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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.

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ACR–AIUM–SRU PRACTICE GUIDELINE FOR THE PERFORMANCE OF DIAGNOSTIC AND SCREENING ULTRASOUND OF THE ABDOMINAL AORTA IN ADULTS

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 of 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.

Therefore, it should be recognized 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 contained in specific sections of this guideline (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), and the Society of Radiologists in Ultrasound (SRU). Recommendations for physician requirements, written request for the examination, procedure documentation, and quality control vary among the three organizations and are addressed by each separately.

These guidelines are intended to assist in the performance and interpretation of the dedicated sonographic examination of the abdominal aorta. The examination may be performed as a diagnostic or screening study. Comprehensive population screening programs have not yet been developed in the United States but do exist elsewhere in the world [1,2]. While it is not possible to detect every abnormality, following this guideline will maximize the detection of abnormalities of the abdominal aorta.

II. QUALIFICATIONS AND RESPONSIBILITIES OF PERSONNEL

Each organization addresses this requirement individually. ACR language is as follows:

See the [ACR–SPR–SRU Practice Guideline for Performing and Interpreting Diagnostic Ultrasound Examinations](#).

III. INDICATIONS/CONTRAINDICATIONS

Indications for ultrasound of the abdominal aorta include, but are not limited to:

A. Diagnostic Evaluation for Abdominal Aortic Aneurysm

1. Palpable or pulsatile abdominal mass.
2. Unexplained lower back pain, flank pain, or abdominal pain.
3. Follow-up of a previously demonstrated abdominal aortic aneurysm.
4. Follow-up of patients with an abdominal aortic and/or iliac endoluminal stent graft.

B. Screening Evaluation for Abdominal Aortic Aneurysm

1. Men age 65 or older.
2. Women age 65 or older with cardiovascular risk factors.
3. Patients age 50 or older with a family history of aortic and/or peripheral vascular aneurysmal disease.
4. Patients with a personal history of peripheral vascular aneurysmal disease.

Groups with additional risk include patients with a history of smoking, hypertension, or certain connective tissue diseases (e.g., Marfan’s syndrome).

There are no absolute contraindications to ultrasound of the aorta. If aortic rupture or dissection is clinically suspected, ultrasound is usually not the examination of choice.

IV. WRITTEN REQUEST FOR THE EXAMINATION

Each organization addresses this requirement individually. ACR language is as follows:

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

Documentation that satisfies medical necessity includes 1) signs and symptoms and/or 2) relevant history (including known diagnoses). 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’s scope of practice requirements. (ACR Resolution 35, adopted in 2006)

V. SPECIFICATIONS OF THE EXAMINATION

A. Diagnostic Examination

The examination includes the following, when feasible:

1. Abdominal aorta
 - a. Longitudinal images (along the long axis of the vessel)
 - i. Proximal
 - ii. Mid
 - iii. Distal
 - b. Transverse images (perpendicular to the long axis of the vessel)
 - i. Proximal (near diaphragm)
 - ii. Mid
 - iii. Distal
 - c. Measurements
 - i. Measurements of the proximal, mid, and distal aorta should be obtained. Measurements are taken at the greatest diameter of the aorta from outer edge to outer edge.
 - ii. If an aneurysm is present, the maximal size and location of the aneurysm should be documented and recorded. The relationship of the dilated segment to the renal arteries and to the aortic bifurcation should be determined if possible.
 - iii. A measurement of the length of the aneurysm is not necessary.
2. Common iliac arteries
 - a. Longitudinal images of the proximal right and left common iliac arteries (along the long axis of the vessel).
 - b. Transverse images (perpendicular to the long axis of the vessel) of the proximal

common iliac arteries just below the bifurcation.

- c. Measurement of the widest visualized portion of each common iliac artery from outer edge to outer edge.

Color Doppler imaging and/or spectral Doppler with waveform analysis of the aorta and iliac arteries may provide additional information.

After endoluminal graft placement, color (or power) and spectral Doppler are required to document the presence or absence of endoleaks.

Interobserver measurements of an aortic aneurysm can vary by as much as 5 mm. This variation makes visual comparison with previous studies particularly important to determine whether or not a significant change in size has occurred [3].

