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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.

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ACR PRACTICE GUIDELINE FOR THE PERFORMANCE OF A SHOULDER ULTRASOUND EXAMINATION

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

The clinical aspects of this guideline (Introduction, Indications, Specifications of the Examination, and Equipment Specifications) were developed collaboratively by the American College of Radiology (ACR) and the American Institute of Ultrasound in Medicine (AIUM). Recommendations for physician requirements, procedure documentation, and quality control vary between the two organizations and are addressed by each separately.

This guideline has been developed to assist practitioners performing a sonographic examination of the shoulder. In some cases, an additional and/or specialized examination may be necessary. While it is not possible to detect every abnormality, following this guideline will maximize the detection of abnormalities of the shoulder.

In experienced hands, shoulder ultrasound has been demonstrated to be an accurate and cost-effective examination that is comparable to MRI for the evaluation of full-thickness rotator cuff tears.

II. QUALIFICATIONS AND RESPONSIBILITIES OF PERSONNEL

Application of this guideline should be in accordance with the [ACR Practice Guideline for Performing and Interpreting Diagnostic Ultrasound Examination](#).

III. INDICATIONS FOR A SHOULDER ULTRASOUND EXAMINATION

The indications for ultrasound of the shoulder include, but are not limited to, evaluation of shoulder pain or dysfunction.

IV. SPECIFICATIONS OF THE EXAMINATION

Patients should be examined in the sitting position, preferably on a rotating seat.

Examination of the shoulder should be tailored according to the patient's clinical circumstances and range of motion.

The biceps tendon should be examined with the forearm in supination and resting on the thigh or with the arm in slight external rotation. The tendon is examined in a transverse plane (short axis) where it emerges from under the acromion to the musculotendinous junction distally. Longitudinal views (long axis) should be obtained of the biceps tendon. These views should be used to determine if the tendon is properly positioned within the bicipital groove, subluxed, dislocated, or torn.

To examine the subscapularis tendon, the arm should be in external rotation. Both transverse (long axis) and sagittal (short axis) views should be obtained. Dynamic evaluation as the patient moves from internal to external rotation may be helpful.

To examine the supraspinatus tendon the arm can be extended posteriorly, and the palmar aspect of the hand can be placed against the superior aspect of the iliac wing with the elbow flexed and directed towards midline (instruct patient to place the hand in the back pocket). Other positioning techniques may also be helpful. To scan the supraspinatus and infraspinatus tendons along their long axis, it is important to orient the transducer approximately 45 degrees between the sagittal and coronal planes to obtain a longitudinal view. The transducer should then be moved posteriorly to visualize the tendons. Transverse views should be obtained by rotating the probe 90 degrees to the long axis of the tendons. The more posterior aspect of the infraspinatus and teres minor tendons should be examined by placing the transducer at the level of the glenohumeral joint below

the scapular spine while the forearm rests on the thigh with the hand supinated. Internal and external rotation of the forearm is helpful in identifying the infraspinatus muscle and its tendon and in detecting small joint effusions. To visualize the teres minor tendon, the probe should be angled slightly inferiorly. Throughout the examination of the rotator cuff, the cuff should be compressed to detect nonretracted tears. In the evaluation of rotator cuff tears, comparison with the contralateral side may be useful.

While examining the rotator cuff, it is also important to evaluate for bursal thickening, fluid, loose bodies, tendon calcification, and muscle and bony abnormalities. If symptoms warrant, the acromioclavicular joint, the supraspinatus notch, and the spinoglenoid notch should also be evaluated. Dynamic evaluation of the rotator cuff is also useful.

V. DOCUMENTATION

Adequate documentation is essential for high-quality patient care. There should be a permanent record of the sonographic examination and its interpretation. Images of all appropriate areas, both normal and abnormal, should be recorded in an appropriate format. Variations from normal size should be accompanied by measurements. Images are to be appropriately labeled with the examination date, patient identification, and image orientation. A report of the sonographic findings should be included in the patient's medical record. Retention of the permanent record of the sonographic examination should be consistent both with clinical need and with the relevant legal and local health care facility requirements.

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

VI. EQUIPMENT SPECIFICATIONS

Shoulder ultrasound should be performed with real-time scanners using high-frequency linear array transducers. Center frequencies between 7 and 10 MHz are usually best for imaging the rotator cuff. When the rotator cuff is much deeper than normal, a 5 MHz transducer may be required for adequate penetration.

VII. 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 Real Time Ultrasound Equipment](#).

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