

MANAGEMENT OF RENAL ARTERY STENOSIS

There are two major causes of renal artery stenosis (RAS):

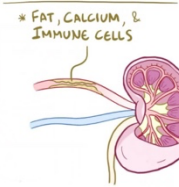
1. Atherosclerosis

- primarily affects patients over the age of 45 years
- usually involves aortic orifice or proximal renal artery
- common in patients with diffuse atherosclerosis but can occur as an isolated kidney lesion

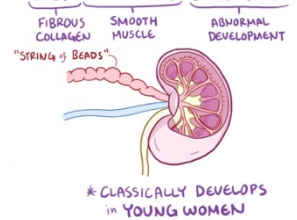
2. Fibromuscular dysplasia

- primarily identified in females under the age of 50 years
- typically involves the mid- or distal main renal artery or the intrarenal branches

ATHEROSCLEROTIC PLAQUE BUILDUP



RENAL FIBROMUSCULAR DYSPLASIA

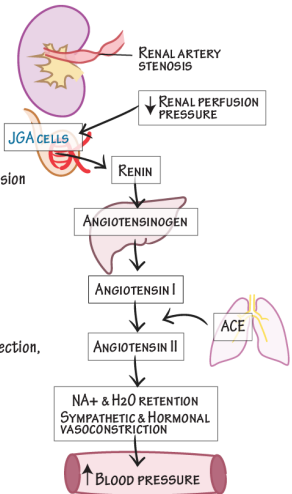


Atherosclerotic Renal Artery Disease

- Patients with atherosclerotic renovascular disease have a high prevalence of systemic atherosclerosis → increased risk of coronary artery disease; therefore, emphasis should be placed on BP control, smoking cessation, prophylaxis with ASA and statin for the primary prevention of major adverse cardiovascular events (MACE).
- Unilateral Renal Artery Stenosis: one kidney is affected with the second kidney being normal.
- Bilateral Renal Artery Stenosis: there is stenosis to both kidneys and a higher incidence of fluid retention, loss of kidney function, and heart failure.
 - Bilateral renal arterial stenosis is associated with more widespread atherosclerotic disease, higher serum creatinine levels, and higher mortality than unilateral disease.

RENAL ARTERY STENOSIS

- ✓ Most common cause of 2° hypertension.
- ✓ Decreased renal blood flow
 - ↳ Triggers JGA
 - ↳ Activation of RAAS, Sympathetic pathway, Red. NA⁺ excretion.
 - ↳ Renovascular hypertension Ischemic nephropathy Heart failure, ACS
- ✓ Unilateral or bilateral
- ✓ Etiologies
 - Atherosclerosis
 - Fibromuscular dysplasia
 - Cellular proliferation in arterial walls.
 - Also: aneurysm, dissection, tortuosity.

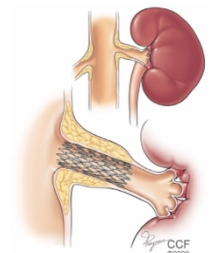


Management of Renal Artery Stenosis

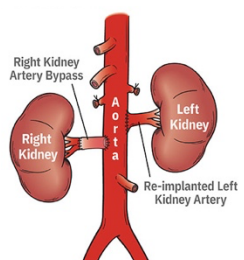
There are three therapeutic options for managing patients with hemodynamically significant renal artery stenosis:

1. medical therapy alone
 2. percutaneous renal angioplasty with stent placement, plus medical therapy
 3. surgical revascularization plus medical therapy
- Medical therapy for control of hypertension is indicated in all patients with renal artery stenosis (unilateral and bilateral stenosis).
 - Revascularization, usually by percutaneous angioplasty with stenting, is likely to benefit patients with the following considerations:
 - Patients with a short duration of blood pressure elevation prior to the diagnosis of renovascular disease.
 - Patients who failed optimal medical therapy to control their BP and experienced deterioration of kidney fx during antihypertensive drug tx.
 - Patients with recurrent flash pulmonary edema and/or refractory CHF.
 - Patients with progressive kidney function impairment.
 - Surgical revascularization is primarily indicated for complex vascular lesions and for repeated episodes of re-stenosis after stenting.

