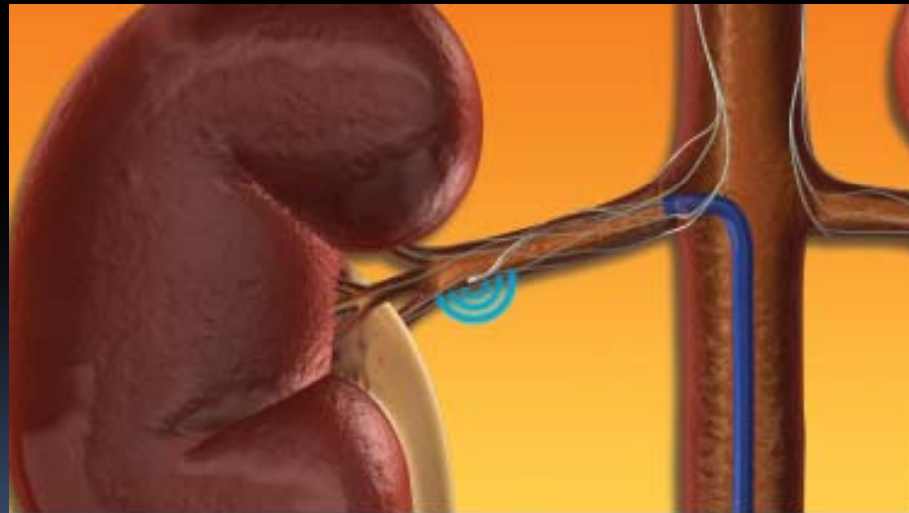


RENAL DENERVATION FOR RESISTANT HYPERTENSION: ASIAN EXPERIENCE



Renal Denervation Patient Eligibility Based on Symplicity HTN-1 and HTN2

Patients eligible for renal denervation

Office SBP ≥ 160 mm Hg (≥ 150 mm Hg in patients with type 2 diabetes mellitus) and ≥ 3 antihypertensives

eGFR ≥ 45 ml/min/1.73m²

Age ≥ 18 years

Patients excluded from renal denervation studies

Type 1 diabetes

Pregnancy, planned pregnancy, or nursing

Hemodynamically significant valvular heart disease

MI, unstable angina, or CVA within last 6 months

Contraindications for MRI

REASON

Potential for \uparrow rate of RF and \uparrow CV complications

Potential for contrast and radiation exposure

Large drops in BP could be hazardous

Comorbidities present certain challenges

MRI used to access left ventricular mass

Symplicity HTN-1 Investigators. *Hypertension*. 2011;57:911-917. / Symplicity HTN-2 Investigators. *Lancet*. 2010;376:1903-1909.
Mahfoud F, et al. *Dtsch Med Wochenschr*. 2011;136:2418;doi:10.1055/s-0031-1272580.

Case 1

- Male/76
- Non-smoker
- History of HT for 10 yrs
- Hyperlipidemia
- Diabetes mellitus
- IHD s/p PCI
- Old CVA

Admitted in August 2011 for hypertensive urgency (SBP > 200 mm Hg)

