

RENAL ARTERY STENTING- A CASE SERIES

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Abstract: Renal artery stenosis (RAS) may cause resistant hypertension, recurrent pulmonary edema and acute coronary syndromes. Controversy exists regarding the management of RAS with respect to renal artery stenting as all randomized trials showed no benefit of renal artery revascularization when compared to medical therapy although there was selection bias in these trials. So, selection of patients for renal artery stenting is important to get the clinical benefits. The present case series highlights the patient selection for renal stenting.

Introduction:

Renal artery stenosis (RAS) is one of the causes of the resistant hypertension and the most common etiology being atherosclerosis in majority of the cases. Renal hypoperfusion caused by renal artery stenosis stimulates renin angiotensin system. This activation leads to a state of secondary hyperaldosteronism which causes hypertension, left ventricular hypertrophy. This abnormal activation of renin angiotensin system by renal artery stenosis can result in resistant hypertension, recurrent pulmonary edema, acute coronary syndromes and ischemic nephropathy (1). The severity of renal artery stenosis predicts the mortality in patients with coronary artery disease (2). Difference of opinion exists whether renal artery stenting for RAS would benefit in control of hypertension, prevention of renal function deterioration and in decreasing mortality when compared to medical therapy. All the randomized trials comparing medical therapy with renal artery stenting for RSA failed to show benefit of renal artery stenting over medical therapy (1). Angioplasty and Stenting for Renal Artery Lesions (ASTRAL) trial (3) and Stent Placement in Patients With Atherosclerotic Renal Artery Stenosis and Impaired Renal Function (STAR) trial (4) showed no benefit of renal artery stenting to medical therapy in control of hypertension and renal outcomes. The major limitation of these two studies was majority of the patients included in the study had intermediate degree of stenosis in renal arteries and severity of stenosis was assessed only anatomically and not functionally. CORAL trial which was designed to study the clinical benefits of renal artery stenting failed to show its benefit with respect to cardiovascular and renal mortality, occurrence of myocardial infarction and congestive heart failure, and in preventing progression of renal failure when compared to medical therapy(5), although again the limitation being inclusion of non-obstructive stenosis in study. So the patients included in these studies are not ideal subjects that will benefit from revascularisation. Agency for Healthcare Research and Quality comparative effectiveness statement on renal artery stenting

stated that severe RAS with resistant HTN, recurrent pulmonary edema were the group of patients that will be benefited by renal artery stenting(2). Therefore identifying which patients will benefit from revascularisation is important. The clinical event that results from renal artery stenosis is the best predictor of benefits after revascularisation. In the present case series we are presenting five cases of severe renal artery stenosis with indication for revascularisation.

Case series

1.76 years female patient with history of diabetes and hypertension with post coronary bypass status presented with pulmonary edema. Her blood pressure at presentation was 200/100 mmHG. Her blood pressure was controlled with intravenous nitroglycerine and pulmonary edema with IV diuretics and non-invasive ventilation. Although initially recovered from acute episode, she required multiple antihypertensive medications for blood pressure control including diuretics. She developed recurrent episodes of acute flash pulmonary edema in hospital, each time with accelerated hypertension and worsening renal parameters. Cardiac evaluation was normal. So, a suspicion of reno vascular hypertension was made and confirmed by elevated gradients on renal doppler across left renal artery. The left renal artery stenosis was confirmed on angiogram as shown arrow in Fig 1(a). Fig 1(b) shows left renal artery post stenting with 6 x 18 mm RX HERCULINK ELITE STENT. Post revascularization there were no further episodes of pulmonary edema and blood pressure was controlled with minimal dosage of drugs and renal parameters were improved. She has completed two years of follow up with blood pressure under target levels.

