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Case Report

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An Unusual Cure for Resistant Renovascular Hypertension: Cutting the Gordian Knot: A Case Report

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ABSTRACT

Renovascular hypertension is important cause of resistant hypertension in young. Fibromuscular dysplasia (FMD) is a rare cause of clinically significant renal artery stenosis. It is commoner in women, usually truncal or distal and typically multifocal, giving characteristic "string of beads" appearance on conventional angiography. Percutaneous transluminal angioplasty alleviates hypertension in up to 80% of such cases. We present a rare case of ostial, unifocal FMD in a 34-year-old male who presented with resistant hypertension. The patient was on nine antihypertensive drugs including diuretics. He became normotensive following nephrectomy and has maintained normal renal function and normotension off drugs on follow-up.

Keywords: Renal, Resistant hypertension, Renal hypertension, Fibromuscular dysplasia, Nephrectomy, Renal artery stenosis

INTRODUCTION

Atherosclerosis and fibromuscular dysplasia (FMD) leading to renal artery stenosis are the two common aetiologies of renal artery stenosis. FMD can cause clinically significant renal artery stenosis (RAS) which is typically truncal or distal. It is often curable with percutaneous renal revascularization. This case explores an unconventional but successful approach to renovascular hypertension in the face of an unusual occlusive anatomy.

CASE REPORT

We present the case of 34-years-old male who was diagnosed to be hypertensive during a routine medical examination. His hypertension remained poorly controlled despite incremental medication. There was grade II hypertensive retinopathy. There was no proteinuria and he maintained normal renal function. His 2D echocardiography was essentially normal. He was then evaluated further and diagnosed to have renovascular hypertension due to right RAS. He remained hypertensive (maximum BP 210/110 mm Hg) despite being on

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nine antihypertensive drugs including diuretics. He was on ramipril 10 mg BD, aliskiren 150 mg BD, furosemide 80 mg BD, spironolactone 50 mg BD, clonidine 0.2 mg BD, amlodipine 5 mg BD, prazosin 5 mg BD, metoprolol 100 mg BD and minoxidil 5 mg BD. Computed tomographic angiogram as well as conventional angiography (Figure 1) revealed occlusion of right main renal artery (MRA) with reformation through lumbar collaterals. Digital subtraction angiography was suggestive of atretic origin of the right MRA while the Diethylene triamine Penta acetic acid (DTPA) renogram showed a small right kidney due to RAS (Split function- Right kidney 12%, Left kidney 88%).

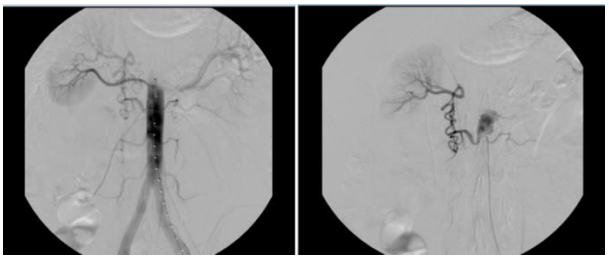

Figure 1: Conventional angiography showing occlusion of right MRA with reformation through lumbar collaterals

As percutaneous interventional revascularization was not amenable, it was planned to do in situ revascularization with reversed great saphenous vein graft. Intraoperatively, the right MRA was found to have an extremely small calibre which was not amenable to aortorenal bypass. Eventually, the patient was subjected to right nephrectomy (Figure 2).

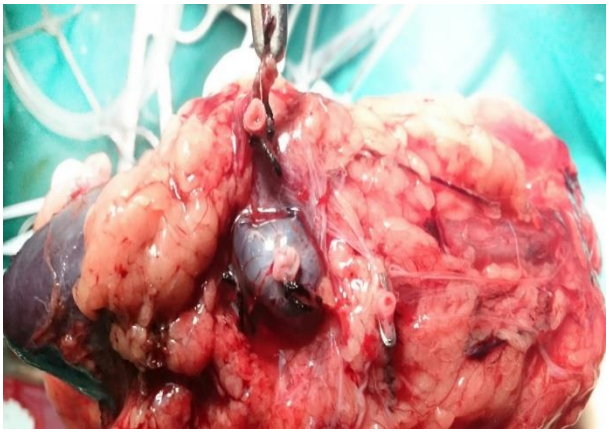

Figure 2: Right nephrectomy, clamp holding small calibre right main renal artery

Histopathological examination of the nephrectomised kidney revealed ischemic nephropathy with fibromuscular dysplasia (Medial fibroplasia) (Figure 3). The patient recovered completely and has remained off antihypertensive drugs thereafter.

