

Medical Engineering and Physics
PMS
DUPLEX SCAN FOR ABDOMINAL AORTIC ANEURYSM

Introduction and scope:

Rupture of Abdominal aortic aneurysms (AAA) can be fatal (30% - 50% mortality on arrival at hospital). Duplex ultrasound is used to image possible AAA and aid the planning of elective surgical or endo-vascular repair, which reduces mortality significantly. Ultrasound is reliable for detecting;

- Presence or absence of AAA
- Size of AAA
- Involvement of major aortic branches
- Presence of Thrombus
- Presence of infra-aortic aneurysms (Femoral, or popliteal arteries)

The size of an AAA can be monitored at regular intervals with ultrasound if required.

Responsibilities:

Test staff: Scientific or technical staff trained in vascular duplex ultrasound scanning.

Equipment:

Duplex ultrasound scanner usually with a low frequency (2.5-6MHz) phased array or curvilinear array transducer, or other transducers as appropriate.

Examination protocol:

The patient should be supine. The aorta should be imaged using B-mode in transverse and longitudinal sections from the diaphragm to the bifurcation into the iliac arteries. The diameter should be noted at the most proximal location possible, at the level of the mesenteric artery and just proximal to the bifurcation. Measurements should be made in longitudinal section to avoid oblique measurements that overestimate diameter, they should be taken from outer wall to outer wall of the aorta.

When AAA is detected the largest diameter (outer to outer) should be measured from three approaches, sagittal and left and right oblique planes at peak systole, and the largest diameter reported. Images of the maximum diameter should be stored on the PACs system.

The anatomical relation to the renal arteries should be established if possible, by imaging them directly or inferring their location by the origin of the superior mesenteric artery (SMA).

The involvement of the iliac arteries should be investigated and their diameters measured.

Any visualisation of thrombus within the aneurysm should be noted.

On discovery of a new AAA or where distal embolisation is suspected, the popliteal arteries should also be examined for aneurysm.

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Images:

In the absence of aneurysmal disease the following images should be recorded:

- Outer to outer wall longitudinal measurement of the abdominal aorta at most proximal location, level of SMA and just proximal to the bifurcation.
- Maximum diameter of common iliac arteries.

Where aneurysmal disease is identified:

- Outer to outer wall longitudinal measurement of AAA from sagittal and left and right oblique planes.
- Common iliac arteries with maximum diameter measured.

Reporting:

The report should include:

- Maximum diameter of the aorta, measurement given should be outer to outer and if not this must be stated on the report.
- Which approach the measurement has been taken from.
- Previous diameter measurement and date of previous assessment.
- Statement about renal artery involvement or if it was not possible to tell.
- Maximum diameter of iliac arteries, or reason for not imaging them.

With presentation of a new AAA or iliac artery aneurysm forward patient details to/inform the vascular team.

AAA criteria:

The abdominal aorta is aneurysmal if the maximum diameter exceeds 3cm or is more than 1.5 times greater than the minimum diameter.

The iliac arteries are aneurysmal if the maximum diameter exceeds 1.5cm or is a greater than 50% dilatation.

Inspection criteria:

Complete CRIS report, tested/DNA/rebooked

References:

Cole S E et al. 2001 Vascular laboratory practice. (part 3) IPeM.

Meire H et al Abdominal and General ultrasound. 2001. Churchill livingstone.

Zwiebel W. 1992 Introduction to Vascular Ultrasound (third edition).

Thrush A and Hartshorne T 2010 Vascular Ultrasound (third edition)

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