B. Screening Examination for Abdominal Aortic Aneurysm

1. Abdominal aorta
 - a. Longitudinal images (along the long axis of the vessel)
 - i. Proximal
 - ii. Mid
 - iii. Distal
 - b. Transverse images (perpendicular to the long axis of the vessel)
 - i. Proximal (near diaphragm)
 - ii. Mid
 - iii. Distal

C. Interpretation of the screening examination should include at least 3 categories:

1. Positive – Infrarenal abdominal aortic aneurysm greater than or equal to 3 cm in diameter or greater than or equal to 1.5 times the diameter of the more proximal aorta [4]. The latter definition is particularly important in women [5].
2. Negative – No infrarenal abdominal aortic aneurysm.
3. Indeterminate – Aneurysmal status not defined because of nonvisualization or only partial visualization of the infrarenal abdominal aorta.

The report should also state whether or not the suprarenal aorta was seen and, if seen, should reflect whether or not it is normal.

VI. DOCUMENTATION

Each organization addresses this requirement individually. ACR language is as follows:

Adequate documentation is essential for high-quality patient care. There should be a permanent record of the ultrasound examination and its interpretation. Comparison with prior 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. Images should be labeled with the patient identification, facility identification, examination date, and image orientation. 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.

Reporting should be in accordance with the [ACR Practice Guideline for Communication of Diagnostic Imaging Findings](#).

VII. EQUIPMENT SPECIFICATIONS

Abdominal aortic ultrasound should be performed with real-time scanners with transducers that allow for appropriate penetration and resolution, depending on the patient's body habitus. Diagnostic information should be optimized, while keeping total ultrasound exposure as low as reasonably achievable.

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

Each organization addresses this requirement individually. ACR language is as follows:

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 *Position Statement on QC & Improvement, Safety, Infection Control, and Patient Education* on the ACR web page (<http://www.acr.org/guidelines>).

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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on Ultrasound in collaboration with the AIUM and the SRU.

Collaborative Committee

ACR

Raymond E. Bertino, MD, FACR, Chair
Lincoln L. Berland, MD, FACR
Edward I. Bluth, MD, FACR

AIUM

Lin Diacon, MD
David M. Paushter, MD, FACR
Carl C. Reading, MD, FACR

SRU

Mark E. Lockhart, MD, MPH
Laurence Needleman, MD, FACR
Hisham Tchelepi, MD

ACR Guidelines and Standards Committee – Ultrasound

Mary C. Frates, MD, FACR, Chair
Debra L. Acord, MD
Marcela Bohm-Velez, MD, FACR
Helena Gabriel, MD
Ruth B. Goldstein, MD
Robert D. Harris, MD, MPH, FACR
Beverly E. Hashimoto, MD, FACR
Leann E. Linam, MD
Laurence Needleman, MD, FACR
Maitray D. Patel, MD
Philip W. Ralls, MD, FACR
Michelle L. Robbin, MD, FACR
Robert M. Sinow, MD
Deborah Levine, MD, FACR, Chair, Commission

Comments Reconciliation Committee

Beverly G. Coleman, MD, Co-Chair, FACR
Richard N. Taxin, MD, Co-Chair, FACR
Kimberly E. Applegate, MD, MS, FACR
Lincoln L. Berland, MD, FACR
Raymond E. Bertino, MD, FACR
Edward I. Bluth, MD, FACR
Lin Diacon, MD
Howard B. Fleishon, MD, MMM, FACR
Mary C. Frates, MD, FACR
David I. Hammond, MD, FACR
Alan D. Kaye, MD, FACR
Paul A. Larson, MD, FACR
Deborah Levine, MD, FACR
Lawrence A. Liebscher, MD, FACR
Mark E. Lockhart, MD, MPH
Laurence Needleman, MD, FACR
David M. Paushter, MD, FACR
Carl C. Reading, MD, FACR
Hisham Tchelepi, MD
E. Kent Yucel, MD, FACR

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Suggested Reading (Additional articles that are not cited in the document but that the committee recommends for further reading on this topic)

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*Guidelines and standards are published annually with an effective date of October 1 in the year in which amended, revised or approved by the ACR Council. For guidelines and standards published before 1999, the effective date was January 1 following the year in which the guideline or standard was amended, revised, or approved by the ACR Council.

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