infertility [1, 20]
7. Follow-up of previous indeterminate scrotal ultrasound findings [14, 19, 21]
8. Evaluation of inguinal testes [22]
9. Detection of an occult primary tumor in patients with metastatic germ cell tumor [23] or unexplained retroperitoneal adenopathy or paraneoplastic syndrome
10. Follow-up of patients with previous primary testicular neoplasms, testicular adrenal rest tumors, or testicular leukemia/lymphoma [24, 25]
11. Evaluation of an abnormality noted on other imaging studies (including, but not limited to, computed tomography , magnetic resonance imaging and positron emission tomography)
12. Evaluation of a disorder of sexual development [26]

III. QUALIFICATIONS AND RESPONSIBILITIES OF PERSONNEL

See the ACR–SPR–SRU Practice Parameter for the Performance and Interpretation of Diagnostic Ultrasound Examinations [27].

IV. SPECIFICATIONS OF THE EXAMINATION

The written or electronic request for scrotal ultrasound should provide sufficient information to demonstrate the medical necessity of the examination and allow for the proper performance and interpretation of the examination.

Documentation that satisfies medical necessity includes 1) signs and symptoms and/or 2) relevant history (including known diagnoses). The provision of 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. (ACR Resolution 35 adopted in 2006 – revised in 2016, Resolution 12-b)

The presence of two testes should be documented either on a single transverse, coronal, or coronal oblique image. A cine loop survey scan, taken in both longitudinal and transverse projections, may be obtained and stored with the rest of the study when technically feasible. The testes should be evaluated in at least two planes, longitudinal and transverse. Transverse images should be obtained in the superior, mid, and inferior portions of the testes. Longitudinal views should be obtained centrally as well as medially and laterally. Each testis should be evaluated in its entirety. Testicular volumes can be provided using the Lambert formula (length × width × height × 0.71) [28]. In cases of acute swelling or pain, the presence or absence of pain, by patient report, before beginning the scan should be noted. Some authors suggest that the asymptomatic side should be evaluated first and the

symptomatic side afterward with the same/similar grayscale and Doppler settings [11]. The size, echogenicity, and blood flow of each testis and the epididymis should be compared with the contralateral side. Comparison of the right and left testes on both grayscale and color/power Doppler is best done with separate side by side views in a dual screen format. If a palpable abnormality is the indication for the sonogram, this area should be directly imaged [1, 2]. In the event that a testis is not identified within the scrotum, the ipsilateral inguinal canal, inguinal rings, and pelvis should be scanned in an attempt to locate the testis.

Relevant intra-scrotal structures should be evaluated. The head, body, and tail of the epididymis should be evaluated when technically feasible. The spermatic cord and the supratesticular area should be evaluated if there is suspicion for testicular torsion [9, 10, 29]. The scrotal wall, including the overlying skin, should be evaluated. Additional techniques, such as the Valsalva maneuver or upright positioning, can be used as needed. If the examination is performed for infertility workup, consider scanning in the upright position which can increase the sensitivity for detection of varicoceles [30]. When possible, the vas deferens should also be evaluated in infertility workup. [31].Any abnormality should be documented.

Doppler sonography (spectral and color/power Doppler imaging) should be used as necessary in examinations of the scrotum and is required in the setting of acute scrotal pain. If used, color and/or power Doppler sonography should include at least one side-by-side image comparing both testes. Provided overlying tissues do not attenuate sound asymetrically, identical Doppler settings should be used to evaluate symmetry of flow between the testes. Both arterial and venous flow should be documented on Doppler sonography. Low-flow detection settings should be used, if necessary, to document testicular blood flow. When available, resistive index measurements from arteries in each testis for comparison.

V. DOCUMENTATION

Reporting should be in accordance with the ACR Practice Parameter for Communication of Diagnostic Imaging Findings [32]

Adequate documentation is essential for high-quality patient care. In the case of testicular torsion, which is a critical diagnosis (or emergent finding), please refer to the ACR Practice Parameter for Communication of Diagnostic Imaging Findings [32], in the section on nonroutine communications. Comparison with previous relevant imaging studies may prove helpful. Images of all appropriate areas, both normal and abnormal, should be recorded. Variations from normal size should generally be accompanied by measurements. The presence or absence of changes should be documented when prior ultrasound examinations are available for comparison. Comparison with other previous relevant imaging studies may also prove helpful. An official interpretation (final report) of the ultrasound examination should be included in the patient's medical record. Retention of the ultrasound examination images should be consistent both with clinical need and with relevant legal and local health care facility requirements.

VI. EQUIPMENT SPECIFICATIONS

Equipment performance monitoring should be in accordance with the ACR-AAPM Technical Standard for Diagnostic Medical Physics Performance Monitoring of Real Time Ultrasound Equipment [33].

Scrotal studies should be conducted, preferably using a 12 MHz or higher linear array transducer. A curved array transducer or linear transducer with lower frequencies may be needed if the scrotum is enlarged, recognizing that there is a trade-off between spatial resolution and beam penetration. The highest possible Doppler frequencies (typically in the 5.0-10 MHz range) providing optimal resolution and flow detection should be used. The Doppler frequency may differ from imaging frequency. A copious layer of gel can be used, if necessary, to improve imaging.

VII. QUALITY CONTROL AND IMPROVEMENT, SAFETY, INFECTION CONTROL, AND PATIENT EDUCATION

Transducers should be cleaned after each use.

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 appearing under the heading *ACR Position Statement on Quality Control and Improvement, Safety, Infection Control and Patient Education* on the ACR website (https://www.acr.org/Advocacy-and-Economics/ACR-Position-Statements/Quality-Control-and-Improvement).

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