Fibromuscular Dysplasia (FMD) in Renal Arteries

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Disclosure

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I have the following potential conflicts of interest to report:

☒ Consulting (Cook, Gore, Bard, Abbott, Medtronics, Penumbra)
☐ Employment in industry
☐ Stockholder of a healthcare company
☐ Owner of a healthcare company
☐ Other(s)

☐ I do not have any potential conflict of interest
What is FMD?

• First described in 1938 (J Urol)
• Non atherosclerotic aneurysmal and occlusive disease of renal artery
• Commonest artery with dysplasia followed by carotids and iliac artery
• Incidence unknown but said to be less than 5%
  • 2\textsuperscript{nd} most common pathologic lesion responsible for renovascular hypertension
Types

- Intimal Fibroplasia (5%)
- Medial Hyperplasia (less than 1%)
- **Medial Fibrodyplasia (85%)** Commonest referred commonly as FMD
- Perimedial Dysplasia (10%)
Intimal Fibroplasia

• Primary or Secondary

• Primary – Usually Unilateral, Main Renal artery with smooth focal stenosis

• Microscopically subendothelial mesenchymal cells irregularly arranged and usually internal elastic lamina identifiable

• Secondary – Most bilateral, long tubular stenosis

  • Likely related to arteritis

• Dyplastic changes in outer layers of vessel wall also involved
Medial Hyperplasia

• Unusual cause
• Women 4\textsuperscript{th} or 5\textsuperscript{th} decade
• Mid portion renal artery
• Increase in smooth muscle cell numbers
  • Intima and adventitia normal
  • controversial lesion
Medial Fibrodyplasia

• Commonest usually called FMD
• Uncommon in African Americans
  • 4th and 5th decade of life
• Can range from solitary focal stenosis to the commonest presentation with series of stenosis and aneurysmal outpouchings
  • String of beads appearance
Medial Fibrodyosplasia
FMD (Medial Fibro dysplasia)

- Affects distal main renal artery
- Bilateral disease 60-70%
- Progression is common

Two forms
- Peripheral (disease through outer media)
- Diffuse (entire media) this is commonly seen
  - Internal elastic lamina fragmented
FMD Histopathology
Perimedial Dysplasia

- It may coexist with medial fibrodysplasia
  - Usually women
- Main renal artery without mural aneurysms
- Minimal increase in medial ground substance with intact smooth muscle cells
Indications of Treatment

• Presence of moderate to severe hypertension
• Hemodynamically significant renal artery stenosis
• Evidence of functional importance of the stenosis

No need to do fly by interventions
Imaging Diagnosis

- Renal Duplex sonography
  - MRA
  - CTA
- Radionuclide scans
- Angiography (Gold standard)
  - Renin assays
Duplex USG (FMD)
CT Scan FMD (Not a Great test)
Gold Standard (Angiogram)
Selective Angiogram
Associated Pathology (ICA)
Associated Pathology (Iliac artery)
Treatment

• Drug Therapy
• ACE inhibitors (renal function impaired)
  • Angiotensin II antagonists
  • Beta blockers
  • Diuretics
• Ca channel blockers
Treatment

- 90% of FMD treated with PTA
- Stenting reserved for perforations or dissections with thrombosis
- Autologous vein graft for adults and hypogastric artery for children
- PTFE for main renal artery may be used.
- In situ repair if branch arteries not involved
- Ex vivo repair for extensive or complex disease
Treatment

- Access secure with sheath in place
- Cannulation with cobra/vanchi/omni sos
  - 0.014/0.018 system
- Dilate with smaller balloon if needed
- 1:1 dilatation (based on normal caliber vessel at that location)
  - 2 mins slow dilatation
  - Systemic heparin
Complications

- Perforation
- Dissection
- Thrombosis
- Anastomotic stenosis (post surgery)
- Vein grafts dilatation (post surgery)
Our Experience

Last 13 years
32 patients treated
24 Female 8 Male

Hypertension the one symptom (More than 3 antihypertensives (HTN) on average)

31 patients treated with PTA
1 treated with surgical repair (in vivo)

Symptoms improved with HTN in 28 patients to two or less antihypertensive

1 complication perforation
Moderate FMD
Pre treatment FMD
Post Treatment FMD
Complication post angioplasty pseudoaneurysm
Conclusion

- Young patients with renovascular hypertension with renal artery stenosis
  - PTA Treatment of choice
  - Stents rarely needed
  - Be aware of complications
  - Open surgery rarely needed
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