Case 1

- BP controlled with iv GTN

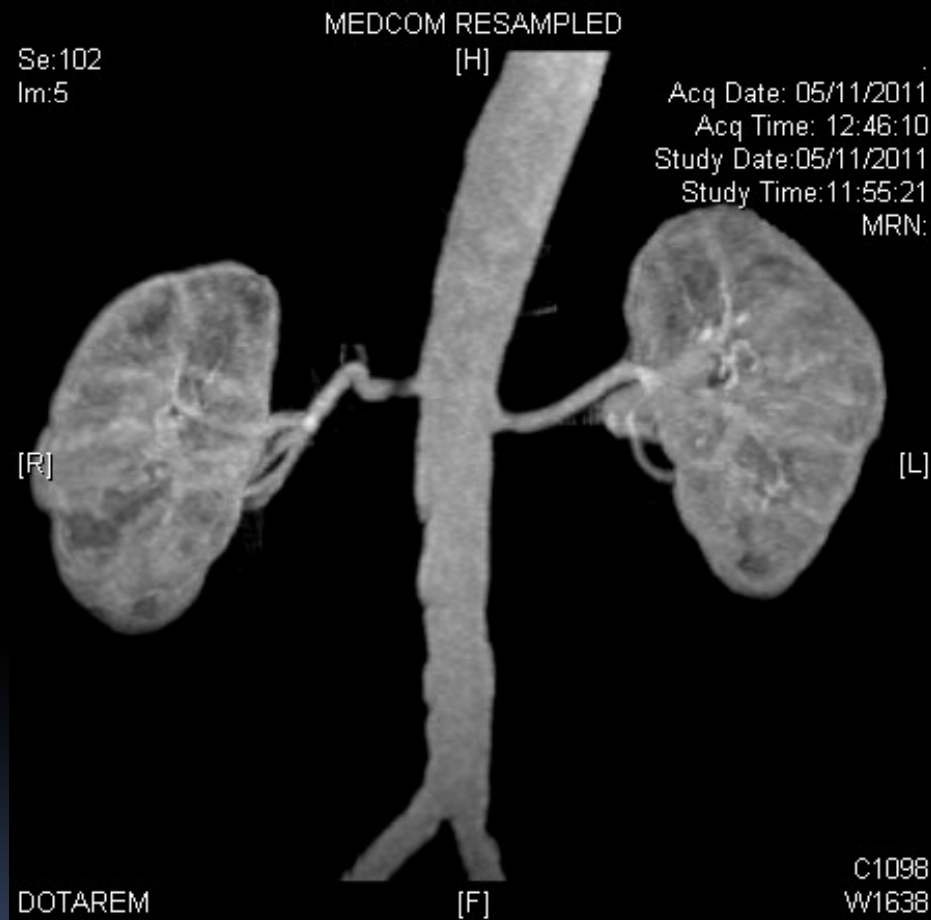
Medications:

- Lisinopril 10mg OM
- Nifedipine 90mg OM
- Hydrochlorothiazide 25mg OM
- Atenolol 50mg OM
- Hydralazine 50mg tds

Case 1

- Normal renal function (eGFR > 45)
- USG doppler of renal arteries: no renal artery stenosis
- Echo: LVEF 55%; mild LVH ; normal valves.
- BP monitored in outpatient and at home
- SBP > 150mmHg
- Planned for renal denervation

