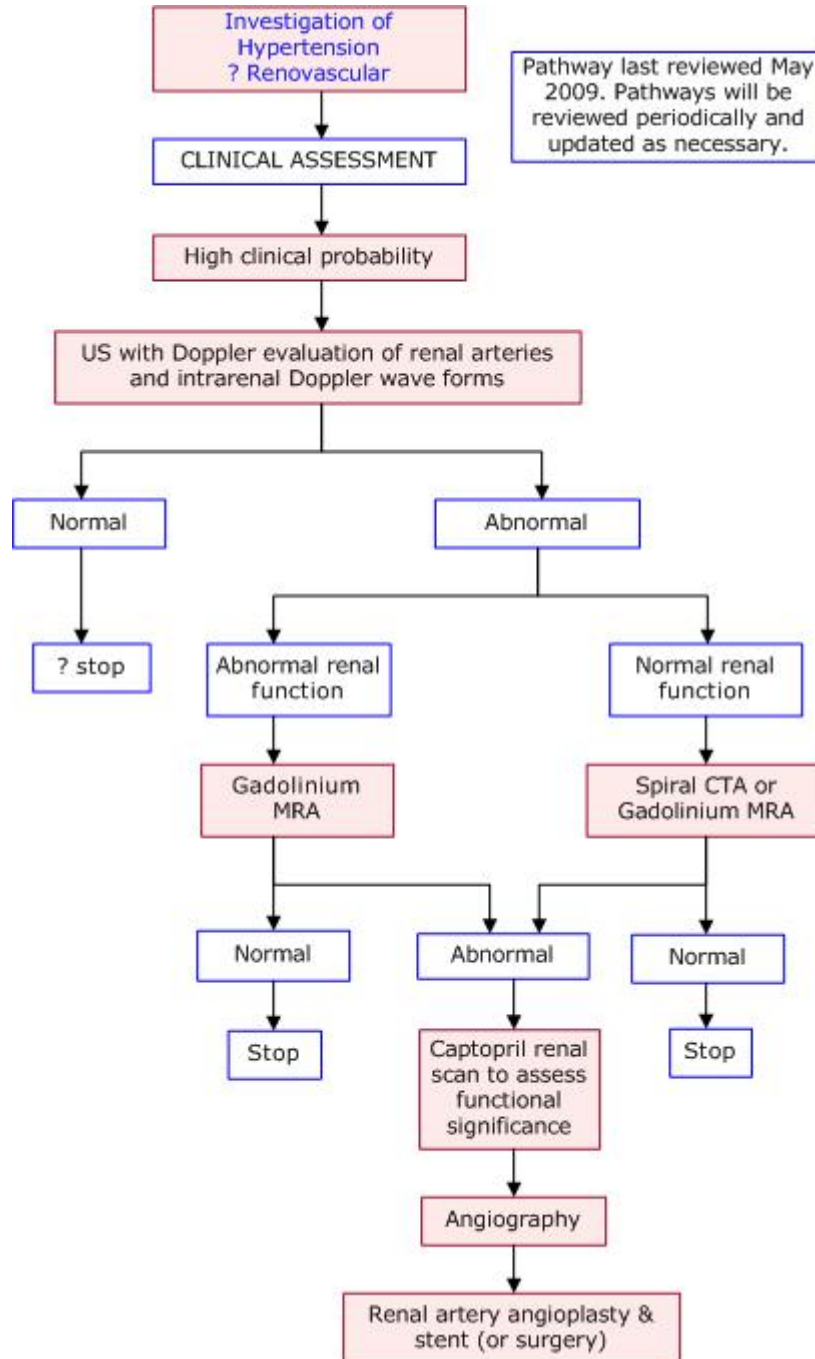




DIAGNOSTIC IMAGING PATHWAYS

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HIGH CLINICAL PROBABILITY OF RENOVASCULAR HYPERTENSION

- Consider renovascular hypertension when: [14](#)
- Newly diagnosed hypertension presents with features that are atypical of essential hypertension such as young or very old patients, no family history, severely elevated blood pressure, epigastric bruit or coexisting clinical indicators of atherosclerosis (ie ischaemic heart, cerebral or peripheral vascular disease); or

- Resistant hypertension is associated with risk factors for atheroma; or
- Angiotensin-converting enzyme (ACE) inhibitor or angiotensin-II- receptor antagonist therapy is associated with increasing plasma creatinine levels.

