

# Renovascular Hypertension

Philip Stockwell, MD  
Assistant Professor of Medicine (Clinical)  
Warren Alpert School of Medicine  
Cardiology for the Primary Care Provider  
September 28, 201

# Renovascular Hypertension

- An important and potentially correctable cause of secondary hypertension
- Frequency varies with population studied
  - Less than 1% of mild to moderate HTN
  - Much more common with acute, severe or refractory HTN

# Suggestive Clinical Findings

- Onset of HTN prior to 30 yo, particularly if no FH or other risk factors (ie obesity)
- Onset of severe ( $\geq$ stage II or 160/90) HTN after age 55
- Resistant HTN – not controlled on 3 drugs at therapeutic doses
- Acute rise in BP over previously stable baseline
- Malignant HTN – severe HTN with end organ damage (ARF, HF, neurologic change, papilledema, retinal hemorrhages)
- Acute rise in creatinine ( $\geq$ 30%) with ACE-I
- Moderate to severe HTN in patient with unexplained atrophic kidney or asymmetric kidney size ( $\geq$ 1.5cm)
- Moderate to severe HTN in patients with diffuse atherosclerosis (?bruit)
- Moderate to severe HTN with recurrent acute pulmonary edema
- ?Hyponatremia (unclear etiology)

# Screening for Renovascular Hypertension

- Medical therapy with RAAS blockade (ACE-I, ARB, direct renin inhibitors) and diuretic (if necessary) is indicated in all patients with renovascular HTN.
- Often quite effective
- Therefore, do not screen for renovascular HTN unless discovery of a stenosis would alter treatment (ie an intervention would be performed)

# Screening Tests for Renovascular HTN

- Renal arteriography is gold standard
- Noninvasive alternatives include
  - MRA
  - CTA
  - Duplex Doppler ultrasonography
- Other tests now felt to be not useful due to inferior accuracy
  - Captopril renal scintigraphy
  - Selective renal vein renin measurements
  - Plasma renin activity

# Diagnostic Imaging Tests for Renovascular HTN

- MRA
  - Increasingly used as first line screening test.
  - Sensitivity approaches 100% with specificity 71-96% in populations at high risk of atherosclerotic disease. Less useful for patients with fibromuscular dysplasia.
  - Gadolinium contraindicated for  $GFR < 30$
- CTA
  - Sensitivity and specificity in excess of 95% for detection of main renal artery lesions in patients with history suggestive of renovascular HTN.
  - Contrast must be given. With low GFR, CT contrast preferable to gadolinium.
- Duplex Doppler Ultrasonography
  - Noninvasive
  - Highly operator dependent
  - Can take up to 2 hours to perform
  - In good hands, sensitivity 85% and specificity 92%
- Test characteristics do vary with population studied.
  - Noninvasive testing most helpful in moderate risk patients.
  - For high risk patients, MR or CT reasonable alternative to angiography.
  - For patients at low risk for renovascular HTN for whom diagnosis needs to be pursued, angiography preferred (ie FMD).

# Treatment of Renovascular HTN

- Diagnosis of renovascular HTN requires
  - Documentation of >75% stenosis
  - One or more of clinical features suggesting that stenosis plays an important role in elevated BP (see slide 3).
  - Discovery of an incidental stenosis at cath should not prompt revascularization
- Patients with atherosclerotic renovascular HTN have CAD equivalent and should have aggressive risk factor reduction according to published guidelines
- Three options
  - Medical therapy – indicated in all patients (if tolerated)
  - Angioplasty, generally with stenting
  - Surgery
- Revascularization, usually with stenting, warranted for >75% lesions and one of following
  - Resistant HTN
  - Malignant HTN
  - Inability to tolerate medications
  - Recurrent flash pulmonary edema

# Revascularization vs Medical Therapy

- Several randomized trials have examined this issue, most notably ASTRAL
- Other than slight reduction in number of medications used, none demonstrated a significant benefit from stenting
- Limitations
  - Many patients had stenoses that were not clinically significant (50-70%).
  - Patients excluded if doctors felt they "definitely" needed revascularization
  - Primary outcome was progression of chronic kidney disease, not BP control
- In a meta-analysis of 1208 patients undergoing stenting, 4 deaths were reported and 12 renal artery perforations or dissections
- Surgery is indicated with
  - Multiple small renal arteries
  - Early primary branching of main renal artery
  - Need for aortic reconstruction near renal arteries.
  - Death rate 3-7% in these high risk patients.
- Revascularization probably not helpful in patients with advanced kidney disease (ie creat  $\geq$  3)

# Bilateral Renal Artery Stenosis and RAS associated CKD

- Medical therapy with ACE-I +/- diuretic safe in majority of patients with HD significant bilateral renal artery stenosis.
- ACE-I mediated reduction in GFR will occur but often not clinically significant
  - Only 5-10% will have large increase in Scr
  - First step would be to stop diuretic
  - A minority of patients are unable to have simultaneous BP control and stable renal function, and in these patients revascularization should be considered
- Theoretic concern of chronic renal hypoperfusion and atrophy in these patients with medical therapy. Risk of this is unclear.
- Chronic medical therapy of RAS also runs risk of progression of stenosis and eventual related renal failure.
  - 21 patients with bilateral RAS and 3 year follow-up
    - 17 stable renal function
    - 4 had 50% increase in Scr
    - 2 of those 4 on dialysis
    - But, overall mortality rate was 43% with MI and HF being major culprits
  - These patients often succumb of atherosclerotic disease of other organs

# Conclusions

- Renovascular HTN is rare in overall population but fairly common in specific subgroups
- Aggressive risk factor modification is warranted (CAD equivalent)
- All patients should be treated with RAAS blockade +/- diuretic. This is generally well tolerated even with bilateral disease.
- Screening should only occur for patients in whom revascularization would be performed. MRA first choice, angiography gold standard.
- Revascularization (generally stenting) is of arguable benefit but probably plays some role in patients with relatively preserved renal function and difficult to control hypertension, perhaps with hypertension related complications