MRA Renal

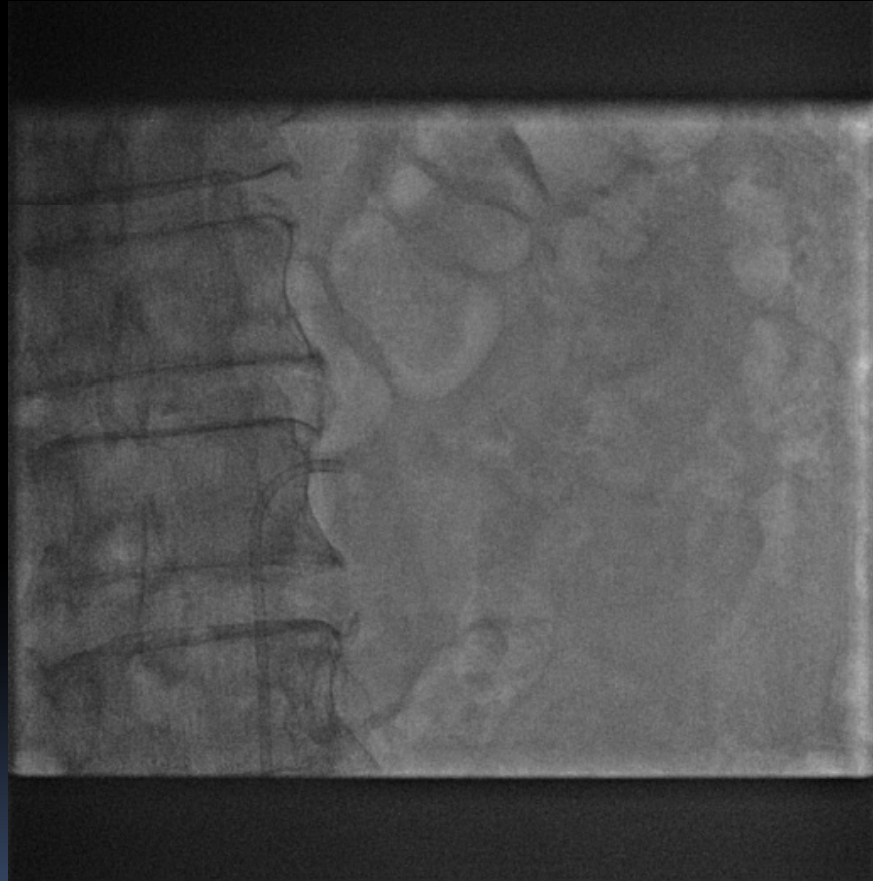


MRA provides accurate information about the number of **renal arteries**, the size of the kidneys and the presence of anatomic variants.

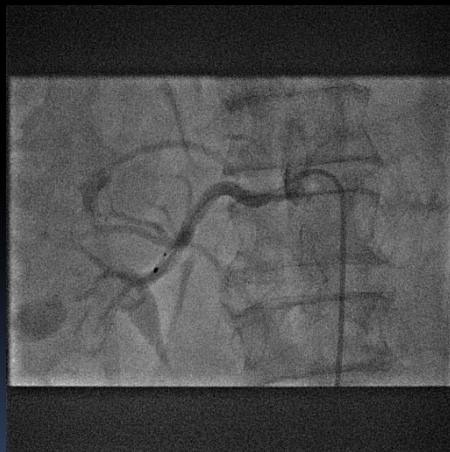
Renal Angiogram



Renal Denervation



Renal Denervation



Renal denervation: 7 ablations on Rt.side ; 6 ablations on Lt.side

Progress

- No acute complications ; normal renal function
- Follow-up: BP under normal range (SBP 130mmHg)

Medications

Pre RDN

Medications:

- Lisinopril 10mg OM
- Nifedipine 90mg OM
- Hydrochlorothiazide 25mg OM
- Atenolol 50mg OM
- Hydralazine 50mg tds



Post RDN

Medications:

- Lisinopril 10mg OM
- Nifedipine 30mg OM

Case 2

- Male/58
- Non-smoker
- Diabetes mellitus
- Hypertension for 15 years
- Hyperlipidemia
- IHD s/p PCI
- Obesity (BW 125kg ; BMI 42 kg/m²)
Referred for BP control before bariatric surgery

Case 2

- USG doppler of renal arteries: no RAS
- Echo: LVEF 55% ; mild LVH; normal valves
- Renal function(eGFR> 45)

Medications:

- Bisoprolol 5mg daily
- Amlodipine 5mg daily
- Hyzaar Forte 1 tab daily (Hyzaar 100mg + HCTZ 25mg)

Progress

- Pt's drugs were uptitrated (Amlodipine 10mg daily and Bisoprolol 10mg daily)
- SBP range: 150-180mmHg

