

# Immediate Normalisation of Blood Pressure following Intervention in Functional Total Occlusion of Unilateral Renal Artery with an Atrophic Kidney



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# Clinical History

- A 22 year old female, a nursing student, evaluated for secondary hypertension → Right Renal Artery Stenosis.
- Presented with Uncontrolled Hypertension for last 2 years on 3 antihypertensive drugs (Metoprolol 100 mg, Ramipril 10 mg BD, Amlodipine 10 mg OD). Her renal functions were normal .( Intolerant to diuretic).

## Physical exam

- Blood pressure 160/110 bilateral upper limbs. All other pulses well palpable .No any other abnormality noticed.



## Relevant Test Results

- **USG KUB (July 2010)** : Left Kidney= 11.8cm, Right Kidney= 7.0 cm
- **Tc99m DTPA SCAN -(JULY 2010)**  
Relative Function LK =82%, RK=18% with impaired perfusion and severely impaired cortical tracer uptake.
- **ESR** = 14 mm 1<sup>st</sup> hr
- **Serum Creatinine** =1.1mg/dL
- ANA negative, ANCA Negative, FBS 76 mg%, LDL 133 mg/dL, HIV Negative.



# CT Scan

Atrophic Kidney

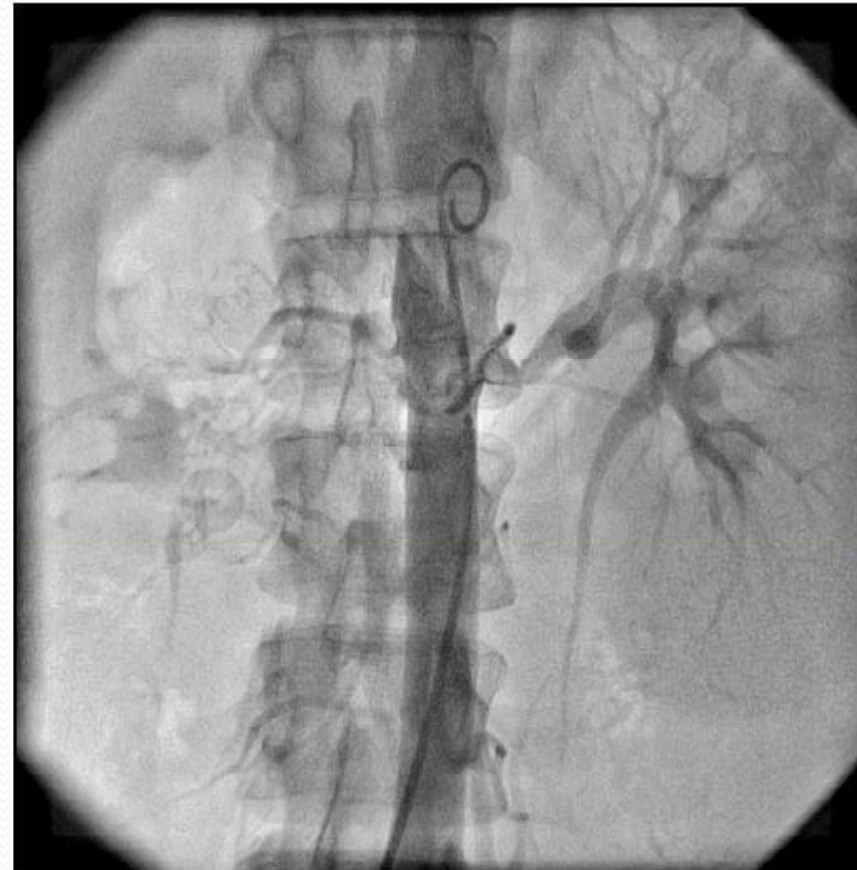


Right Renal Artery Occlusion  
No Accessory Renal arteries



## Renal Angiogram (September 2010)

- Non-selective aortogram reveals non-opacification of right artery and normal left renal artery.





# Diagnosis

- Secondary Hypertension –Uncontrolled with Drugs
- Unilateral Renal Artery Stenosis  
Functional Total Occlusion  
Small kidney

Etiology ? Takayasu's Arteritis



# Treatment options

..... For a young ,active female , not willing to take multiple medications for a long term

## PTRA/Stenting

- Less invasive
- No Scar ( Young Female)
- Preserves kidney
- Equivalent beneficial BP Response

## Surgical Revascularization/ Nephrectomy

- Higher Morbidity
- Scar mark
- Concern of RAS in contra-lateral kidney in future
- No additional benefit.

# ACC AHA guidelines

## Indication for Renal interventions in RAS

- Uncontrolled hypertension • II a
- Flash pulmonary edema/CHF • I
- Unstable Angina • II a
- Renal dysfunction
  - B/L RAS ,Solitary kidney • II a
  - Unilateral RAS • II b
- Asymptomatic RAS • II b

