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Renal Artery Aneurysm: Successful Exclusion With a Stent Graft

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Renal artery aneurysms are uncommon. They are either incidentally discovered or identified during workup for secondary hypertension. An association with rupture at sizes greater than 1.5 cm exists. In this case report, the exclusion of a renal aneurysm with a covered stent is described. In spite of compromise of a side-branch vessel, there were no deleterious effects on renal function at 6-month follow-up. *Catheter Cardiovasc Interv 2004;61:314–316.* © 2004 Wiley-Liss, Inc.

Key words: aneurysm; stent; renal

INTRODUCTION

Renal artery aneurysms (RAAs) are uncommon, occurring in approximately 0.09% of the general population. They account for 22% of all visceral aneurysms [1]. The etiology for RAAs ranges from fibromuscular dysplasia to atherosclerosis. Hypertension is the most common presenting symptom. The natural history is unclear but the likelihood of rupture seems to increase as the diameter exceeds 1.5 cm [2]. Treatment options for RAAs include medical management, endovascular exclusion, and open surgical repair. Open surgical repair involves aneurysmectomy and revascularization with angioplastic closure or reimplantation of the renal arteries.

CASE REPORT

A 63-year-old female with escalating hypertension, referred for workup of renovascular hypertension, was incidentally noted to have an aneurysm of the left renal artery. The berry-shaped aneurysm measured 12–13 mm and was located just proximal to the origin of two interlobar arteries supplying the lower pole of a normal-sized kidney (Fig. 1). Renal function was normal and no evidence of atherosclerotic renal artery stenosis was noted.

After obtaining consent from the local institutional review board and human device exemptions (HDE) from the manufacturer, a decision to attempt exclusion of this aneurysm was made. An 8 Fr LIMA guiding catheter (Medtronic AVE, Santa Rosa, CA) was used for the intervention. After hand-crimping the stent over an extrasupport Radius (Radius Medical, Maynard, MA) 0.014″ coronary guidewire, a 16 mm Jomed (San Diego, CA) stent graft was delivered to the aneurysm site on a 3.5 × 20 mm NC Ranger balloon (Boston Scientific, Maple Grove, MN) (Fig. 2). Postdilatation was carried out at 22 atm.

Final angiography demonstrated exclusion of the aneurysm with loss of a small inferior pole artery in proximity to the aneurysm (Fig. 3). Due to the small portion of the kidney parenchyma supplied by this vessel and the presence of an accessory renal lower pole artery, the patient had no adverse consequences due to the loss of this vessel (Fig. 4).

On 6-month clinical follow-up, the patient continues to have a normal creatinine; renal size and CT angiography demonstrate persistent exclusion of the aneurysm.

DISCUSSION

The management of RAAs is largely based on data from small case series or retrospective registries. The underlying pathophysiology appears to be arterial fibrodysplasia exaggerated at branch points in the renal vasculature due to discontinuity in the internal elastic lamina.

The association between hypertension and RAAs is not causal. It is debatable whether RAAs alone cause hypertension. Renal ischemia may be a mechanism for hypertension, owing to microinfarcts from distal embolization or from kinking and compression of the renal artery [3]. There also remains an association between

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Fig. 1. Selective left renal arteriogram demonstrating a large left renal artery aneurysm in the proximal segment of lower pole branch of the renal artery.

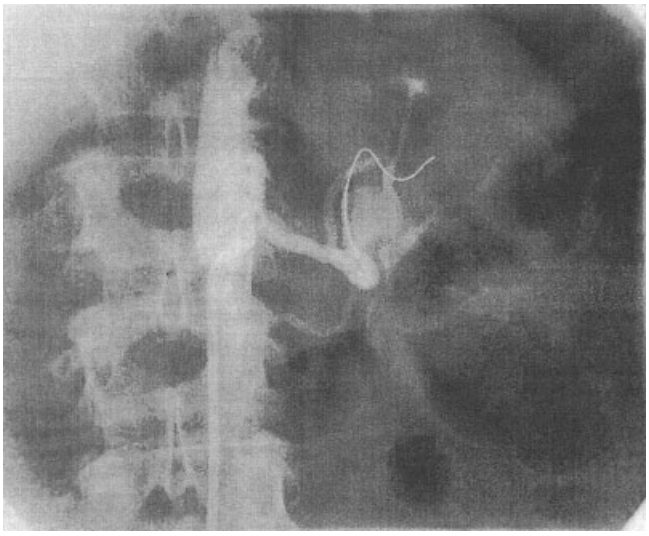

Fig. 2. Left renal arteriogram with the covered stent at the site of the aneurysm over a 0.014″ coronary wire.