Important Issues

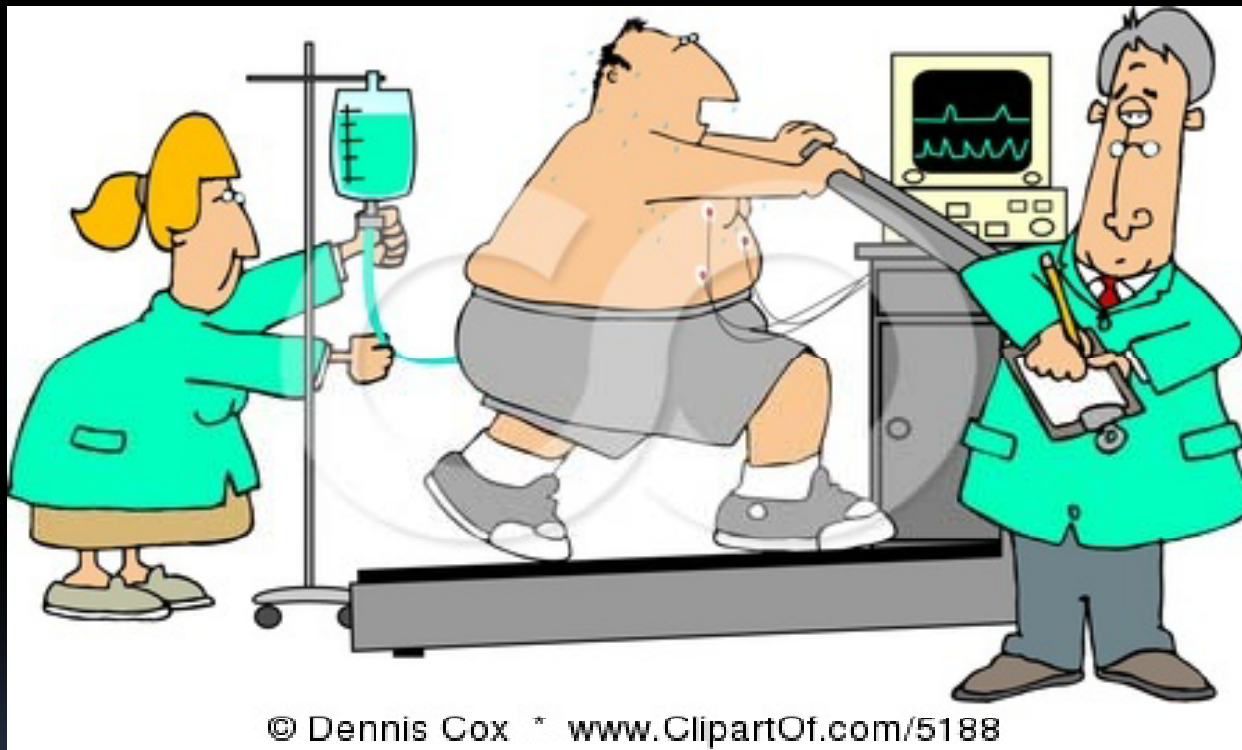
2 Issues

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graph TD; A[2 Issues] --> B[Need for bariatric OT]; A --> C[Resistant Hypertension];
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Need for bariatric OT

Resistant
Hypertension

Bariatric Surgery



He had undergone gastric banding 6 years ago with transient wt.loss of 10kg

Bariatric Surgery

Bariatric surgery and long-term cardiovascular events.

- Bariatric surgery was associated with a *reduced number of cardiovascular deaths* (28 events among 2010 patients in the surgery group vs 49 events among 2037 patients in the control group; adjusted hazard ratio [HR], 0.47; 95% CI, 0.29-0.76; P = .002).
- The number of total first time (fatal or nonfatal) cardiovascular events (myocardial infarction or stroke, whichever came first) was *lower* in the surgery group (199 events among 2010 patients) than in the control group (234 events among 2037 patients; adjusted HR, 0.67; 95% CI, 0.54-0.83; P < .001).

JAMA 2012 Jan 4;307(1):56-65.

Bariatric Surgery

Bariatric Surgery versus Intensive Medical Therapy in Obese Patients with Diabetes

- In obese patients with uncontrolled type 2 diabetes, 12 months of medical therapy plus bariatric surgery *achieved glycemic control* in significantly more patients than medical therapy alone.

N Engl J Med. 2012 Mar 26. [Epub ahead of print]

Hypertension & Surgery

General principles

- **Cardiovascular stability** is important during anaesthesia and the perioperative period.
- Hypertensive patients are at risk of *greater swings* of blood pressure than the normal population.
- **BP lability** associated with ↑ CVS morbidity and mortality peri- and postoperatively, particularly in patients with severe uncontrolled hypertension.
- *Optimisation* with investigation and drug treatment can prevent such complications.

