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All Sites	VAS-DP-3	Kelly Swagell	
Title	Version Date	Version Number:	
Abdominal aortic aneurysm ultrasound	April 2022	1.3	

Scope & purpose

An abdominal aortic aneurysm (AAA) duplex assessment is performed to determine the presence/absence of an AAA. If present, to measure its maximum outer diameter and to document the presence of any lesions (i.e. atheroma, dissections, thrombus).

Personnel

Clinical vascular scientists (CVS), including trainees.

Principles / performance characteristics

The aims of the scan are to:

- Identify the abdominal aortic artery
- Document the maximum outer anterior-posterior (AP) and right-left (RL) diameters
- Document the common iliac artery diameters
- Document any visible lesions i.e. atheroma, thrombus, dilatations

Service users & background

Patients who have been referred for this scan are patients where an AAA may be suspected (i.e. palpated, family history), incidental findings or who are under surveillance for a known AAA. Patients with a known AAA will be under surveillance to monitor the size of the aneurysm sac and to see if it is increasing. If the AAA reaches certain criteria then intervention may be necessary.

There are few contraindications for AAA duplex ultrasound assessments; however, limitations may include the following:

- Bowel gas
- Raised BMI
- Severe oedema/swelling
- Dressings, casts, open wounds, staples, haematoma etc.
- Acoustic shadowing
- Patients who are unable to lie flat
- Patients who are unable to cooperate due to reduced cognitive functions e.g. Alzheimer's or dementia and through involuntary movements
- Examinations undertaken at the patient's bedside may be limited due to equipment and room dimensions
- Patient discomfort

Facilities, equipment & special supplies

Duplex ultrasound machine with both linear and curvilinear transducers available. There should be a selection of transducers delivering a wide range of frequencies (high and low). An abdominal or vascular pre-set should be selected on the machine.

The examination couch should be height adjustable. The CVS's chair should provide good lumbar support, be height adjustable and allow for the CVS to move close to the examination couch.

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Ultrasound gel to provide a couplant between transducer and patient.

Cleaning materials should be available in line with local and manufacturer's guidelines. These are available either in each procedure room or located in the laboratory store room.

Calibration

Across all sites annual calibration and safety checks of the ultrasound equipment are performed by Clinical Engineering (Trust contract with GE Healthcare).

Quality control

Second opinions from vascular scientist colleagues are requested routinely if clarification is sought.

Trainee vascular scientists have all AAA scans checked until they are signed off by a senior colleague for competency.

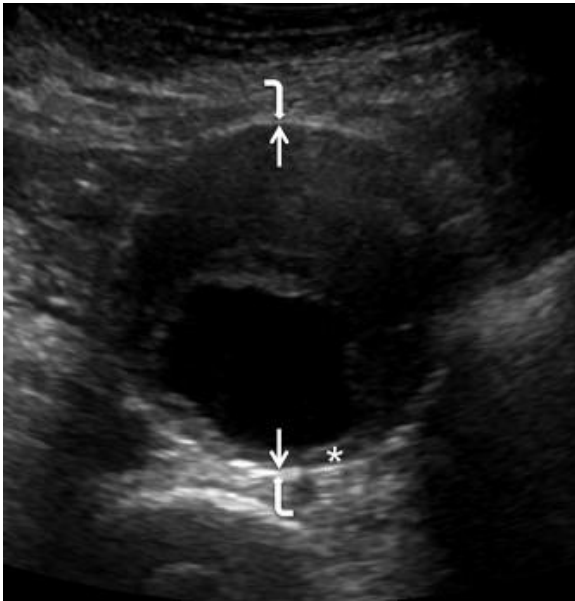
Environmental & safety controls

Infection control procedures followed in accordance with Trust infection control and risk assessment policies – Please see 'Personal Protective Equipment (PPE) for infection prevention and control' policy, 'Hand Hygiene' policy and 'Staff Risk Assessments' which are all available through the Trust Intranet.

Tristel wipes are for cleaning the ultrasound machines and probes after patient use. Universal Clinell wipes are for cleaning all other equipment. Where high risk infection presents or post-op wounds are present use probe covers with sterile gel or Tegaderm dressings, in addition to routine cleaning.