Percutaneous Renal Angioplasty w/Stenting



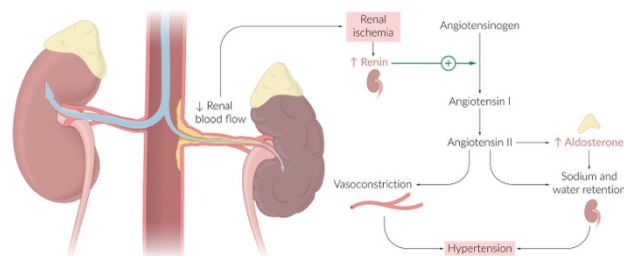
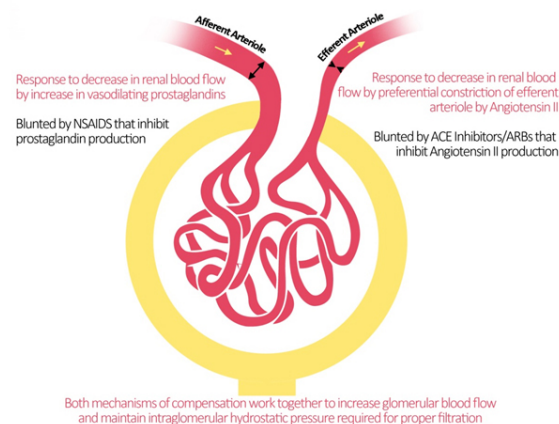
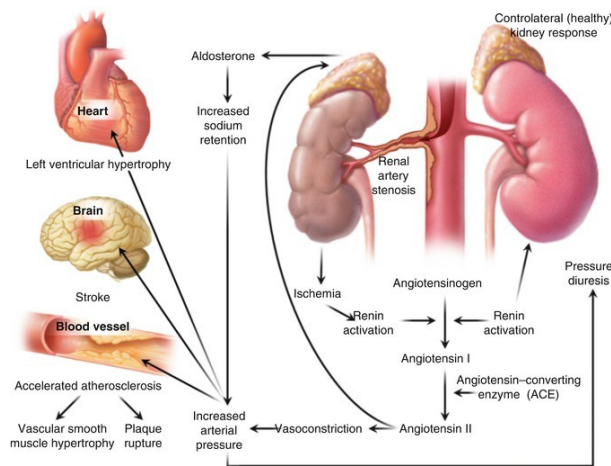
Surgical Revascularization



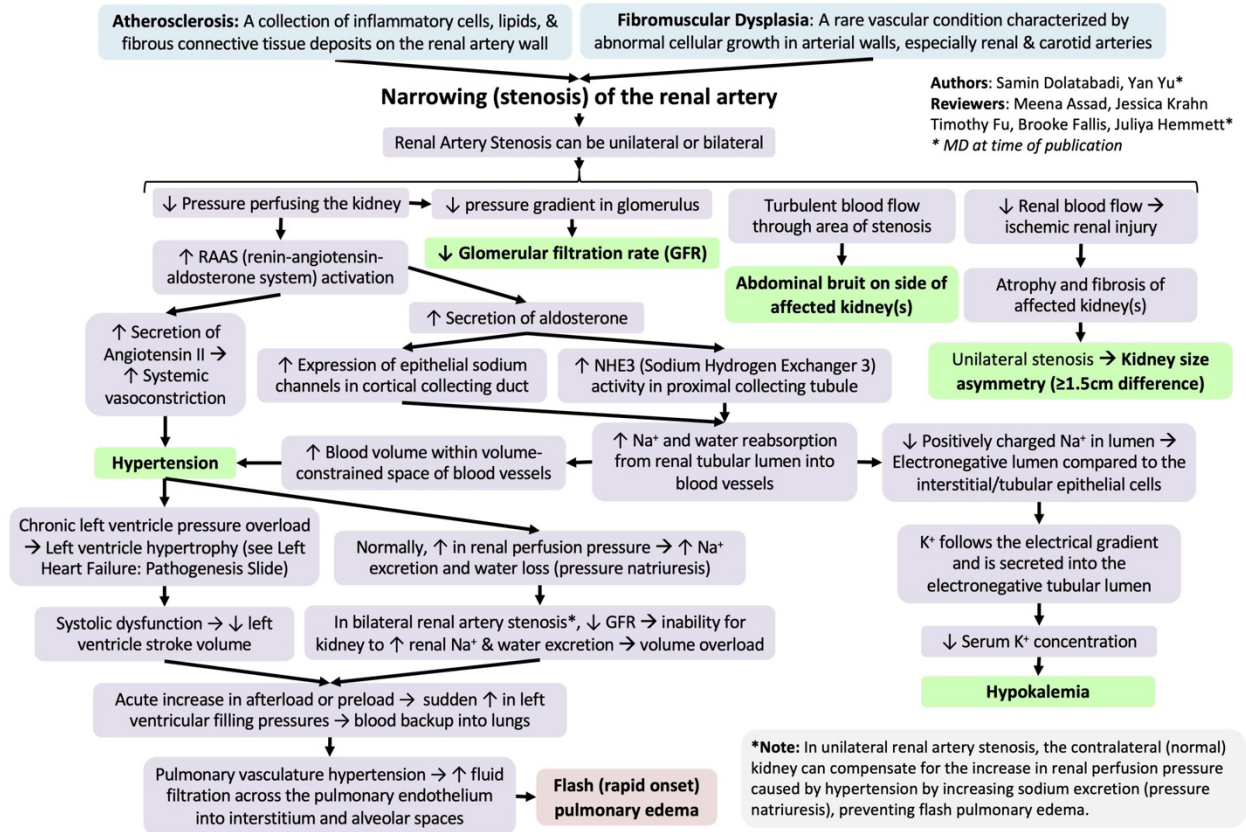
Medical Therapy of Renal Artery Stenosis