Management of Hypertension



Lifestyle



Medications



Management of Hypertension



Lifestyle



Medications



Devices



Important Issues

2 Issues

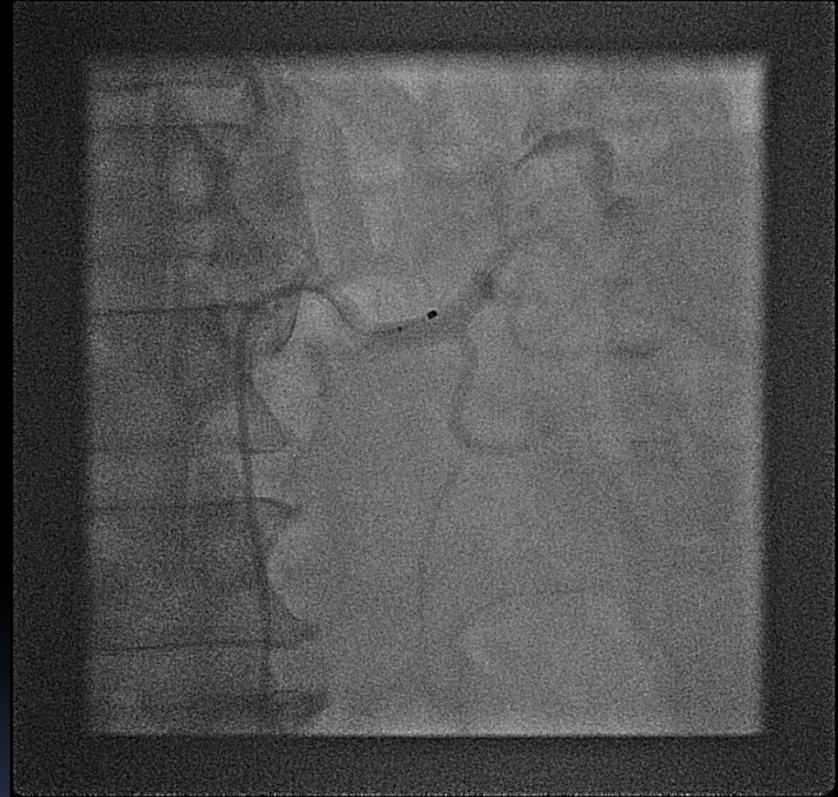
Need for bariatric OT

**Resistant
Hypertension**

RENAL DENERVATION



Renal Denervation

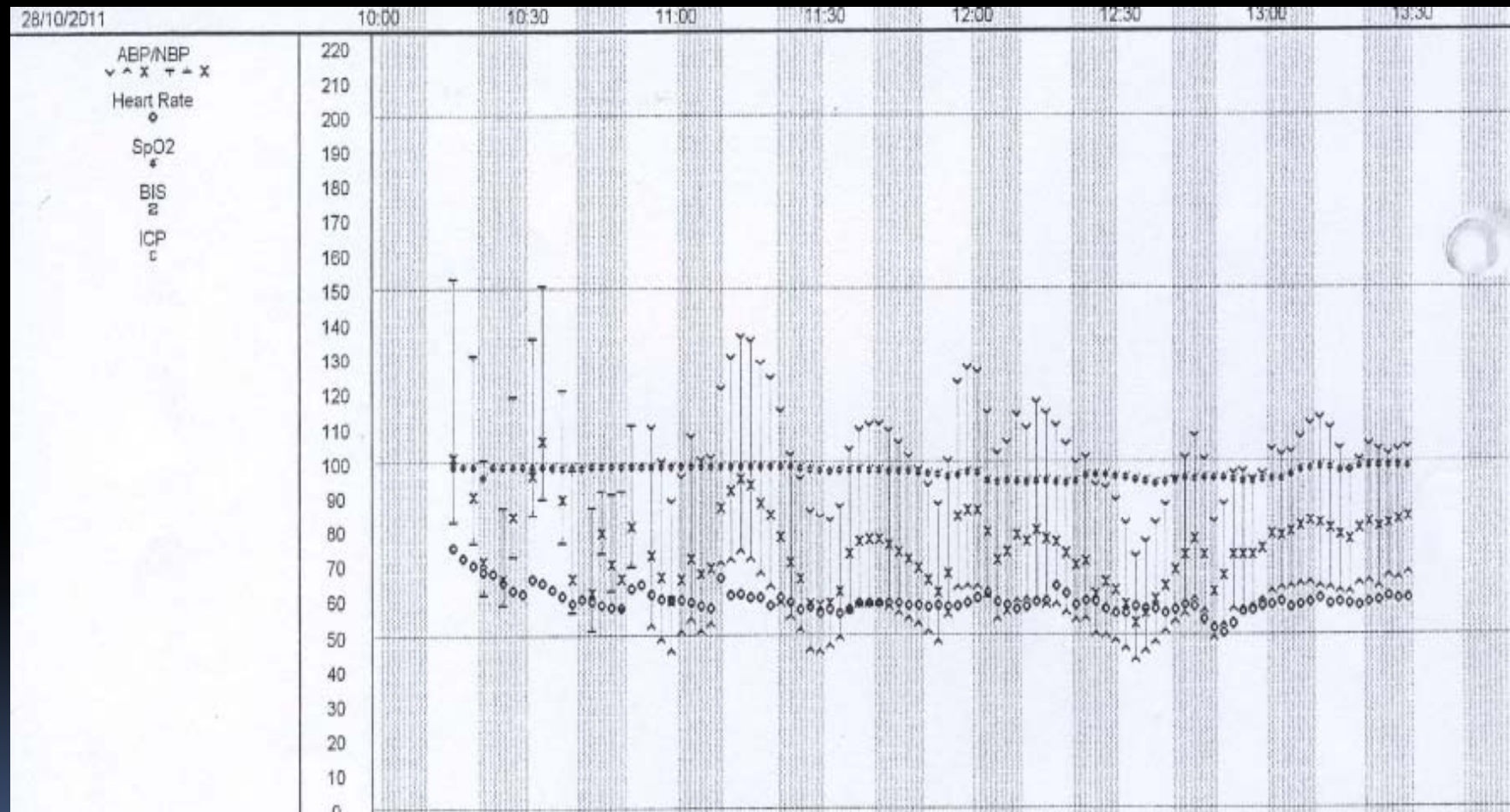


5 ablations on both sides

Progress

- SBP < 135 mmHg over the next few weeks
- He underwent bariatric surgery 1 month later

Arterial BP during peri-operative period



Optimal range of BP during OT ; uneventful operation

Progress

- Lost 20kg after bariatric surgery
- SBP < 130mmHg on follow-up
- USG doppler of renal arteries at 6 months: unremarkable

Medications

Pre RDN

Medications:

- Bisoprolol 10mg daily
- Hyzaar Forte 1 tab daily
(Hyzaar 100mg + HCTZ 25mg)
- Amlodipine 10 mg daily



Post RDN

Medications:

- Bisoprolol 10mg OM
- Losartan 50mg daily

Renal Denervation

**** Novel use of renal denervation therapy to treat resistant HT as pre-operative strategy before intermediate risk non-cardiac surgery**



(In press)

Case 3

- M/58
- Non-smoker
- HT
- IHD s/p PCI
- Diabetes mellitus
- Hyperlipidemia
- Recurrent CVA(ischaemic)

*Presented with hypertensive urgency
(SBP > 200 mmHg)*

Case 3

- Admitted to CCU for iv Nitroprusside

Medications:

- Amlodipine 10mg OM
- Carvedilol 50mg BD
- Hydralazine 75mg QID
- Prazosin 1mg tds
- Lisinopril 40mg daily
- Aldactone 12.5mg daily

Case 3

- USG doppler of renal artery: no RAS
- 24hr urine catecholamine: normal
- Echo: EF 45% ; mild LVH ; normal valves
- Renal function: eGFR > 45 ml/min
- Plan for renal denervation