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Abdominal aortic aneurysm (AAA) ultrasound procedure (ref 1)

	Preceding document: <i>VAS-MP-6 Patient management</i>
1.	<p>Patient preparation: The patient is asked to adjust their clothing to expose the abdomen and is ideally examined in the supine position.</p>
2.	<p>Identify the abdominal aorta using B-mode and colour Doppler.</p> <p>Once identified, scan the abdominal aorta in B-mode in cross-sectional and longitudinal view, from the most proximal obtainable image down to the bifurcation.</p> <p>Freeze a cross-sectional image of the AAA on maximum systole or scroll back to maximum systole. Three measurements from outer wall to outer wall should be taken from separately acquired images (more than three measurements may be taken if deemed necessary). Document measurements in the anterior-posterior and right-left (APxRL) planes for each acquired image. A measurement of the AP diameter in longitudinal view may be necessary to ensure an oblique measurement has not been recorded in cross-sectional view.</p>  <p>Figure 1: A cross sectional image of an aorta, with the arrows indicating where the callipers would be placed for an outer to outer (AP) measurement.</p> <p>In addition, a recording of the AP diameter of the proximal abdominal aorta (supra-renal) in longitudinal view should also be recorded where possible. If a supra-renal abdominal aortic aneurysm is identified and the proximal extent of the aneurysm cannot be imaged then the possibility of a thoracic aortic aneurysm extending into the abdomen should be considered. This should be documented on the report, for</p>

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	<p>example: 'Suprarenal aneurysm seen that may extend above diaphragm, further imaging to clarify and exclude a thoracic aortic aneurysm recommended' (ref 2).</p> <p>The bilateral common iliac arteries should also be imaged throughout to determine the presence of any aneurysmal disease, and an outer-outer anterior-posterior diameter measurement of the proximal common iliac arteries, or at the point of maximum diameter, should be recorded.</p> <p>Use colour Doppler to check patency of the aorta and to determine the presence or absence of thrombus.</p> <p>The machine controls should be optimised in a diagnostically appropriate way throughout the scan.</p>
3.	<p>If this is the patient's first attendance and an AAA is identified, then the following arteries are checked bilaterally for any further aneurysmal dilatations: common iliac, proximal internal iliac, external iliac and popliteal arteries.</p> <p>If a popliteal artery aneurysm is identified then refer to the lower limb arterial duplex protocol – [VAS-DP-9].</p>
4.	<p>If a patient is attending for a scan of an iliac aneurysm:</p> <ul style="list-style-type: none"> - Scan the aorta and bilateral iliac arteries in full if it is their first attendance. - Scan the aorta and the iliac arteries on the aneurysmal side if attending for a unilateral aneurysm surveillance scan. - If the patient is under surveillance for bilateral iliac aneurysmal disease then both sides should be imaged routinely.
	<p>Subsequent documents: VAS-MP-6 Patient management, VAS-MP-1 Results processing</p>

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Reporting

The diagrammatic report is a record and interpretation of observations made during the AAA ultrasound examination; it should be written by the CVS undertaking the examination.

The report should include correct patient demographics, date of examination, examination type, the name and status of the CVS and any clinical history deemed relevant.

The report should include:

- Three measurements of the maximum outer diameter (AP x RL). The method of measuring should also be documented on the report (i.e. maximum outer diameter, AP x RL)
- The maximum AP diameter of the supra-renal abdominal aorta
- The maximum external diameters of the common iliac arteries
- If the iliacs and popliteals are imaged the diameters should be documented
- All diameter measurements to be documented in centimetres, to one decimal place
- Any limitations e.g. difficult examination due to body habitus, bowel gas, calcification etc
- The diagram should note the characteristics of the aorta i.e. tortuosity, presence of thrombus, shape of aneurysm, any dissections, presence of an echolucent 'halo' around AAA
- If a supra-renal abdominal aortic aneurysm is identified and the proximal extent of the aneurysm cannot be imaged then the possibility of a thoracic aortic aneurysm extending into the abdomen should be considered. This should be documented on the report, for example: 'Suprarenal aneurysm seen that may extend above diaphragm, further imaging to clarify and exclude a thoracic aortic aneurysm recommended' (ref 2).

If the AAA measures larger than 5.5cm, or measures above 4.0cm and has increased by 1cm or more in a year, then the vascular team should be informed if the patient is not being reviewed in clinic on the same day, clinical judgement to be used (ref 3).

Any incidental findings should be documented and further imaging recommended when clinically appropriate.

References

1.	VAS-ED-5. Vascular Technology Professional Performance Guidelines Lower Limb Arterial Duplex Ultrasound Examination.
2.	VAS-ED-19. Society of Radiographers / BMUS.Guidelines for Professional Ultrasound Practice. p81.(2020)
3.	VAS-ED-20 NICE guideline [NG156] Abdominal aortic aneurysm: diagnosis and management (2020).