AIUM Practice Parameter for the Performance of Scrotal Ultrasound Examinations, 2025 Revision

The American Institute of Ultrasound in Medicine (AIUM) is a multidisciplinary association dedicated to advancing the safe and effective use of ultrasound in medicine through professional and public education, research, development of clinical practice parameters, and accreditation of practices performing ultrasound examinations.

The AIUM Practice Parameter for the Performance of Scrotal Ultrasound Examinations, 2025 Revision, was revised by the American Institute of Ultrasound in Medicine (AIUM) in collaboration with other organizations whose members use ultrasound for performing this examination(s) (see "Acknowledgments"). Recommendations for personnel requirements, the request for the examination, documentation, quality assurance, and safety may vary among the organizations and may be addressed by each separately.

This Practice Parameter is intended to provide the medical ultrasound community with recommendations for the performance and recording of high-quality ultrasound examinations. The parameter reflects what the AIUM considers the appropriate criteria for this type of ultrasound examination but is not intended to establish a legal standard of care. Examinations performed in this specialty area are expected to follow the Parameter with the recognition that deviations may occur depending on the clinical situation.

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]

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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]

Qualifications and Responsibilities of Personnel

Physicians interpreting or performing this type of ultrasound examination should meet the specified AIUM Training Guidelines[27] in accordance with AIUM accreditation policies.[28]

Sonographers performing the ultrasound examination should be appropriately credentialed[29] in the specialty area in accordance with AIUM accreditation policies.[28]

Physicians not personally performing the examination must provide supervision, as defined by the Centers for Medicare and Medicaid Services Code of Federal Regulations 42 CFR §410.32,[30] which is available from the US Government Publishing Office.

Request for the Examination

The written or electronic request for an ultrasound examination must originate from a physician or other appropriately licensed health care provider or under the provider's direction. The clinical information provided should allow for the performance and interpretation of the appropriate ultrasound examination and should be consistent with relevant legal and local health care facility requirements.

Specification 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 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 $\times$ width $\times$ height $\times$ 0.71).[31] 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.[9,10,32] 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.[33] When possible, the vas deferens should also be evaluated in infertility workup.[34] 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 asymmetrically, 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, use resistive index measurements from arteries in each testis for comparison.

Documentation

Accurate and complete documentation is essential for high-quality patient care. Written reports and ultrasound images/video clips that contain diagnostic information should be obtained and archived, with recommendations for follow-up studies if clinically applicable, in accordance with the AIUM Practice Parameter for Documentation of an Ultrasound Examination.[35]

In the case of testicular torsion, which is a critical diagnosis (or emergent finding), please refer to the *AIUM Practice Parameter for Documentation of an Ultrasound Examination*,[35] in the section on Reporting of Nonroutine Results. 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.

Equipment Specification

Equipment performance monitoring should be in accordance with the *AIUM Routine Quality Assurance of Clinical Ultrasound Equipment*.[36]

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 the imaging frequency. A copious layer of gel can be used, if necessary, to improve imaging.

Quality and Safety

Policies and procedures related to quality assurance and improvement, safety, infection control, and equipment-performance monitoring should be developed and implemented in accordance with the AIUM Standards and Guidelines for the Accreditation of Ultrasound Practices.[28]

ALARA Principle

The potential benefits and risks of each examination should be considered. The ALARA (as low as reasonably achievable) principle[37] should be observed for factors that affect the acoustical output and by considering transducer dwell time and total scanning time. Further details on ALARA may be found in the

current version of the AIUM's publication *Medical Ultrasound Safety*.[38]

Infection Control

Transducer preparation, cleaning, and disinfection should follow manufacturer recommendations and be consistent with the AIUM's Guidelines for Cleaning and Preparing External- and Internal-Use Ultrasound Transducers Between Patients, Safe Handling, and Use of Ultrasound Coupling Gel.[39]

Equipment Performance Monitoring

Monitoring protocols for equipment performance should be developed and implemented in accordance with the AIUM Standards and Guidelines for the Accreditation of Ultrasound Practice.[28]

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Data Availability Statement

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

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