The Role Of Pressure Wires And IVUS In The Assessment Of Renal Artery Stenosis In The Treatment Of Hypertension And Other Conditions

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Disclosures

- Medical Advisory Board
  - Auxetics
  - Boston Scientific
  - Medtronic
- Stock Shareholder
  - Analytics 4 Life
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  - Calgary Scientific
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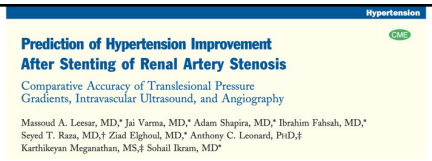

Hypertension

CME

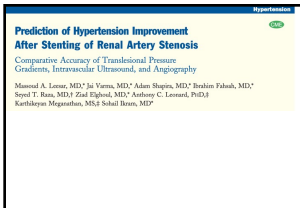
Prediction of Hypertension Improvement After Stenting of Renal Artery Stenosis

Comparative Accuracy of Translesional Pressure Gradients, Intravascular Ultrasound, and Angiography

Massoud A. Leesar, MD,* Jai Varma, MD,* Adam Shapira, MD,* Ibrahim Fahsah, MD,* Seyed T. Raza, MD,† Ziad Elghoul, MD,* Anthony C. Leonard, PhD,‡ Karthikeyan Meganathan, MS,‡ Sohail Ikram, MD*

- 62 patients
- Compared:
  - Pressure guidewire
    - FFR
    - Mean gradient
    - Hyperemic systolic gradient (after 30 mg IA papaverine)
  - IVUS
  - Quantitative angiography

JACC. 53: 2009;2363-71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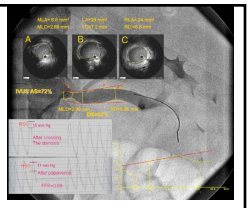

- HSG ≥ 21 mm Hg only independent predictor HBP improvement
  - (odds ratio: 1.39; 95% confidence interval: 1.05 to 1.65; p 0.013

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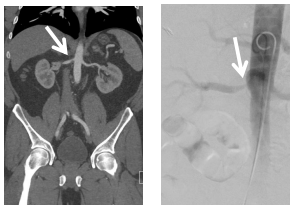
39-year-old male with medically refractory hypertension and right renal artery stenosis



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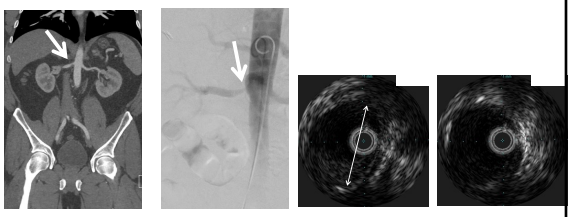
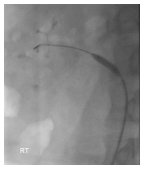


IVUS used for vessel sizing
25 mm Hg gradient

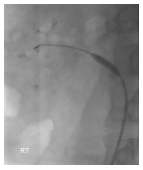
39-year-old male with medically refractory hypertension and right RAS



Angioplasty - 6 x 20 mm balloon

No change angio or pressures

39-year-old male with medically refractory hypertension and right RAS



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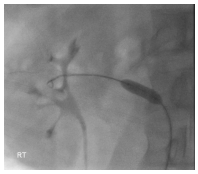


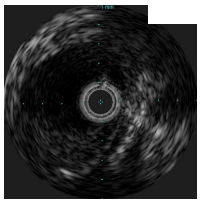
7 x 18 mm BeGraft covered stent

39-year-old male with medically refractory hypertension and right RAS

Post BeGraft

39-year-old male with medically refractory hypertension and right RAS

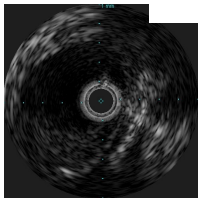
Post BeGraft



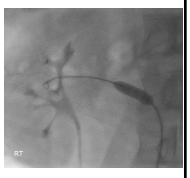
IVUS – stent 5.8 mm

39-year-old male with medically refractory hypertension and right RAS

Post BeGraft



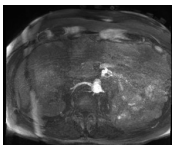
IVUS – stent 5.8 mm



Post dilated to 7.0 mm
Distal to stent:143/74, mean 99
Aorta: 135/79, mean 99

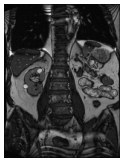
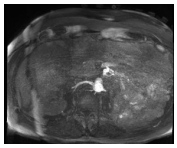
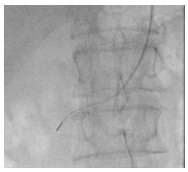
84-year-old male solitary right kidney

