

The Kidneys and Hypertension

- Two types of hypertension: primary ('essential') and secondary
- Primary hypertension can damage the kidneys
- Renal Artery Stenosis can cause secondary hypertension ('renovascular hypertension'). The renin angiotensin system acts to increase the overall blood pressure as a response to kidney hypoperfusion (it is mistaken for general systemic hypotension)

Renal Artery Stenosis

- Atherosclerosis:
 - Older patients (arteriopathy, metabolic syndrome etc)
 - Atherosclerotic plaques and stiff vessel walls
 - Hypertension that is unresponsive to treatment
 - Abdominal bruits
- Fibromuscular dysplasia:
 - Younger patients (commonly women)
 - Some genetic predisposition
 - Artery wall thickening (not due to atherosclerosis or inflammation)
 - Sometimes patients get flash pulmonary oedema
 - ACEI and Angiotensin II receptor antagonist (ARBs) (e.g.: Losartan, Valsartan, Eprosartan) worsen renal function (ACEI reduce/abolish glomerular filtration e.g.: Ramipril, Lisinopril, enalapril etc)
- Abdominal bruits, weak leg pulses

Treatment: medications such as diuretics, then on to angioplasty (widening with a balloon +/- stent to keep the vessel open)

Renal Artery Occlusion

- Thrombus or embolus
- Cholesterol emboli often originate from atherosclerotic plaques in the aorta
- Acute presentation of aching pain in the flank area ('backache'), abdominal pain, fever, nausea and vomiting, haematuria, oliguria/anuria
- You need to break up the thromboembolus through anticoagulation (e.g.: heparin) and possibly treat it surgically (e.g.: embolectomy)

Renal Vascular Disease

Two basic scenarios:

- Occlusion (total/bi-lobed of the renal artery)
- Stenosis (narrowing of the renal artery)

Low Blood Volume

- Poor blood supply -> poor urine production -> poor kidney function
- Usually due to low blood volume
- Treatment is to give fluids
- Prolonged low blood volume -> ischaemic Acute Tubular Necrosis
- Skip lesions throughout tubules (epithelial cell death)

PRE-RENAL
[= hypoperfused kidneys]

1) Low blood volume -> ischaemic Acute Tubular Necrosis

2) Renal vascular disease

1) Occlusion (thromboembolus)

2) Renal artery stenosis

1) Atherosclerosis

2) Fibromuscular dysplasia

2) Hypertension