Isolated Spontaneous Renal Artery Dissection: A Case Report and Review

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Int J Angiol 2012;21:99–102.

Abstract

We report an interesting case of a 65-year-old gentleman who presented with hypertensive emergency and was found to have an isolated spontaneous dissection of the right renal artery. The dissection was stented via endovascular approach and resulted in marked improvement in blood pressure. Spontaneous renal artery dissection is a difficult condition to diagnose and treat, unless suspected early enough during the course of treatment. Endovascular intervention is the treatment of choice, as failure of conservative treatment may have long lasting clinical implications relating to decreased renal perfusion. Surgical intervention can be associated with high rate of complications.

Keywords

- renal artery obstruction
- renovascular hypertension

Spontaneous renal artery dissection (SRAD) is a rare condition and usually presents with nonspecific symptoms. It is thus difficult to diagnose early enough to prevent complications of renal ischemia. SRAD has been associated with several disease processes and situations but a specific causal relationship has not yet been established. There are several treatment options available for SRAD with endovascular treatment being a safe and effective choice.

Case Presentation

A 65-year-old male patient presented to the emergency room upon request from his ex-wife due to signs of depression, he was tearful and expressed suicidal inclinations. Upon arrival in the emergency room the patient's blood pressure and pulse were 240/150 mm Hg and 105 beats per minute, respectively. He initially denied symptoms of blurry vision, seizures, focal weakness, headache, chest pain, swelling of the lower limbs, syncope, abdominal pain, and hematuria.

The patient's medical history was significant for primary hypertension, chronic obstructive pulmonary disease, and obstructive sleep apnea. He had a history of smoking 30-pack per year. His basic metabolic panel showed a normal creatinine. Urine analysis was significant for proteinuria but no hematuria. He was found to have elevated b-type natriuretic peptide in whole blood. Chest X-ray revealed a slightly enlarged heart, and his electrocardiogram showed T-wave inversion in leads V1 and AVL suggestive of ischemia.

The patient developed chest pain during hospitalization. A coronary angiogram was performed and revealed a 70 to 80% stenosis of the left anterior descending coronary artery. Percutaneous coronary intervention to the left anterior descending artery was done. Renal artery angiography was also performed during the same session to evaluate for renovascular hypertension. A dissection was discovered in the right renal artery (►Fig. 1).

The dissection was verified by intravascular ultrasound assessment. There was no evidence that the dissection was caused by the catheterization procedure, and it was limited only to the right renal artery (►Fig. 2) and a magnetic resonance angiogram (MRA) (►Fig. 3) done before the percutaneous catheterization also showed the dissection in the right renal artery. The dissection was treated with balloon angioplasty and a bare metal stent. Patient's blood pressure preprocedure was 190/110 mm Hg and after percutaneous intervention of right renal artery patient's blood pressure was 120/71 mm Hg (►Fig. 4).

Discussion

Isolated SRAD is rare with an incidence of only 0.036 to 0.049% of all arterial dissections.¹ Renal artery dissections are generally associated with aortic dissection, being involved in 12.4% of all aortic dissections.² SRAD is difficult to diagnose and treat early given its nonspecific presentation. Only ~200 cases of isolated SRAD have been reported so far and out of those ~25% were found during autopsy.³

Figure 1 Right isolated renal artery dissection.

Figure 2 Renal angiogram with right renal artery dissection.

Figure 3 Magnetic resonance of right renal angiogram with dissection.

Figure 4 Right renal artery dissection after intervention.

The presentation of SRAD is most commonly nonspecific; occasionally SRAD can present with flank pain and accelerated hypertension.⁴ In general renal artery dissection has been described to one of two types. Type 1 or primary renal artery dissection is associated with conditions such as atherosclerosis, fibromuscular dysplasia, hypertension, and connective tissue disorders such as Marfan syndrome. Type 2 or secondary renal artery dissection is due to trauma or instrumentation.^{1,5}

Some studies have suggested that SRAD might be a presentation of a form of fibromuscular dysplasia.⁶ This association has male predominance with a male to female ratio of 10:1,⁴ although fibromuscular dysplasia itself has a female predominance.⁴ Different types of trauma have also been reported to cause renal artery dissection ranging from blunt trauma to playing football and running marathons.^{7,8} Rare causes such as subadventitial angioma of the renal artery has also been reported.⁹ While association has been reported, a definitive causal relationship for SRAD is yet to be established.

Three different clinical sequelae of renal artery dissection have been described in the literature: silent with no apparent ramifications; acute occlusion leading to renal infarction; and chronic leading to renovascular hypertension.¹ Diagnosis of SRAD is usually made by computed tomography (CT) angiography or MRA but renal angiography is the gold standard and also provides an option to treat.¹⁰

Treatment of SRAD has always been debatable, with the best option being customized to the patient's clinical presentation and to anatomical features of the dissection. Conservative treatment with or without anticoagulation has been used with good results.⁵ In another small series of eight patients followed up for 72 months, treatment with anti-hypertensives and antiplatelet therapy and followed up by CT angiography also showed good results with conservative management being beneficial in 77% of patients.¹¹ Failure of conservative management may lead to complications of either acute infarction or chronic renovascular hypertension due to decreased renal perfusion.

Surgical treatment is an option. The most common surgical indication is acute occlusion or refractory renovascular hypertension in the chronic stage¹¹ and aortorenal bypass is the most common surgical approach. In a case series of 25 patients treated surgically the failure rate was 20%.¹² In another study of 15 patients treated with extracorporeal reconstruction and autotransplantation, a success rate of 95% was reported with 80% patients having good control of blood pressure.¹³ Vascular reconstruction has been associated with high rates of acute thrombosis and late anastomotic stenosis.^{11,14}

Over time percutaneous endovascular intervention is becoming a safe and effective treatment. Percutaneous intervention was used in our patient with marked improvement in blood pressure and no target organ damage. Percutaneous endovascular treatment with long-term follow-up has been shown to be associated with less use of antihypertensive medications, less complication rates and less target organ damage as compared with surgical and conservative treatment.¹⁴ Percutaneous intervention with coil embolization has been reported in a case of SRAD in an accessory renal artery.¹⁵

Conclusion

SRAD is a rare condition and is difficult to diagnose early unless clinical suspicion is high. There are several treatment options available, with percutaneous endovascular intervention a safe and effective treatment.

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