- Progression CKD
  - Cr 495, GFR 9
- ER visits
  - SOB due to fluid overload
  - Worsening hypertension



Ultrasound impossible and MR poor due to dyspnea

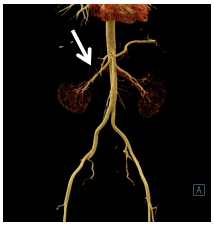
84-year-old male solitary right kidney

Ultrasound impossible and MR poor due to dyspnea

Pressure wire no gradient

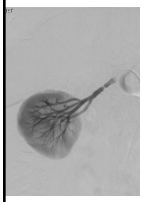
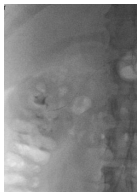
48 yr old woman
HBP poorly controlled on 3 medications. CVA x 2

FMD right renal artery

LRA probably normal

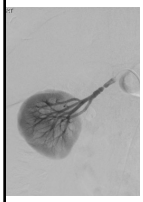
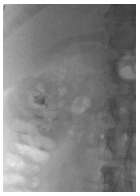
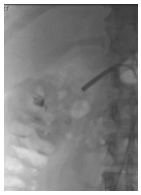
48 yr old woman
HBP poorly controlled on 3 medications. CVA x 2

Angio -> FMD

Hilum: 161/93, mean 120 mm Hg
Aorta: 129/80, mean 101

48 yr old woman
HBP poorly controlled on 3 medications. CVA x 2

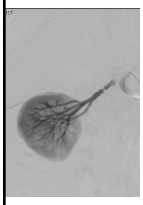
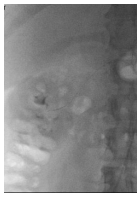
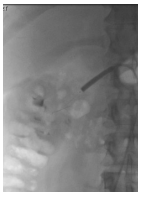
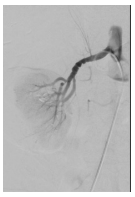




Angio -> FMD

Hilum: 161/93, mean 120 mm Hg

Balloon angioplasty

48 yr old woman
HBP poorly controlled on 3 medications. CVA x 2

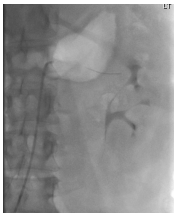
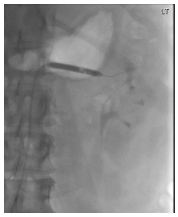
Angio -> FMD

Hilum: 161/93, mean 120 mm Hg
Aorta: 129/80, mean 101

Balloon angioplasty

Post dilation angio
Persistent undulation – no gradient

48 yr old woman
HBP poorly controlled on 3 medications. CVA x 2

Angio -> subtle FMD

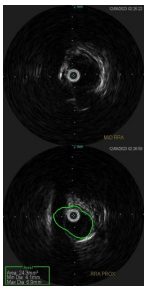
18 mm systolic gradient

Balloon angioplasty

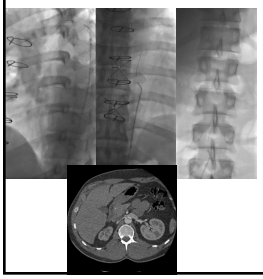
31 yr old man. Type A dissection. Hypertension on five medications.
Query dynamic dissection flap across renal artery orifice

Chronic occlusive changes RRA
Pressure wire – no gradient
IVUS - no **dynamic** dissection **flap**





Aortic Pullback Pressures



- 31 mm Hg systolic gradual gradient through narrowed true lumen
- Patient elected medical management

Summary - The Role Of Pressure Wires And IVUS In The Assessment Of Renal Artery Stenosis In The Treatment Of Hypertension And Other Conditions

- Pressure wires
  - Guide intra-procedure management atherosclerotic RAS
    - ? More accurate than IVUS threshold for intervention
  - FMD – direct intervention in subtle cases
    - Good endpoint when angio findings unchanged
- IVUS
  - Accurate sizing endovascular devices
  - Dynamic assessment, e.g. dynamic flaps dissection