Clinical suspicion of abdominal aortic aneurysm (AAA)

Clinical history, physical examination

Asymptomatic, clinically stable
- US abdominal aorta (NCCT as alternative if US not suitable, e.g. obesity)
  - AAA excluded

Symptomatic with pain
- Haemodynamically unstable and not for urgent CTA
  - Resuscitation
  - Urgent surgical intervention
- Haemodynamically stable
  - CTA to confirm presence of AAA, delineate size / morphology of AAA, and complications of AAA (most important ones being rupture / impending or contained rupture)
  - No sign of rupture / impending or contained rupture
  - Rupture / impending or contained rupture
  - Urgent surgical care / intervention

Need and choice of further imaging depends on size / morphology of AAA, patient’s clinical profile / risks, management plan (endovascular aortic repair, surgery)
  e.g. CTA for definitive anatomy, periodic US surveillance for monitoring size of AAA
REMARKS

1 US
   1.1 Initial examination of choice for asymptomatic, clinically stable patients.
   1.2 Should be a dedicated study (including complete longitudinal extent of abdominal aortic aneurysm (AAA), any involvement of common iliac arteries, relationship with renal arteries).
   1.3 Difficult to delineate upper margin of AAA from juxtarenal level or above, and involvement of visceral vessels.
   1.4 Limitations from patient’s body, habitus and acoustic window.

2 CT
   2.1 Non-contrast computed tomography (NCCT) may be considered when US is not suitable (e.g. obese patients).
   2.2 NCCT may be considered in patients with or without clinical suspicion of impending or contained rupture.
   2.3 Computed tomography angiogram (CTA) is best for definitive diagnosis and as a pre-interventional reference.
   2.4 Useful information obtained from CTA includes morphology and full extent of the AAA, extent of mural thrombus, involvement of branch vessels, three-dimensional (3D) analysis (such as volume rendering, maximum intensity projection (MIP), multiplanar reformats).
   2.5 First line imaging modality in the emergency setting for the assessment of suspected AAA rupture / impending or contained rupture.

3 MRI
   3.1 Magnetic resonance angiogram (MRA) may be an alternative to CTA.
   3.2 Non-contrast and contrast-enhanced sequences can be used.
   3.3 Non-contrast sequences for patients with severe impaired renal function [glomerular filtration rate (GFR) <30]. Disadvantages of non-contrast MRA include suboptimal assessment of small vessel lesions / small side branches, susceptibility to flowing blood and blooming artefacts.
   3.4 Other concerns include scanner accessibility, skilled operator / expertise availability, longer scanning time, decreased spatial resolution and general contraindications to MRI (such as pacemaker).
   3.5 Significant artefacts can be encountered with certain types of stents other than nickel.

4 Catheter angiography
   4.1 Usually not for establishing the diagnosis.
   4.2 Essentially replaced by non-invasive imaging techniques in diagnosis (US, CTA).
   4.3 May be used for pre-interventional planning.
   4.4 Essential component of endovascular aortic repair (EVAR) procedure.
Management of AAA includes conservative approach, open surgery and EVAR; depending on clinical presentation, patient’s profile and size / morphology of aneurysm:

5.1 EVAR has emerged as an important treatment option in the management of AAA.

5.2 With the advent of EVAR, pre-interventional imaging has become indispensable for surgical planning (suitability for stent graft deployment, delivery sheath size allowance).

5.3 CTA is accepted as the gold standard for pre-EVAR planning, post-EVAR and post-open repair imaging surveillance.
REFERENCES