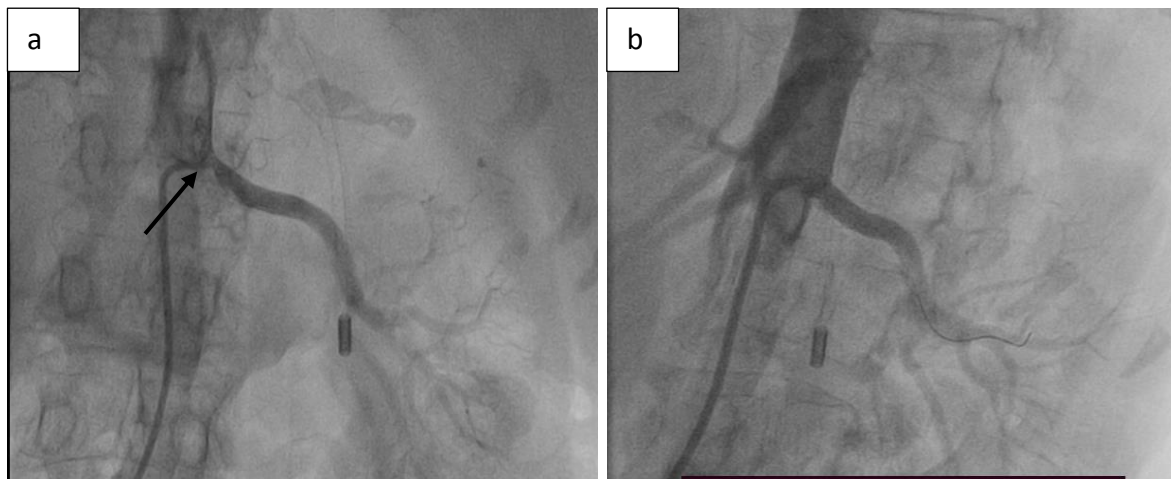


Fig 1(a) Showing 80% stenosis of left renal artery , 1(b) showing post stenting with 6x18mm stent

2.38 years female with premature atherosclerotic heart disease (post stenting to left anterior descending and obtuse marginal arteries) presented with accelerated hypertension (BP 220/110 mmHg) and impaired renal function. In view of early onset and recurrent episodes of accelerated hypertension secondary cause was suspected and renal angiogram was done

which showed severely stenosed (90%) left renal artery in proximal segment as shown in Fig2(a). Post stenting with 6 x 18 mm RX HERCULINK ELITE STENT (Fig 2b), the episodes of accelerated hypertension decreased and achieved target blood pressure levels with minimal dosage of anti-hypertensives.

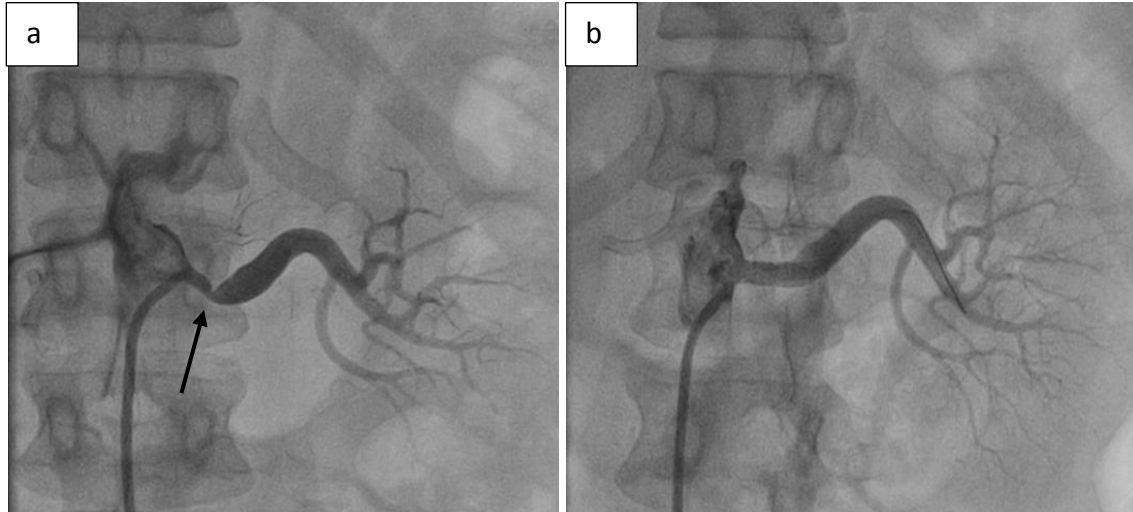


Fig 2: (a) Showing 90% stenosis of left renal artery as indicated by arrow. 2(b) showing left renal artery post stenting.

3. 58 yeas diabetic female with well controlled hypertension for 5 years presented with accelerated hypertension and required more than five classes of anti-hypertensive drugs including diuretic (resistant hypertension). In view of resistant hypertension renal angiogram was done which showed stenosis (70%) of ostium of left renal artery as shown in Fig 3(a). After revascularization with 5 x 18 mm RX HERCULINK ELITE STENT (Fig 3b), the hypertension well responded to lower doses of drugs on follow up.