ULTRASOUND

- Best screening tool for renovascular hypertension. [1,2](#)
- Ultrasound assesses renal size and morphology and Doppler gives information regarding blood flow velocities and waveform.
- 63-100% sensitivity and 73-100% specificity for renal artery stenosis. [3](#)
- A renal resistive index value of at least 0.8 reliably identifies patients with renal-artery stenosis in whom angioplasty or surgery will not improve renal function, blood pressure, or kidney survival. [4](#)
- Patients with abnormal US or high clinical suspicion of renal artery stenosis need to be further evaluated with MRA or CTA. [5,6](#)
- Advantages: non-invasive, relatively inexpensive, does not involve the use contrast material and no exposure to ionising radiation.
- Limitations: difficult in obese patients and where breath holding and cooperation are poor. [7](#)

GADOLINIUM MAGNETIC RESONANCE ANGIOGRAPHY (MRA)

- Most accurate non-invasive modality for detecting renal artery stenosis (>95% sensitivity and specificity). [3,8](#)
- Useful in patients with impaired renal function.
- Advantages : [7](#)
 - No risk of nephrotoxicity with gadolinium based contrast.
 - No radiation.
 - Combined with other MR techniques can assess the significance of stenosis.
 - Can differentiate between truncal and ostial stenosis.
- Disadvantages: not sensitive for distal artery or segmental renal artery stenosis (limited visualisation of intrarenal arteries). [7](#)

COMPUTED TOMOGRAPHY ANGIOGRAPHY (CTA)

- Alternative to gadolinium MRA.
- ~95% sensitivity and specificity. [3](#)
- Advantages: can identify non-renal causes of hypertension, and visualisation of both the arterial

lumen and wall allows improved differentiation between truncal and ostial stenosis. [7](#)

- Disadvantages: ionising radiation, contrast nephrotoxicity, and failure to identify small arteries <2mm and accurately assess renal arteries beyond renal hilum. [7](#)

CAPTOPRIL RENAL SCAN

- Assesses perfusion, function, transit time and response to captopril.
- Currently used to determine functional significance of detected renal artery stenosis.
- Inferior to other imaging modalities as a diagnostic test for renal artery stenosis. [3](#)
- Captopril renal scan assessment of renal function can predict response to therapy. [15](#)
- Sensitivity of 64-93% and specificity of 71-97% for detection of renal artery stenosis when angiography used as standard of reference. [3](#)
- Limitations:
 - False negative studies due to poor absorption of oral captopril. [7](#)
 - False positives due to stenosis proximal or distal to the main renal artery. [7](#)

ANGIOGRAPHY

- "Gold standard" for detection of renal artery stenosis. [7](#)
- Provides therapeutic opportunity.
- Disadvantages: invasive with a risk of complications, expensive, requires administration of iodinated contrast material and exposure to ionising radiation.

RENAL ARTERY ANGIOPLASTY AND STENTING

- In contrast to initial observational studies, recent randomised trials demonstrate no significant difference in blood pressure control and renal function when angioplasty without stenting was compared to medical therapy [9,11](#).
- Angioplasty with stenting has been shown to have a lower rate of restenosis compared to angioplasty alone for ostial lesions, but there are no randomised trials comparing stenting to medical therapy. [10-12](#)
- Angioplasty with stenting results in a significant reduction in blood pressure, but the effect on serum creatinine has been variable. [10-12](#)
- Non-ostial stenoses and fibromuscular hyperplasia can be treated by angioplasty alone. [16](#)
- Disadvantages: significant rate of technical failure, restenosis (17%) and complications (11%). [10,16](#)
- Surgery is reserved for exceptional cases or following failed angioplasty.

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FURTHER READING

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Website

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