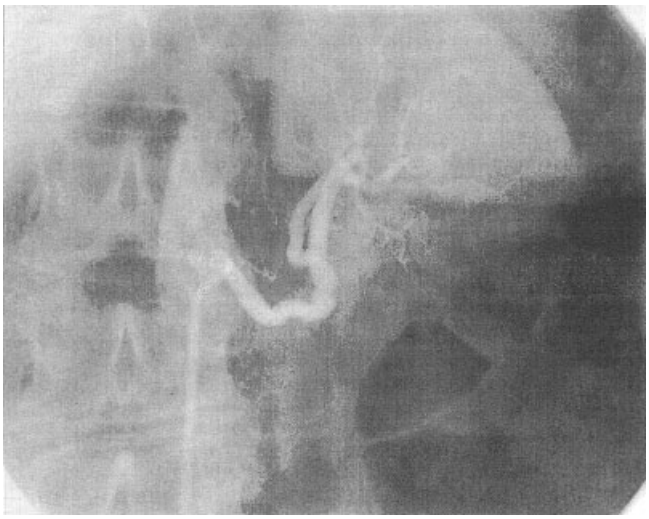

Fig. 3. Left renal arteriogram after placement of a Jomed stent graft documenting aneurysm exclusion.

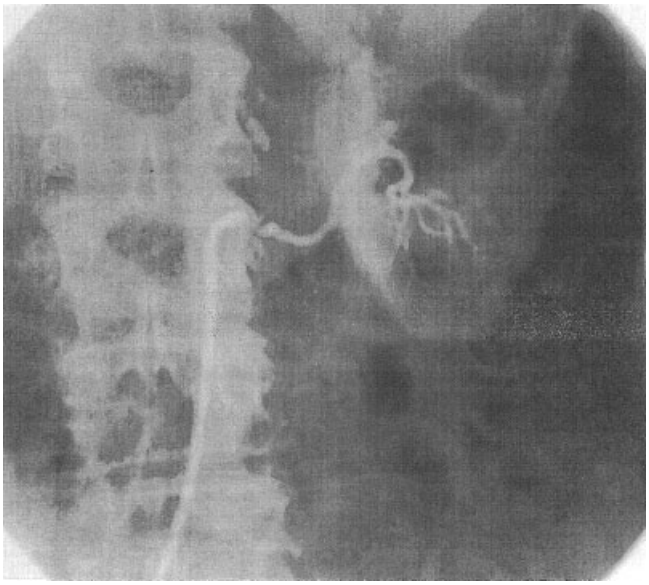

Fig. 4. Arteriogram of the accessory renal artery supplying the territory excluded by the lobar branch off the aneurysm.

renal artery stenosis and the presence of RAA that further confounds causality for hypertension.

Indications for treatment of RAA include hypertension, hematuria, size $>$ 2 cm, flank pain, and pregnancy. Of the indications for treatment, size of the RAA is the most controversial. Reports have documented rupture at sizes $<$ 2 cm and yet other reports suggest no necessity of treatment for sizes $<$ 2 cm [4,5]. Regardless, once rupture occurs, mortality approaches 10%.

Surgical approaches for treatment of RAA have stood the test of time but are technically challenging with need for retroperitoneal dissection for exposure and carry a mortality and morbidity approaching 10%, making catheter-based approaches a viable alternative.

Although exclusion of RAAs with a covered stent has been described in the literature, this case report highlights the safety of such an approach even in the setting of compromise to a side branch as long as the compromised side branch is small or the portion of the kidney supplied by it has an accessory renal vessel [6]. The

long-term patency of stent grafts in the renal vasculature remains unknown, necessitating close follow-up of patients once treated by this minimally invasive technique.

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