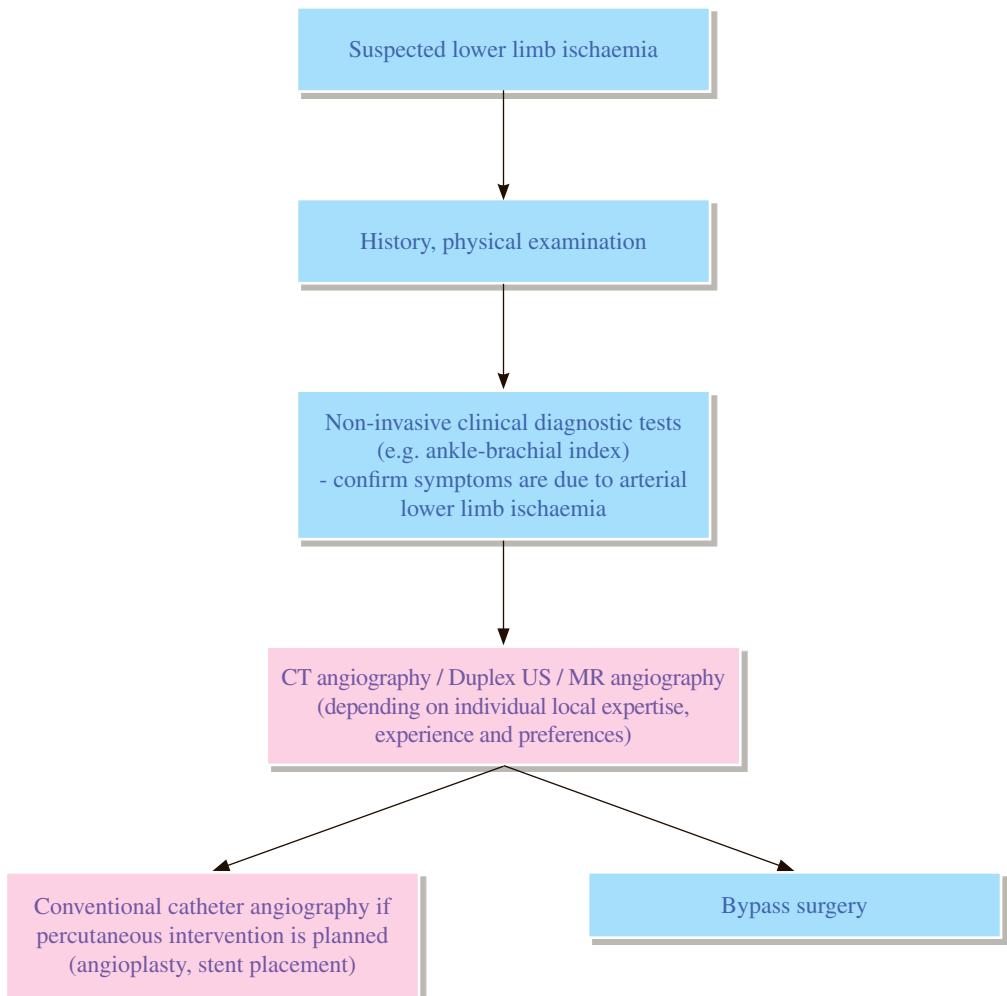


## CV 4 Intermittent claudication



## **REMARKS**

### **1. Non-invasive haemodynamic tests**

- 1.1 Include ankle-brachial index (ABI), toe-brachial index (TBI), segmental pressures or pulse volume recordings.
- 1.2 These are important tools for evaluating peripheral vascular disease.
- 1.3 With the presence of normal ABI both at rest and exercise with compressible vessels, atherosclerotic occlusive disease is effectively excluded as a cause of claudication / rest pain and obviates need of further arterial imaging.

### **2 US**

- 2.1 Duplex US imaging can diagnose the location, degree and extent of stenosis down to the level of the knee.
- 2.2 It can also estimate the velocity of blood flow.
- 2.3 Needs skilled and experienced operators, and is a time consuming procedure.
- 2.4 Has limitations which include vessel visualization obscured by bowel gas (abdominal aorta and iliac arteries), dense calcifications and in the setting of multiple sequential lesions.

### **3. Computed Tomography Angiogram (CTA)**

- 3.1 With improvements in multidetector CT (MDCT) technology, CTA has several advantages over digital subtraction angiogram (DSA), including shorter examination time, non-invasive nature, lower complication rates, direct visualization of mural plaque and calcium, visualization of collaterals and three-dimensional (3D) volumetric display and analysis.
- 3.2 CTA has limitations which include difficulties in grading severity of vessel stenosis in presence of dense calcium; suboptimal assessment of calf vessels due to timing issues. Streak artefacts from metallic implants also limit the role of CTA in stent surveillance.
- 3.3 Use of iodinated intravenous (IV) contrast and ionizing radiation are concerns.

### **4. Magnetic Resonance Angiogram (MRA)**

- 4.1 Non-invasive with no ionizing radiation.
- 4.2 Majority of MRI employs contrast-enhanced MRA sequences.
- 4.3 Non-contrast MRI sequences can be considered for patients with renal insufficiency.
- 4.4 Limitations of MRI which affect image quality include longer scanning time (may be more prone to motion artefacts); unreliable visualization of lesions with high flow and turbulence; suboptimal assessment of stent lumen or lumen close to prosthesis.

### 5. Catheter angiography

- 5.1 DSA is considered the gold standard for imaging of peripheral vascular disease.
  - 5.2 Can allow for intervention such as balloon angioplasty or stenting.
  - 5.3 It is invasive, needs iodinated IV contrast, requires multiple projections and involves ionizing radiation.
  - 5.4 It is now mainly indicated if intervention is planned.
6. Choices of non-invasive investigations (duplex US, CTA, MRA) depend on local expertise and experience.

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