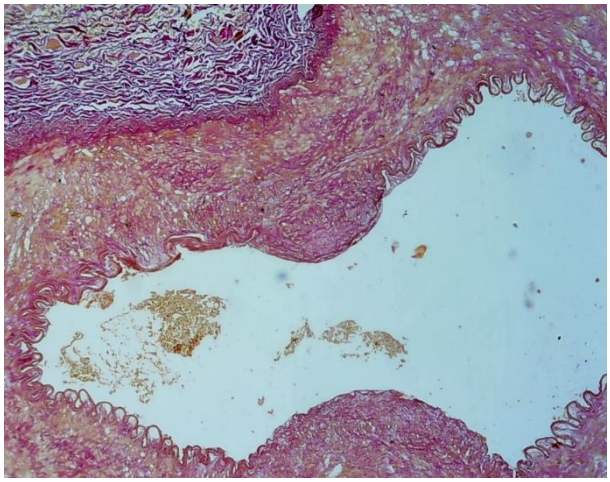

Figure 3: Fibromuscular dysplasia of right main renal artery, Medial type (Verhoeff-Van Gieson staining; 10 X magnification)

DISCUSSION

Resistant hypertension is defined as BP that remains above the desired goal despite use of three antihypertensive medications (of which one is a diuretic), prescribed at optimal dose amounts (1). Renovascular hypertension contributes significantly to morbidity as the diagnosis is often delayed and it is usually not treated promptly. Renal vascular atherosclerosis (90%) and fibromuscular dysplasia (10%) are its two main etiologies (2). The renal vein renin ratio has a diagnostic and prognostic role in renovascular hypertension. It predicts improvement of hypertension after nephrectomy in patients with lateralisation and ipsilateral loss of kidney function (3).

Fibromuscular dysplasia (FMD) is more common in young to middle aged females (4). Renal arterial FMD was first classified by Harrison EG Jr and McCormack LJ and later revised by Stanley JC (5). It is classified into three subtypes (medial, adventitial, and intimal) based on the arterial wall layer involved. The medial subtype is most common and it shows the typical “string of beads”

appearance in conventional angiography. FMD most commonly involves the renal artery and is usually bilateral (6). It can be differentiated from atherosclerosis by its location and absence of renal dysfunction4. It is typically located at the truncal and distal portion of the renal artery while atherosclerosis affects ostium or proximal segment6. FMD can be diagnosed by colour doppler flow imaging, DTPA scan, CT angiography and Gadolinium enhanced magnetic resonance angiography. Percutaneous transluminal angioplasty is the mainstay of treatment and it resolves hypertension in 60-80% cases. Nephrectomy remains an option in patients with resistant hypertension and a poorly functioning unilateral kidney in whom the renal artery occlusion cannot be percutaneously revascularized, or surgically corrected (4).

Our patient was detected to have ostial and unifocal form of renal artery stenosis. He was presumed to have an atherosclerotic lesion and was treated with multiple antihypertensives including diuretics. On detailed evaluation, he was detected to have a small and poorly functioning right kidney. Percutaneous transluminal angioplasty was not feasible as the right main renal artery was atretic. Nephrectomy was done which cured hypertension and biopsy revealed an atypical form of FMD (ostial, unifocal) with ischemic nephropathy.

CONCLUSION

This unique case emphasizes the importance of considering FMD, even in atypical presentations, in young hypertensive individuals. Early and accurate diagnosis, employing diverse imaging techniques, is vital. While percutaneous angioplasty remains the primary treatment, nephrectomy can be a curative option in cases where revascularization is not feasible, providing a valuable addition to the therapeutic arsenal.

Author declaration

Authors' contributions:
The authors, D.M., R.K.N., S.S., B.D. and A.R. have contributed equally in conception and design of manuscript, analysis and interpretation of data and final approval of the manuscript.

Conflicts of interest:
The authors declare that there is no financial or non-financial conflict of interest.

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Data Availability Statement
Data is available with corresponding and first author.

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