



Renovascular Hypertension

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When to suspect Renovascular Hypertension

Testing for renovascular disease is warranted in patients who fulfill the following criteria

A The clinical findings suggest a cause of secondary hypertension rather than primary hypertension

- Early onset of hypertension < 40 yrs
- Refractory hypertension >140/90mmHg despite three antihypertensive agents
- Severe hypertension 180/110mmHg
- Hypertensive emergency e.g flash pulmonary oedema and hypertensive encephalopathy
- Deteriorating renal function
- Asymmetrical renal volume
- Unexplained acute and sustained rise in serum creatinine of more than 30 percent after initiating an ACE inhibitor
- Significant burden of peripheral arterial disease






B Excluded secondary hypertension such as primary kidney disease, hyperthyroidism, primary aldosteronism, Cushing's syndrome, pheochromocytoma

C Renal revascularization or another intervention would be considered if a significant stenotic lesion is found.

Who will benefit from renal artery revascularisation?

Antihypertensive drugs are effective and the gold standard to control the blood pressure in many patients with renovascular hypertension. Clinical evidence suggest that individuals with moderate renovascular disease have little benefit from renal revascularization if blood pressure is well controlled and kidney function remains stable.

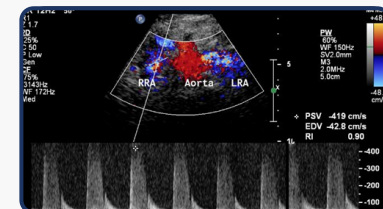
Situations where patients benefit are:

-  Progressive impairment of renal function
-  Failure or intolerance of optimal medical therapy to control the blood pressure
-  Suspected fibromuscular disease in a young person in an attempt to limit the need for life-long antihypertensive therapy
-  End organ dysfunction – flash pulmonary oedema or hypertensive encephalopathy
-  Patients with short duration (< 2 yrs) of blood pressure elevation prior to the diagnosis of renovascular disease, as this is the strongest clinical predictor of a fall in blood pressure after renal revascularization

Diagnostic testing options:

Renal artery duplex

- Non invasive and affordable – suitable for surveillance
- Not nephrotoxic
- Resistive Index (RI) (PSV-EDV/PSV) provides prognostication for renal parenchymal disease – hence poor outcome for revascularisation
- Operator dependent and needs experience specialist vascular sonographer

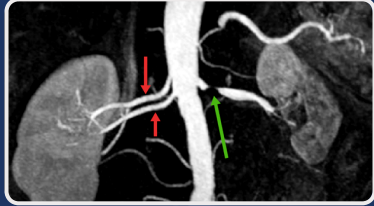


Features of a hemodynamically significant stenosis greater than 60%:

- PSV > 300cm/s
- EDV > 150cm/s
- Resistive Index < 0.7
- Renal Aortic Ratio > 3.5
- Difference in kidney size > 15mm

CT Renal Artery angiogram

- Highly sensitive for atherosclerotic and FMD lesions
- Not user dependent
- Contrast induce nephropathy a risk for patient with eGFR < 45



Renal artery atherosclerotic stenosis seen on CT angiography with kidney volume loss



Renal artery fibromuscular dysplasia with characteristic beading seen on CT angiography

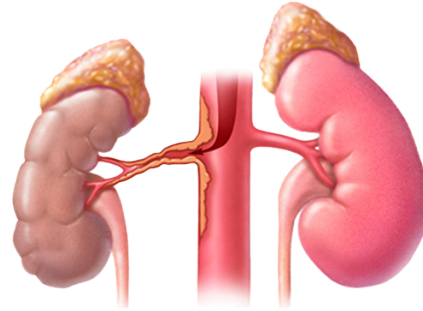
MRI angiography

- Good imaging modality similar to CT angiography
- Time consuming and expensive - poor accessibility
- Gadolinium induce nephrogenic systemic fibrosis in patients with renal impairment



MRI-A of right renal artery stenosis

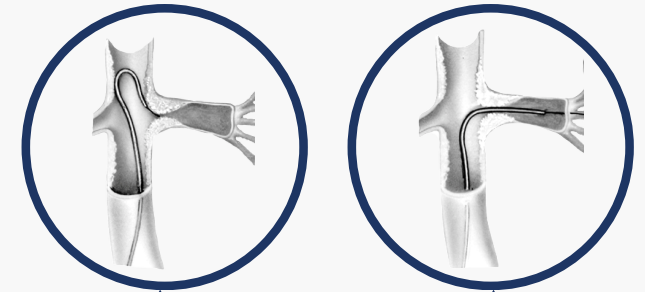
The gold standard for imaging is renal artery catheter angiogram. This is an invasive procedure and usually used as a modality to image with intention to treat with stenting or angioplasty. There is a risk of atheroembolism and renal artery dissection resulting in worsening of renal impairment and loss of renal perfusion with stenting and balloon angioplasty. The quoted risk for renal infarction is less than 1% with atheroembolic events occurring less than 2%. Primary patency of stents is quoted at 75-88% at 12 months compared to 50-60% for balloon angioplasty.



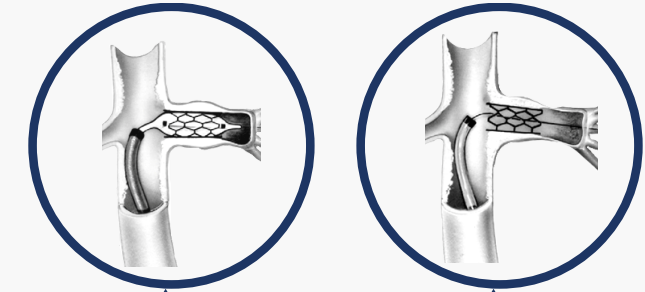
Management

The prevalence of renovascular hypertension is rare < 1% in mild hypertension. However, it is present in 10-40% of patients in refractory hypertension especially in the context of significant peripheral artery disease burden. Medical therapy with aggressive optimisation of risk factors is the cornerstone of management in patients with renovascular hypertension. I advocate the involvement of a MDT approach with GP, Nephrologist and Vascular Surgeon for achieving good outcomes through optimal patient selection.

Outcomes from the randomised control CORAL and ASTRAL trials did not support revascularisation of renal artery stenosis as there was no benefit in primary endpoints when intervention was carried out with optimal medical management. There is however a role for renal artery revascularisation when medical therapy has failed resulting in end organ dysfunction (deteriorating renal function, recurrent flash pulmonary oedema, cardiac failure, hypertensive encephalopathy) and refractory hypertension.



Crossing the lesion with a no touch technique prevents atheroembolism



Covered stent displayed to treat lesion

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