MRA Renal

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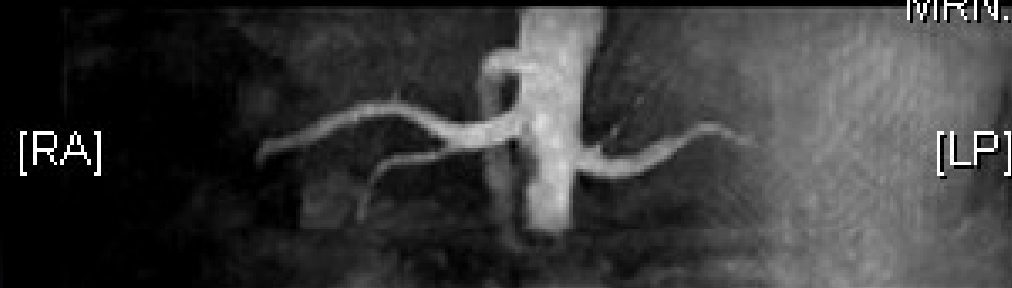
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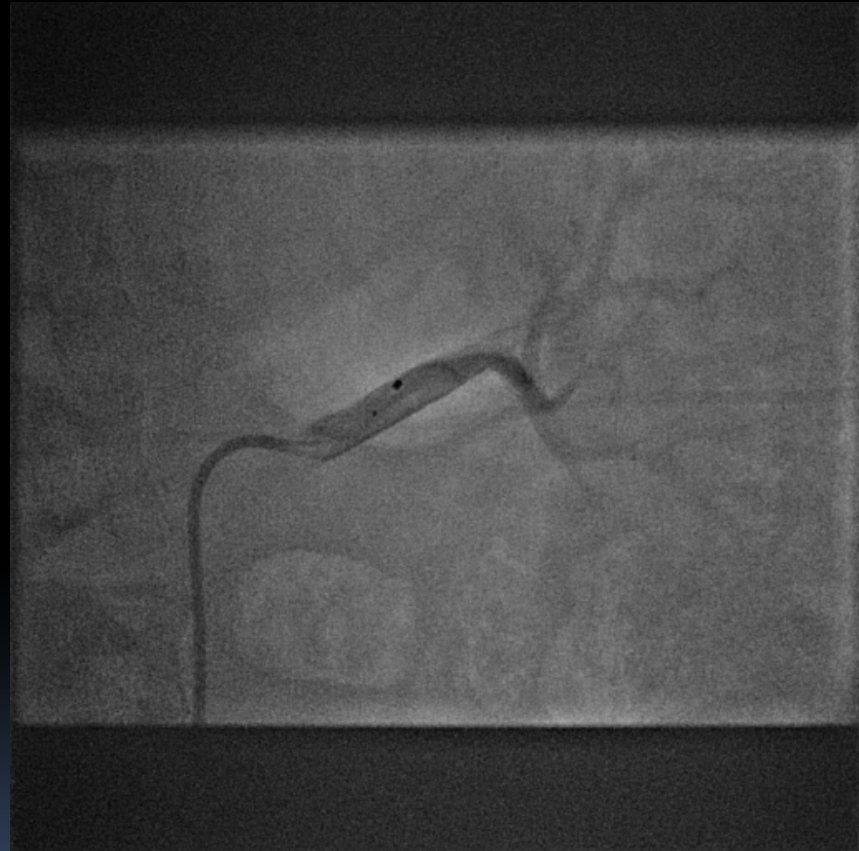
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Renal Angiogram



Renal Denervation



7 ablations on both sides

Progress

- No acute complication
- Followed-up at Heart Failure Clinic
- BP at 2 months follow-up : 123/64 mmHg

Medications

Pre RDN

Medications:

- Amlodipine 10mg OM
- Carvedilol 50mg BD
- Lisinopril 40mg daily
- Aldactone 12.5mg daily
- Hydralazine 75mg QID
- Prazosin 1mg tds



Post RDN

Medications:

- Amlodipine 10mg OM
- Carvedilol 50mg BD
- Lisinopril 40mg daily
- Aldactone 12.5mg daily
- Hydralazine 50mg BD

Conclusion

- Our initial experiences with RDN have been favourable
- All patients had significant reduction in BP
- Successful reduction of medications
- Long term follow-up needed to assess its safety and efficacy