



CAR Standard for Performing Scrotal Ultrasound Examinations

The standards of the Canadian Association of Radiologists (CAR) are not rules, but are guidelines that attempt to define principles of practice that should generally produce radiological care. The physician and medical physicist may modify an existing standard as determined by the individual patient and available resources. Adherence to CAR standards will not assure a successful outcome in every situation. The standards should not be deemed inclusive of all proper methods of care or exclusive of other methods of care reasonably directed to obtaining the same results. The standards are not intended to establish a legal standard of care or conduct, and deviation from a standard does not, in and of itself, indicate or imply that such medical practice is below an acceptable level of care. The ultimate judgment regarding the propriety of any specific procedure or course of conduct must be made by the physician and medical physicist in light of all circumstances presented by the individual situation.

Approved: April 28, 2011

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I. INTRODUCTION

These standards have been developed to provide assistance to practitioners performing ultrasound examinations of the scrotum and are based on the practice guidelines published by the American College of Radiology, the American Institute of Ultrasound in Medicine and the Society of Radiologists in Ultrasound which we acknowledge.

Ultrasound should only be performed for a valid medical reason. The lowest possible ultrasound exposure settings should be used to obtain the necessary diagnostic information. In some cases, additional and/or specialized examinations may be necessary. While it is not possible to detect every abnormality, adherence to the following standards will increase the probability of detecting many of the abnormalities that occur.

Extensive experience has shown that ultrasound is a safe and effective diagnostic procedure. While no demonstrable harmful effects of ultrasound have been demonstrated at power levels used for diagnostic studies, quality assurance dictates it is necessary to utilize this imaging technique in the most appropriate and indicated fashion, and that studies be performed by qualified and knowledgeable physicians and/or sonographers using appropriate equipment and techniques. Diagnostic ultrasound examinations should be supervised and interpreted by trained and credentialed physician imaging specialists.

II. SONOLOGIST'S CREDENTIALS CRITERIA

Diagnostic Radiologists involved in the performance, supervision and interpretation of ultrasonography must have a Fellowship or Certification in Diagnostic Radiology with the Royal College of Physicians and Surgeons of Canada and/or the Collège des médecins du Québec. Also acceptable are equivalent foreign Radiologist qualifications if the Radiologist so qualified holds an appointment in Radiology with a Canadian University. Continuing professional development must meet with the requirements of the Maintenance of Certification Program of the Royal College of Physicians and Surgeons of Canada and/or provincial requirements.

III. SONOGRAPHER'S CREDENTIALS CRITERIA

Sonographers should be graduates of an accredited training program or have obtained certification by the Canadian Association of Registered Diagnostic Ultrasound Professionals (CARDUP) or the American Registry of Diagnostic Medical Sonographers (ARDMS). They should be members of their national or provincial professional organization. Continuing medical education should be mandatory consistent with the requirements of the facility and CARDUP or ARDMS.

IV. DOCUMENTATION

Adequate documentation is essential for high quality patient care and such documentation should consist of a permanent record of the ultrasound examination and its interpretation. Appropriate normal and abnormal images should be recorded for each anatomical area together with appropriate measurements. Images should be appropriately labeled with the examination date, patient identification, facility identification and image location and orientation. A written report should be included with the patient's medical record.

The images must be of sufficient quality to record pertinent findings and to be used for comparison with subsequent examinations and enable third party sonologists to confirm the diagnosis.

A permanent record of each ultrasound examination and written report should be retained for a statutory period which should be consistent with clinical needs and relevant legal and local health care facility requirements. Videotape may be used as a supplement to the digital or hard copy images of an ultrasound examination. The videotape record of the ultrasound examination should be retained for the similar statutory period as the remainder of the permanent record. The videotape cassette number and counter number (name or time) must be recorded in a log book or on the printed report to allow for future access.

V. SUPERVISION AND INTERPRETATION OF ULTRASOUND EXAMINATIONS

A sonologist must be available for consultation with the sonographer on a case by case basis. Ideally the sonologist should be on-site and available to participate actively in the ultrasound examination when required. However, if not possible, then the sonologist must be available by telephone or other electronic/digital means for consultation with the sonographer and the referring physician. The sonologist should visit the facility on a regular basis to provide on-site review of ultrasound procedures and sonographer supervision.

Adequate documentation of each examination is critical. Reporting should be in accordance with the CAR Standard for Communication of Diagnostic Imaging Findings.

