AIUM Practice Parameter for the Performance of Diagnostic and Screening Ultrasound Examinations of the Abdominal Aorta in Adults

Introduction

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 Diagnostic and Screening Ultrasound Examinations of the Abdominal Aorta in Adults was developed (or 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 recognition that deviations may occur depending on the clinical situation.

The examination may be performed as a diagnostic screening study.1–3

Indications

Indications for ultrasound of the abdominal aorta include but are not limited to the following:
A. Diagnostic Evaluation for an Abdominal Aortic Aneurysm (AAA)

1. Palpable or pulsatile abdominal mass or abdominal bruit.
2. Unexplained lower back pain, flank pain, or abdominal pain.
3. Follow-up of a previously demonstrated AAA.
   Recommendations for rescanning patients are as follows: 4
   a. For AAA size of 3.0–3.9 cm, follow-up ultrasound every 3 years.
   b. For AAA size of 4.0–4.9 cm, follow-up annually.
   c. For AAA size of 5.0–5.4 cm, follow-up every 6 months.
4. Follow-up of patients after AAA repair, particularly after endovascular aortic aneurysm repair.

B. Screening Evaluation for

1. Men age 65 or older who have ever smoked.
2. Women age 65 or older with cardiovascular risk factors.
3. Individuals age 50 or older with a family history of aortic and/or peripheral vascular aneurysmal disease.
4. Individuals with a personal history of peripheral vascular aneurysmal disease.
5. Individuals with other risk factors for an AAA.

Qualifications and Responsibilities of Personnel

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

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

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.

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.

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 (below diaphragm, near the celiac artery).
      ii. Mid (near the level of the renal arteries).
      iii. Distal (through the iliac bifurcation).
   b. Transverse images (perpendicular to the long axis of the vessel):
      i. Proximal (below diaphragm, near the celiac artery).
      ii. Mid (near the level of the renal arteries).
      iii. Distal (through the iliac bifurcation).
   c. Measurements:
      i. Measurements are taken at the greatest diameter of the aorta, from outer edge to outer edge. The aorta should be imaged in the plane that is parallel to the long axis of the lumen (for measurement of the anteroposterior dimension) and perpendicular to the long axis of the lumen (for measurement of the transverse dimension). The aorta may also be scanned using a lateral or coronal approach if it cannot be visualized from an anterior transducer approach. The measurements obtained via these scan planes are equivalent to transverse measurements.
      ii. If an AAA is present, the maximal size and location of the aneurysm should be documented and recorded. The relationship of the dilated segment with the renal arteries...
and with the aortic bifurcation should be
determined if possible.
iii. At a minimum, the largest measurement should
be recorded and reported. A measurement of
the length of the aneurysm is optional.
iv. If an AAA is present, the shape of the
aneurysm should be documented either as
fusiform, eccentric, or saccular. Documentation
should include representative
images, which enable the radiologist to
categorize the shape of the aneurysm.
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
imaging with waveform analysis of the aorta and iliac
arteries may be helpful to demonstrate patency and
the presence of an intraluminal thrombus.

After endovascular aortic aneurysm repair, color
(or power) Doppler imaging and spectral Doppler
imaging are required to document the presence or
absence of endoleaks. Contrast-enhanced ultrasound
may be helpful for identification of endoleaks. Note:
This would be an off-label use of contrast-enhanced
ultrasound based on the current Food and Drug
Administration approval status.5

Interobserver measurements of an aortic aneurysm
can vary by as much as 5 mm. Visual comparison with
prior studies is recommended to ensure measurements
are obtained at similar locations and to assess for inter-
val change in aneurysm size. Consistent measurements
of aneurysm diameter are recommended following
endograft repair to check for interval enlargement in
sac size.6 Excessive transducer pressure should be
avoided when measuring aortic size.

B. AAA
Anteroposterior measurements of the aorta sufficient
to determine whether an aortic aneurysm exists
according to the criteria listed above in subhead
Specifications of the Examination, under A. Diagnos-
tic Examination, number 1, section c, subsection i,
should be obtained. If an aneurysm is present, its
greatest dimension should be reported. However, if
no aneurysm is identified, the largest diameter of the
abdominal aorta should be reported.

C. Interpretation of the Screening Examination
Should Include at Least 3 Categories
1. Positive: Infrarenal AAA greater than or equal to
3 cm in diameter or greater than or equal to 1.5
times the diameter of the more proximal infrarenal
aorta.7 The latter definition is particularly impor-
tant in women and small adults.8
2. Negative: No infrarenal AAA.
3. Indeterminate: Aneurysmal status not de-

mented because of nonvisualization or partial visualization
of the infrarenal abdominal aorta and/or iliac
bifurcation.
4. The report should also state whether the suprarenal
aorta was seen and, if seen, should reflect whether it is
normal. The report should also state whether dilata-
tion of the aorta above the celiac artery is noted. For
the area above the celiac artery, an aneurysm may be
reported if the diameter is greater than 3.9 cm for
male patients or 3.1 cm for female patients.

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 recommenda-
tions for follow-up studies if clinically applicable, in
accordance with the AIUM Practice Parameter for Docu-
mentation of an Ultrasound Examination.

Equipment Specifications
An abdominal aortic ultrasound examination should be
performed with real-time scanners with trans-
ducers that allow for appropriate penetration and res-
olution, depending on the patient’s body habitus.
Diagnostic information should be optimized while
keeping total ultrasound exposure as low as reason-
ably achievable.
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.

ALARA (As Low as Reasonably Achievable) Principle
The potential benefits and risks of each examination should be considered. The ALARA principle should be observed for factors that affect the acoustic output and by considering the transducer dwell time and total scanning time. Further details on ALARA may be found in the current AIUM publication Medical Ultrasound Safety.

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 and Equipment Between Patients, Safe Handling, and Use of Ultrasound Coupling Gel.

Equipment Performance Monitoring
Monitoring protocols for equipment performance should be developed and implemented in accordance with the AIUM’s Standards and Guidelines for the Accreditation of Ultrasound Practices.

Acknowledgments

This parameter was revised by the AIUM in collaboration with the American College of Radiology (ACR) and the Society of Radiologists in Ultrasound (SRU). We are indebted to the many volunteers who contributed their time, knowledge, and energy to developing this document.

Collaborative Subcommittees

AIUM
Tara Morgan, MD
Margarita Revzin, MD
Gayatri Yoshi, MD

ACR
John S. Pellerito, MD, chair
Nirvikar Dahiya, MD

Helena Gabriel, MD
Stephen I. Johnson, MD
Joseph F. Polak, MD, MPH

SRU
Raymond E. Bertino, MD
Franklin N. Tessler, MD

AIUM Clinical Standards Committee
Bryann Bromley, MD, chair
James M. Shwayder, MD, JD, vice chair
Nirvikar Dahiya, MD
Rob Goodman, MBCh, MBA, BMSc
Rachel Bo-ming Liu, MD
Jean Spitz, MPH, CAE, RDMS
John Stephen Pellerito, MD

Original copyright 2006; revised 2020, 2015, 2010; Renamed 2015

References
