Diagnostic Imaging Pathways - Abdominal Aortic Aneurysm

Population Covered By The Guidance

This pathway provides guidance on imaging patients with suspected or known abdominal aortic aneurysms.

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Date of next review: 2017/2018
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Quick User Guide

Move the mouse cursor over the PINK text boxes inside the flow chart to bring up a pop up box with salient points. Clicking on the PINK text box will bring up the full text. The relative radiation level (RRL) of each imaging investigation is displayed in the pop up box.

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<thead>
<tr>
<th>SYMBOL</th>
<th>RRL</th>
<th>EFFECTIVE DOSE RANGE</th>
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<tr>
<td></td>
<td>None</td>
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<tr>
<td></td>
<td>Minimal</td>
<td>&lt; 1 millisieverts</td>
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<td>Low</td>
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<td>Medium</td>
<td>5-10 mSv</td>
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<tr>
<td></td>
<td>High</td>
<td>&gt;10 mSv</td>
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Pathway Diagram
Abdominal Aortic and Right Iliac Artery Aneurysms

Image 1a and 1b (Computed Tomography): Axial and reconstructed images of an abdominal aortic aneurysm. There is also a right iliac artery aneurysm which is partially occluded by thrombus.

Tortuous infra-renal abdominal aortic aneurysm with thrombosis of the rest of the sac.
Infra-renal abdominal aortic aneurysm with involvement of both common and internal iliac arteries.

A large abdominal aortic aneurysm is seen which has ruptured with intraluminal developing thrombus formation and intra and retroperitoneal haemorrhage.

**Teaching Points**

- Physical examination has a moderate sensitivity for the detection of AAA
- Ultrasound is highly accurate in detecting the presence or absence of AAA
  - Depending on the size of the aneurysm, further management is based on repeat ultrasounds at variable intervals or referral for surgical intervention (AAA >5cm)
- CT angiography allows evaluation of the anatomy of the abdominal aortic aneurysm and associated structures prior to elective surgical repair

**Computed Tomography Angiography (CTA)**

- Preoperative multi detector (MD) computed tomography angiogram (CTA) of an AAA is required if EVAR is planned
- CTA is reliable in assessing the anatomy and dimensions of AAAs as well as the extent of atheromatous or inflammatory changes in the aorta and iliac arteries
- The main features of interest include
  - The dimensions and extent of the AAA and any associated iliac artery aneurysmal disease
  - The diameter, length, angulation and shape of the neck of the AAA and its relationship to the renal and visceral arteries
  - The calibre and tortuosity of the access (iliac and femoral) arteries
- The advantages of MDCT compared to single detector CT include 2-3 times faster scan speeds and reduced contrast dose. With MDCT the acquisition of raw volumetric data combined with thinner section slices allows the recreation of images in any plane while preserving spatial resolution, and improved three dimensional reconstruction with reduced artefact

**Recommendations for Surveillance of Abdominal Aortic Aneurysm (AAA)**

- Recommendations for surveillance frequency and interval vary widely
- Time taken for an AAA of 4.0 cm or less to have a 10% chance of growing to 5.5 cm is at least 3 years. For men with an AAA of 4.0 cm or smaller, it takes more than 3.5 years to have a risk of rupture greater than 1%. Based on these results, the risk of AAA rupture or the need for aortic repair can be objectively determined and guide surveillance interval decision making
- The risk of an AAA <5.5cm in diameter rupturing is low (<1.6%/year). This rises to ~10%/year for AAAs >5.5cm
The threshold for elective intervention is 5.5cm as, compared to surveillance, survival is not improved by elective repair of AAAs <5.5cm in diameter \(^1,6,7\).

There is some evidence that this threshold should be 5cm in women \(^8\).

Women had a 4-fold greater rupture risk for all AAA sizes and reached a rupture risk of greater than 1% in a much shorter time than men. Differences in anatomy, structure, sex, steroids, and smoking habits have all been suggested to play a role in the increased risk of rupture in women \(^2\).

The clinical implication is that a lower AAA diameter threshold for surgery should be adopted for women, a recommendation already made by the joint council of the American Association for Vascular Surgery and Society for Vascular Surgery, but one not yet supported by randomized trial evidence \(^2\).

Unless there are indications for surgery, surveillance using ultrasound is indicated in all AAAs <5.5cm.

Diameter measurements using ultrasound are reliable and reproducible to within 3mm \(^9\).

The annual rate of AAA expansion varies considerably but generally increases with diameter \(^1,10\):

- 1-3 mm for 3.0-3.9cm AAAs
- 3-4mm for 4-4.4cm AAAs
- 4-5mm for 4.5-4.9cm AAAs

Majority of patients with sub-aneurysmal aortic dilatation progress to true aneurysmal aortic dilatation, with almost half of these doing so within 5 years of follow-up. Furthermore, within 10 years of detection, a smaller proportion (approximately 4%) will progress to an aortic diameter that would be considered at or above the threshold for surgical intervention \(^11\).

### Ultrasound

- An abdominal aortic aneurysm (AAA) is present when the infra-renal aortic diameter is ≥3cm. An AAA of >5.5cm is considered large \(^1\).

- Most AAAs are asymptomatic and detected incidentally at the time of physical examination or imaging (usually ultrasound or CT scanning) for symptoms related to other pathology.

- Physical examination has moderate overall sensitivity (68%) for the detection of AAA but is highly sensitive for diagnosis of AAAs large enough to warrant elective intervention in patients who do not have a large girth \(^12\).

- Ultrasound is highly accurate in detecting an AAA \(^13\).

- Intramural thrombus seen on any imaging is a common feature of AAAs.

- There is evidence that population screening men aged 65 years and over using ultrasound can reduce the mortality from AAA. \(^1,14\) However screening has yet to be introduced into Australia.

### References

**Date of literature search: August 2015**

The search methodology is available on request. Email

References are graded from Level I to V according to the Oxford Centre for Evidence-Based Medicine, Levels of Evidence. Download the document


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