JACC 2006



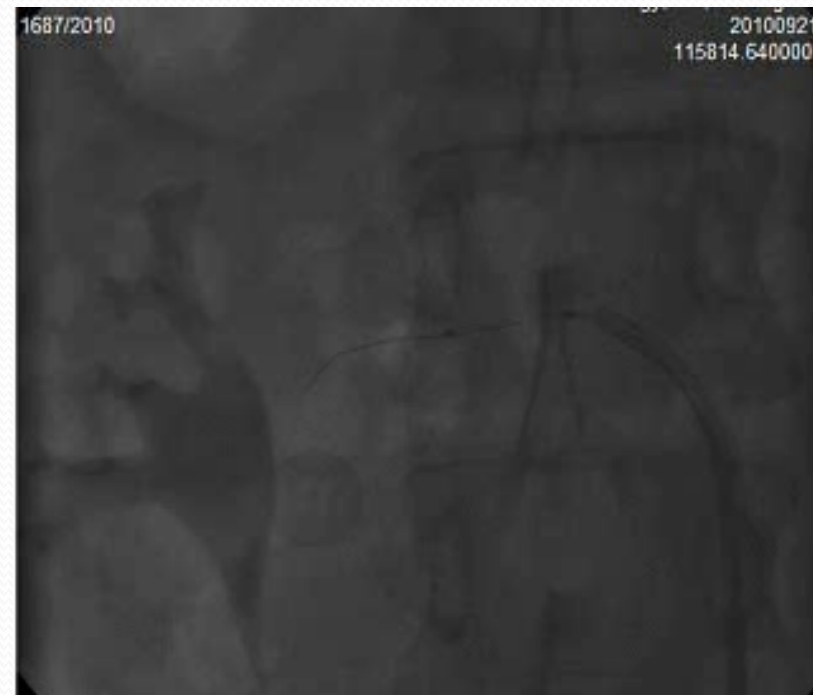


# Procedural Steps



Renal Double Curve guide  
( Cordis )

- Initially a non-hydrophilic coronary guide wire was tried but could not be negotiated across the lesion.
- Later Fielder FC wire (Asahi Intec ) was crossed across the lesion with difficulty.



# Procedural Steps



- Lesion was pre-dilated with 2.0x12 mm sprinter balloon ( Medtronic) at 9 atmosphere for 10 seconds and flow was restored .

- Liberty Monorail 3.0x20 mm BMS stent (Boston scientific) was deployed at 10 atm pressure for 20 seconds.



# Procedural Steps



- Good results achieved.

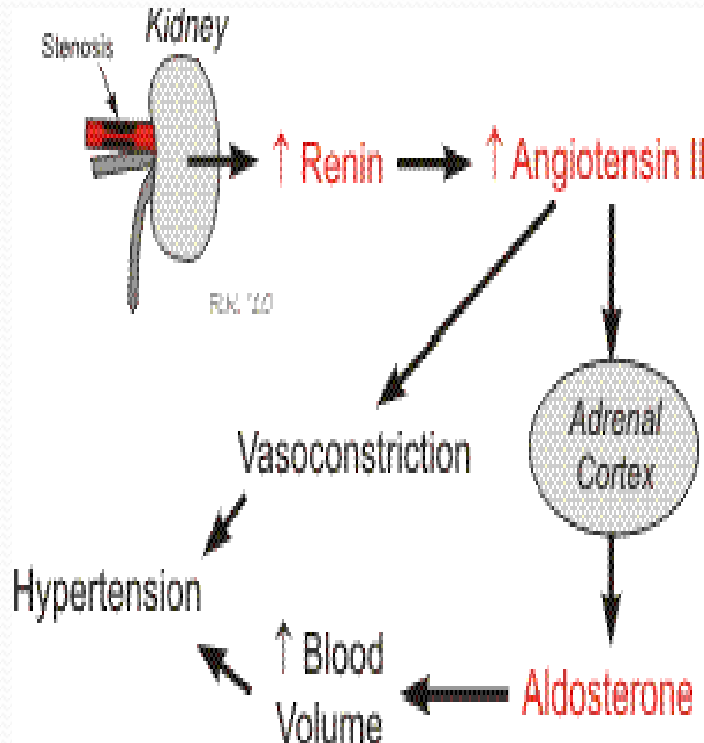
- Due to the inadequate stent expansion, stent was post dilated with Sprinter non compliant balloon (Medtronic), 3.5 x 9 mm at 10 atm pressure for 20 seconds.



# Post-Procedure follow up

- Discharged 3 days after the procedure without any antihypertensive drug.
- Her home blood pressure recordings were in the range of 110/70 mmHg without any drugs.
- Her follow up DTPA scan show minimal improvement in differential renal function (RK- 20%).
- Patient's blood pressure and Serum Creatinine remained normal on follow up at 3 and 6 months post-procedure.
- Follow up Renal Doppler at 5 months – Normal flow bilateral renal arteries. LK 11 cm ,RK 7.5 cm.

# Mechanism of HTN in RAS



## Unilateral RAS

- **Elevated PRA**
- Pressure Natriuresis by nonstenotic kidney → lowers BP → further elevated PRA by stenotic kidney.
- .... predominantly Renin dependent

## Bilateral RAS/Solitary Kidney RAS

- **Volume expansion** → suppresses PRA .
- Relative Lower Ang II levels

# Total Occlusions of Renal Arteries

- No RCT's of Percutaneous Revascularisation
- 95 pts ( 100 lesions ) - Renal artery Occlusion
- 84 /95 pts - Renal dysfunction( Scr > 1.3)
- BP response – equivalent in Nephrectomy vs Revascularization.
- In pts with U/L disease – improvement of renal function only in revascularised pts vs. Nephrectomy.
- No significant difference in mortality ,BP response or survival.
- Favors Revascularization over Nephrectomy for RA-occlusion .

J Vasc Surg 1999;29;140-9



# Revascularisation in Small Kidney ( size < 7 cm)

## Revascularisation

- 9 pts
- All had beneficial BP response
- 44% had improved renal function

## Nephrectomy

- 8 pts
- 75% beneficial BP response
- 38% improved excretory function

J Vasc Surg 1999;29;140-9

## Learning Points .....

- BP may rapidly come down after intervention- close BP monitoring and adjustment of drugs accordingly.
- Renal Revascularization ,even in an atrophic kidney with total occlusion , do not preclude beneficial blood pressure response.
- Nephrectomy can be prevented if otherwise indicated for control of hypertension alone in such patients.
- Unilateral Impaired renal function on DTPA scan is not an indicator of blood pressure response to renal intervention.

**...large randomized trials are required**