

# Management of Resistant Hypertension and Renal Artery Infarct in a 56 Year Old Male: A Case Study of Fibromuscular Dysplasia, Diagnosis and Successful Angioplasty

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**Abstract:** 56 Year Old Male with Resistant Hypertension Presented with Flank pain for evaluation. On work up, he was found to have Bilateral renal artery infarct with multifocal ectasia and stenosis of Bilateral renal artery with sparing of ostium in CT angiogram. Renal angiogram revealed Probable Fibromuscular dysplasia involving right renal artery. He underwent Angioplasty of right renal artery and post procedure he showed significant drop in Blood pressure and improvement in his renal function test. He was discharged with dual antiplatelet therapy and downtitrated antihypertensive medication.

**Keywords:** Fibromuscular dysplasia, Multifocal ectasia and stenosis, Angioplasty of Renal artery

## 1. Introduction

Renovascular hypertension is one of the most common cause of treatable cause of secondary hypertension. [1] Majority of patients have Atherosclerosis as the common etiology, whereas 10% have Fibromuscular dysplasia as a etiology. Usually it affects Young individual and predominantly females. Fibromuscular dysplasia is a idiopathic , segmental , non- inflammatory and non atherosclerotic disease of the musculature of arterial wall leading to stenosis, aneurysm, dissection and occlusion of small and medium sized vessels namely renal and carotid artery.[2] Clinical clues for diagnosis of Renal artery Stenosis include Accelerated Hypertension, Sudden unexplained pulmonary edema, Unexplained size discrepancy in kidney of more than 1.5cm etc.[3] Once Fibromuscular dysplasia is suspected, there are various imaging modalities for confirmation of diagnosis. After diagnosis, Treatment may include management of hypertension and revascularization, both surgical or percutaneous angioplasty. [4]. Routine use of stents is not preferred, however if dilation is suboptimal or dissection occurs, stenting is done. In 30-50% of cases there is complete resolution of systemic hypertension and other symptoms[5]..

## 2. Case Presentation

56 years Male, Known case of Systemic Hypertension was on Regular Guideline directed medical therapy. Patient came with complains of steady and aching flank Pain. Abdominal examination was normal, but his Blood pressure was around 190/110 mmHg despite being on 3 anti hypertensive medication ie, Cilnidipine, Telmisartan and Chlorthalidone on optimal dosage. Blood Urea and serum Creatinine was elevated- 44mg/dl and 2.18mg/dl and serum Potassium- 3.2meq /Lt. General Physical examination was normal . There were no features of Thyroid/ Cushing disorders. His Chest X ray / ECG and Echocardiogram were normal.

Patient was evaluated for Secondary cause of hypertension and CT aortogram was taken, which showed Bilateral Renal infarcts with Multifocal areas of ectasia and stenosis involving Bilateral renal artery with sparing of ostium suggested possibility of Fibromuscular dysplasia .Patient was then proceeded with Renal angiogram , under right Brachial access ,which showed Right renal artery stenosis of around 80-90% with Aneurysm [Figure 1] and left renal artery lesion was insignificant .Right renal artery was engaged with 7 F MPA catheter , Right Renal artery was wired with Run through NS[ Figure 2]. Predilated with Advaglide NC balloon of size 3.5x15mm at 8atm pressure [figure 3]. Right renal artery was stented with Abbott vascular 7x18mm stent at 12 atm pressure[figure 4] . Post stenting showed good flow across renal artery. Post procedure His Renal parameters showed improvement (blood Urea- 32mg% and Sr. creatinine 1.2mg%) and his Blood pressure showed significant reduction of around 140/90mmHg. He was stable and discharged with Dual antiplatelet therapy and his anti hypertensive medication downtitrated to single medication.