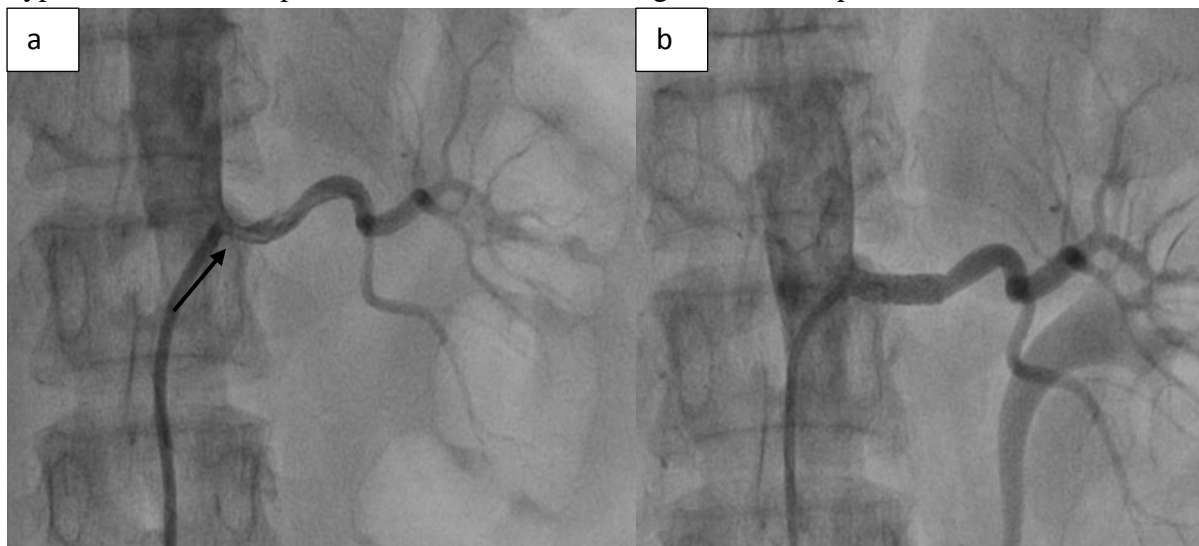


Fig 3: (a) Showing stenosis of ostium of left renal artery, (b) showing left renal artery post stenting

4. 50 years old hypertensive female presented with hypertensive urgency (BP 230/120 mmHG), requiring intravenous drugs for control. Renal angiogram showed 80% stenosis at

the ostio proximal right renal artery (Fig 4a). Renal angioplasty with 7 x 18 mm RX HERCULINK ELITE STENT (Fig 4b) was done. Post stenting on follow up no further episodes of accelerated hypertension episodes and target BP levels achieved with minimal dosage of drugs.

