

ATHEROSCLEROTIC RENAL VASCULAR DISEASE (“RAS”)

Commonest renal arteriopathy; 5% of patients with hypertension and occlusion in 50%

Incidence: increases with age

Pathology:

1. Aortic atheroma compromises proximal 1-2cm of renal artery/arteries → occlusion in 50%

Parenchymal loss in 25% (esp elderly)

Level of stenosis for significant ARVD controversial; 50% has 15mmHg gradient

2. Cholesterol emboli (eg from aortic atheroma during procedures)

Pathophysiology:

RENAL FUNCTION

Reduction in renal artery perfusion pressure → pre-renal impairment

RAAS system activated to support GFR (hence controversy over RAAS blocking drugs)

Become dependent on AT2 for glomerular perfusion → risk of renal failure (esp if bilateral)

Poor correlation between degree of stenosis and GFR/overall renal function (maybe why renal function often fails to improve after revascularisation)

HYPERTENSION

Drop in renal perfusion pressure → RAAS activates → salt and water retention and BP initially rises to support glomerular filtration

Unilateral disease: perfusion pressure also rises in contralateral kidney with pressure natriuresis → normalises ECFV; BP drops rapidly if RAAS blocked

Bilateral disease: no pressure natriuresis → salt and water retention persist and RAAS then suppressed when renal perfusion normalised; RAAS blockade may not work

Diagnosis

Refractory hypertension/flash pulmonary oedema/renal impairment esp if ACE-induced/vascular bruit

Renal arteriography: risk of nephrotoxicity

MRA: gadolinium can cause nephrogenic systemic fibrosis in moderate/severe renal disease

Cholesterol emboli: livedo reticularis, proteinuria, eosinophilia (proteinuria is a key marker in disease progression)

MANAGEMENT

Medical:

Risk factor modification

Antihypertensives (target 140/90 but lower if diabetic or significant proteinuria): ACEi are first-line but watch creat and potassium (esp if bilateral RAS/solitary kidney)

Endovascular:

Kidneys <8cm length unsuitable

Hydrate 12 hours before and after; NAC?

Aspirin and clopidogrel for life with lifelong monitoring of BP and renal function

Complications: contrast nephropathy/arterial damage/cholesterol embolization

Surgery:

Aortic graft and renal bypass (AAA affecting renal ostium)

Aortorenal bypass

Aorto-renal endarterectomy (if suprarenal clamping for AAA repair; close with patch)

Extra-anatomical bypass (if unilateral RAS in absence of aortic disease; 12 yr patency 96%, renal function improved 40%, mortality 2.9% at Cleveland Clinic)

Extracorporeal bench surgery (if multiple small anastomoses required when disease affects branches of renal artery)

Nephrectomy: if renin ratio >1.5 between kidneys and if affected kidney <8cm

Indicated if suitable for revascularisation, multiple small renal arteries, require aortic recon near renal arteries for other indications

Renal artery denervation:

Catheter into RA and RF ablation of nerve fibres in renal artery adventitia

Tackles overactivity of afferent and efferent sympathetics