**Figure 1:** Selective hooking of Right Renal artery showing stenosis 80 with post aneurysmal segment

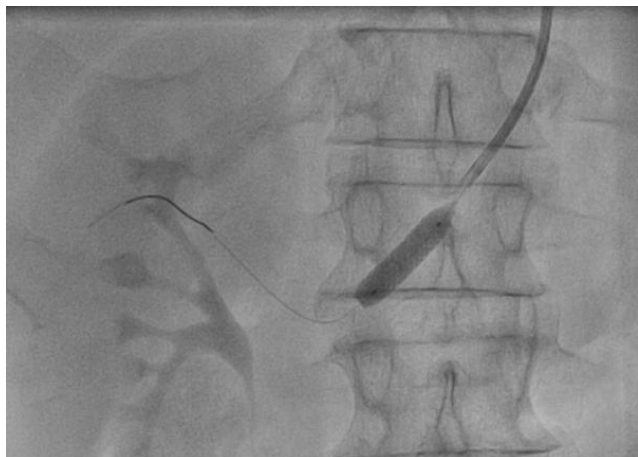
Volume 12 Issue 9, September 2023

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**Figure 2:** Wiring of Renal artery



**Figure 3:** Pre dilation of lesion with NC balloon



**Figure 4:** Post stenting

### 3. Discussion

Renal artery stenosis is the one of the important causes for Resistant Hypertension. The causes of renal artery stenosis is Atherosclerosis or Fibromuscular dysplasia. The various clinical spectra of Renal artery stenosis include Uncontrolled Hypertension , Worsening of renal function and cardiac destabilization syndromes, like Congestive heart failure , Recurrent Flash pulmonary edema, Aortic syndromes and Stroke.<sup>[6][7]</sup> Many RCT have shown no significant difference in outcomes with Stenting+GDMT vs GDMT alone. But

these trials has many limitations which necessitates selection of appropriate patient for Renal artery stenting who would likely benefit.<sup>[7]</sup>

Renal Doppler Ultrasound is a good initial choice for screening. Renal artery Peak systolic velocity to aorta peak systolic velocity  $>3.5$  has high sensitivity for  $>60\%$  stenosis.<sup>[8]</sup>CT/MRA can be performed if Renal Duplex scan is not able to assess the severity of stenosis. However their role is limited in patients with renal failure as there is risk of contrast associated nephropathy and Nephrogenic systemic fibrosis in MRA requiring Gadolinium<sup>[9]</sup>. Invasive Renal artery assessment of stenosis using Digital subtraction angiography may be helpful. Angiographic Renal artery stenosis  $>70\%$  is considered significant/ severe and stenosis Of 50-70% is considered moderately severe. For moderate stenosis, confirmation of haemodynamic severity is necessary prior to stenting. A resting translesional systolic gradient of  $>20$ mm Hg or mean gradient  $>10$ mm Hg or  $FFR \leq 0.8$  confirm Haemodynamic severity.<sup>[10]</sup>CT angiogram in Fibromuscular dysplasia include string of bead appearance. Renal aneurysm and infarcts could also be visualized.

Patient who likely benefit from revascularization are haemodynamically significant Renal artery stenosis and recurrent onset Flash pulmonary edema, Refractory hypertension, Refractory ACS and Patient with Progressive CKD. Revascularization is indicated in young adults with resistant Hypertension to prevent ischemic nephropathy in severe stenosis with goal of curing hypertension. Revascularization may be also indicated in an aneurysm or dissection of the involved artery. Atherosclerotic renal artery stenosis usually involve ostial and proximal part of the artery in older adults compared to Fibromuscular dysplasia involving middle and distal part of the artery in young female.<sup>[11][12]</sup> Conventional balloon angioplasty is the therapy of choice for renal artery stenosis caused by Fibromuscular dysplasia with cured or improved HTN in 60-90% of cases. Recent Published data suggest that cure of hypertension reaches approximately 50% with younger patient more likely to achieve this outcome. Technical success is also nearly 100% in most series. Angioplasty is the initial procedure of choice for patients with Renovascular hypertension caused by Fibromuscular dysplasia. However may not result in normalization if diagnosis is delayed. Frequent monitoring of renal parameters and imaging is necessary to rule out Recurrence<sup>[13]</sup>

### 4. Conclusion

Any Patient with Resistant Hypertension should be evaluated for secondary cause of Hypertension after ensuring adequate drug compliance.

#### Source of Funding:

This research did not receive any specific grant from funding agency in the public, commercial or nonprofit sectors.

#### Acknowledgement

I acknowledge entire catheterization laboratory team of the government medical college, Kozhikode and the radiology

department for their timely intervention to tackle the situation.

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