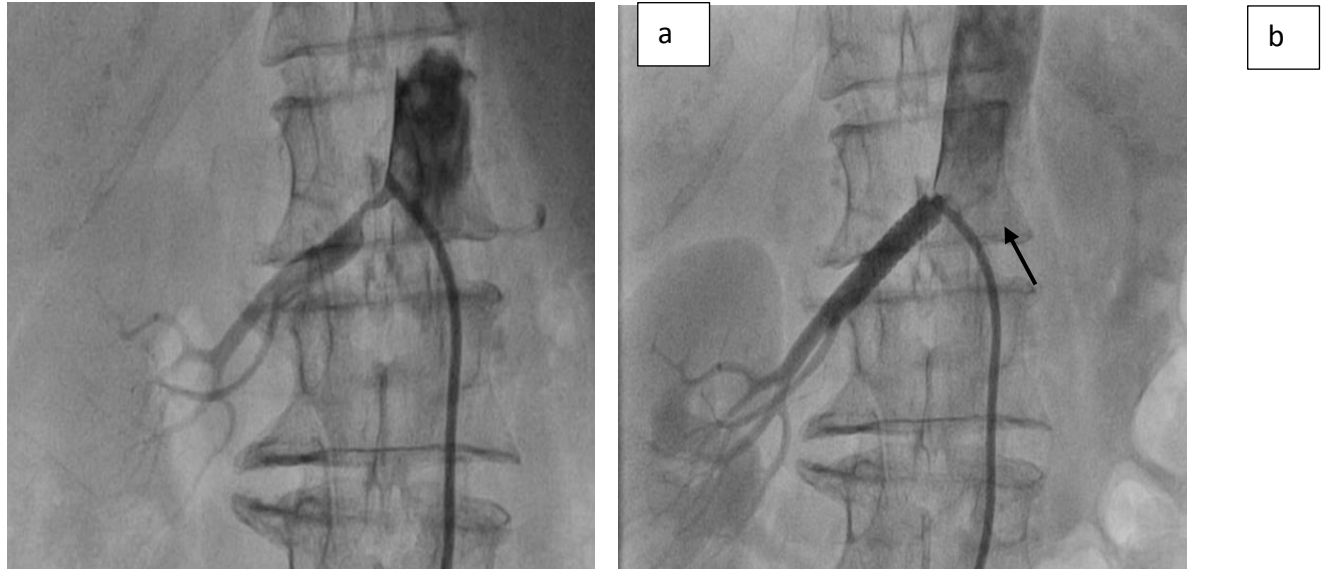


Fig 4: (a) Showing stenosis of ostio proximal segment of right renal artery as shown by arrow, (b) showing right renal artery after revascularization

5. 48 years male diagnosed with hypertension for 4 years presented with accelerated HTN (BP-240/120 mmHG). After initial control of blood pressure with intravenous drugs, he required multiple classes of drugs for achieving target BP levels. Renal angiogram showed 80% stenosis (Fig 5a) of the proximal right renal artery, which was revascularized with 5 x 18 mm RX HERCULINK ELITE STENT (Fig 5b). During the course of time his BP was under target levels with minimal dosage of anti-hypertensive drugs.

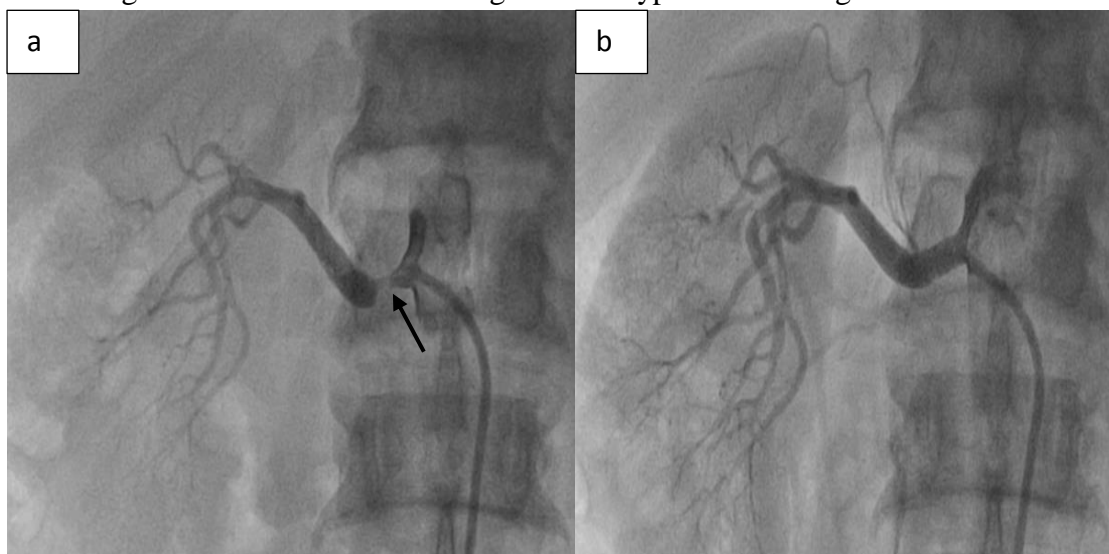


Fig 5: (a) Showing stenosis of proximal segment of right renal artery as shown by arrow, (b) showing right renal after revascularization

Discussion: Selection of patients for renal artery stenting in cases of renal artery stenosis is important to get clinical benefits. In the present case series, the first patient had recurrent pulmonary edema with normal cardiac function and severe left renal artery stenosis. So, these types of cases are appropriate for revascularization rather medical management. Renal artery stenosis should be considered in evaluation of young hypertensive patients who will respond well to revascularization similar to the second case in the present case series. Other group of patients who are appropriate for renal artery stenting are those with resistant hypertension and severe renal artery stenosis like the third, fourth and fifth cases in the present case series.

Conclusion: Proper selection of patients for renal artery stenting is needed to get clinical benefits in cases of renal artery stenosis.

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