- Medical management of renal artery stenosis is essential, since it aims to reduce coexisting cardiovascular risk and protect kidney function.
 - Intensive management of arterial hypertension is the single most important factor in reducing major cardiovascular risks (i.e., MI, stroke).
 - AHA/ACC: Maintain BP <130/80 mmHg and KDIGO recommends SBP <120 mmHg.
- RAS blockers are the preferred antihypertensives in renal artery stenosis since these agents target the activation of the RAAS in renal artery stenosis.
 - Renal artery stenosis → renal hypoperfusion → activation of RAAS → impairs Na⁺ excretion → increases intravascular volume → increases BP.
 - RAS blockers reduce mortality (i.e., MI, stroke) in patients with renal artery stenosis, compared other classes of antihypertensive agents.
 - ACEi/ARB therapy is also associated with lower risk of ESKD, but a higher risk of AKI.
 - Note: AKI is the major limitation of ACEi/ARB therapy in patients with renal artery stenosis.
 - ACEi's/ARBs blunt the autoregulatory mechanism of angiotensin II: inhibit constriction the efferent arteriole → decrease intraglomerular pressure → decrease GFR → AKI.
 - ACEi's/ARBs are more likely to produce a rise in serum creatinine levels (i.e., AKI) in patients with "significant bilateral" renal artery stenosis.
 - When patients reach a critical limit of kidney perfusion, i.e., systemic BP control and stable kidney function cannot be simultaneously achieved, endovascular stenting or surgical revascularization is required to restore renal blood flow and BP control.
 - ACEi's/ARBs are prescribed after endovascular stenting or surgical revascularization to effectively control BP and maintain kidney function.
 - Key Point: it's essential to carefully monitor for elevated serum creatinine levels in patients treated with ACEi's/ARBs for renal artery stenosis.
 - It's also worth noting that patients with severe bilateral renal artery stenosis may also experience AKI with other classes of antihypertensive agents, since reducing systemic BP may also exceed the lower limits of maintaining renal perfusion → AKI.
 - Studies indicate that most patients with unilateral and bilateral renal artery stenosis tolerate and benefit from ACEi's/ARBs, with careful monitoring of serum creatinine levels.

Mechanisms of Renal Artery Stenosis



Summary: Pathogenesis & Clinical Findings of Renal Artery Stenosis



Legend: Pathophysiology Mechanism Sign/Symptom/Lab Finding Complications

Published December 30, 2021 on www.thecalgaryguide.com