VI. QUALITY IMPROVEMENT PROGRAMS

Facilities should maintain and regularly update procedure manuals. Procedures should be systematically monitored and evaluated as part of the overall quality improvement program of the facility. Monitoring should include the evaluation of the accuracy of interpretation as well as the appropriateness of the examination. Incidence of complications and adverse reactions should be recorded and periodically reviewed in order to identify opportunities to improve patient care. Data should be collected in a manner which complies with the statutory and regulatory peer review procedures in order to protect confidentiality of the peer review data.

VII. EQUIPMENT

Scrotal studies should be conducted with a real time scanner, preferably using linear or curved linear transducers. The transducer should be adjusted to operate at the highest clinical appropriate frequency. With modern equipment, these frequencies are usually 7 MHz or higher. Resolution should be of sufficient quality to discern the internal characteristics of detectable lesions.

Doppler frequencies used should be the highest possible to optimize resolution and flow detection. With modern equipment, Doppler frequencies range from 5 to 10 MHz. The total ultrasound exposure should be kept as low as reasonably achievable (ALARA principle).

Standoff pads can be used, if necessary, to improve imaging.

VIII. SONOGRAPHIC TECHNIQUE

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 and longitudinal images, medially, centrally and laterally. Both testes, epididymes and any other scrotal contents should be assessed. Testicular size, location and morphology should be documented. Testicular parenchyma should be evaluated for the presence of focal or diffuse disease.

The epididymal head, body and tail should be evaluated for size, location and morphology including the presence of focal or diffuse abnormality. The size and echogenicity of each testicle and epididymis should be compared with its opposite side. This is best done with a side-by-side transverse image.

Any abnormalities of the testicle or epididymis should be documented and measured, preferably in three planes.

Scrotal skin thickness should be evaluated. If a palpable abnormality is present, this area should be directly imaged.

The contents of the tunica vaginalis should be assessed. Fluid should be characterized as to its volume, location and echogenicity. Additional techniques, such as the Valsalva manoeuvre and upright positioning, can be used as needed, particularly to assess for varicosities.

Spectral and colour/power Doppler sonography should be a part of all scrotal examinations to assess testicular and epididymal blood flow, particularly in patients presenting with acute scrotal pain. Low flow detection settings should be used to document testicular blood flow and the transducer frequency should be optimized for maximum Doppler sensitivity while maintaining adequate penetration. The flow in the symptomatic scrotum should be compared with the asymptomatic side using identical Doppler settings to evaluate symmetry of flow. Variations from normal should be documented. If colour Doppler imaging cannot detect flow, then power Doppler imaging, if available, should be used to increase flow sensitivity.

SELECTED REFERENCES

1. Akin EA, Khati NJ, Hill MC. Ultrasound of the scrotum. *Ultrasound Quarterly* 2004; 20:181–200.
2. Aso C, Enriquez G, Fite M et al. Gray-scale and color Doppler sonography of scrotal disorders in children: an update. *Radiographics* 2005;25:1197-1214.
3. Bhatt S, Dogra VS. Role of US in testicular and scrotal trauma. *Radiographics* 2008; 28:1617–1629.
4. Casalino DD, Kim R. Clinical importance of a unilateral striated pattern seen on sonography of the testicle. *AJR Am J Roentgenol* 2002; 178:927–930.
5. Dogra VS, Gottlieb RH, Oka M, Rubens DJ. Sonography of the scrotum. *Radiology* 2003;227:18–36.
6. Dogra VS, Rubens DJ, Gottlieb RH, Bhatt S. Torsion and beyond: new twists in spectral Doppler evaluation of the scrotum. *J Ultrasound Med* 2004; 23:1077-1085.
7. Ragheb D, Higgins JR Jr. Ultrasonography of the scrotum: technique, anatomy, and pathologic entities. *J Ultrasound Med* 2002; 21:171–185.
8. Sudakoff GS, Quiroz F, Karcaaltincaba M, Foley WD. Scrotal ultrasonography with emphasis on the extratesticular space: anatomy, embryology, and pathology. *Ultrasound Quarterly* 2002;18:255–273.
9. Woodward PJ, Sohaey R, O’Donoghue MJ, Green DE. From the archives of the AFIP: tumors and tumorlike lesions of the testis—radiologic-pathologic correlation. *Radiographics* 2002;22:189–216.
10. Yang DM, Kim SH, Kim HN, et al. Differential diagnosis of focal epididymal lesions with gray scale sonographic, color Doppler sonographic, and clinical features. *J Ultrasound Med* 2003;22:135–142.
11. d. *J Obstet Gynaecol Can* 2007;29:364–365