Renal Salvage in a Patient With a Solitary Kidney

A challenging renal artery stent placement procedure.

BY EDWARD MINER, MD, AND ZVONIMIR KRAJCER, MD

CASE REPORT

A 59-year-old woman was transferred to our institution for severe renal failure and uncontrolled arterial hypertension. Six weeks before being referred to our service, she had undergone right renal artery stenting for fibromuscular dysplasia at an outside facility. Her medical history was also pertinent for left renal cell carcinoma. The interventional procedure was performed 1 day prior to the left renal nephrectomy. Aspirin or clopidogrel was not administered after the renal artery intervention due to the pending left nephrectomy.

After surgery, the patient developed severe renal failure, with a serum creatinine level reaching 4.1 mg/dL. Angiography performed at the outside facility revealed complete occlusion of the right renal artery stent with patent flow through a small lower pole accessory renal artery (Figure 1). An attempt to open the main right renal artery at the outside facility was unsuccessful.

The patient was transferred to our care, and a second attempt was made to open the occluded renal stent 30 days after the initial intervention. A renal ultrasound revealed preserved right renal size of 10.5 cm X 5 cm, indicating likely renal viability.

ENDOVASCULAR PROCEDURE

Because of advanced renal failure, oral N-acetylcysteine and intravenous sodium bicarbonate were administered before and for 24 hours after the procedure. Gadolinium was used as the contrast agent.

A 7-F, 11-cm sheath (Cordis Corporation, a Johnson & Johnson company, Warren, NJ) was placed in the left femoral artery. A 7-F, Renal Double Curve guide catheter (Boston Scientific Corporation, Natick, MA) was advanced to the right renal artery under fluoroscopic guidance, and angiography was performed. The lesion was crossed with a .014-inch PT-Graphix wire (Boston Scientific Corporation) (Figure 2). A Guidant Voyager 2-mm X 8-mm balloon (Abbott Vascular, Santa Clara, CA) was advanced to the lesion, and multiple inflations to 15 atm were performed.

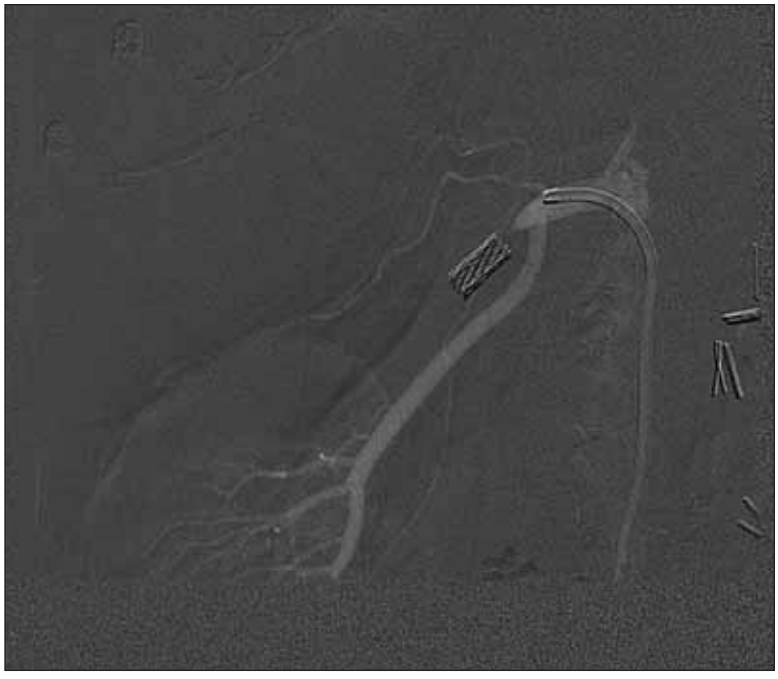

Figure 1. Renal angiography showing complete occlusion of the right main renal artery that was previously stented.

Figure 2. Hydrophilic .014-inch PT Graphix guidewire (Boston Scientific Corporation) across total in-stent renal artery occlusion.

This balloon was exchanged for a 3.75-mm X 10-mm Cutting Balloon (Boston Scientific Corporation), and multiple inflations to 10 atm were performed. This balloon was exchanged for a 4-mm X 20-mm PolarCath balloon (Boston Scientific Corporation), which was inflated to 8 atm at -10° C for three inflations.

The cryoplasty balloon was then exchanged for Multi-Link Vision 4-mm X 23-mm and 4-mm X 8-mm coronary stents (Abbott Vascular), which were each deployed at 17 atm for 15 seconds. Final angiography showed a patent renal artery with minimal residual stenosis (Figure 3).

Figure 3. Final angiography after the interventional procedure showing a patent right renal artery.

The patient did well after the procedure and had normalization of her renal function. Her arterial hypertension was well controlled on 5 mg of amlodipine. Her serum creatinine level at 2 years follow-up remained stable at 1.4 mg/dL. The renal duplex evaluation at 2-year follow-up revealed no evidence of recurrent stenosis (Figure 4).

DISCUSSION

Renal artery stenting is a well-recognized and reliable treatment for hemodynamically significant renal artery stenosis.[1-3] The indications for renal artery stenting include patients with poorly controlled hypertension on multiple medications (three or more, or those who are intolerant of antihypertensive medications) patients with ischemic nephropathy (for preservation of renal function, when experiencing deteriorating renal size and/or function); and patients with a known history of coronary ischemia, heart failure, angina, or flash pulmonary edema, which is worsened by renovascular hypertension.

In the setting of fibromuscular dyplasia, angioplasty alone is generally the preferred approach, with excellent procedural and clinical results.[4] Renal artery stenting is usually reserved for bailout in cases of dissection or suboptimal results from angioplasty.[4] In this case, the indication for primary stenting in the initial renal artery intervention performed at an outside institution was not clear. By contrast, for ostial, atherosclerotic renal artery stenosis, stenting as an initial strategy has been shown to be superior to angioplasty alone.[5]

Renal salvage for acute occlusion of a renal artery is a less common but also important indication for renal

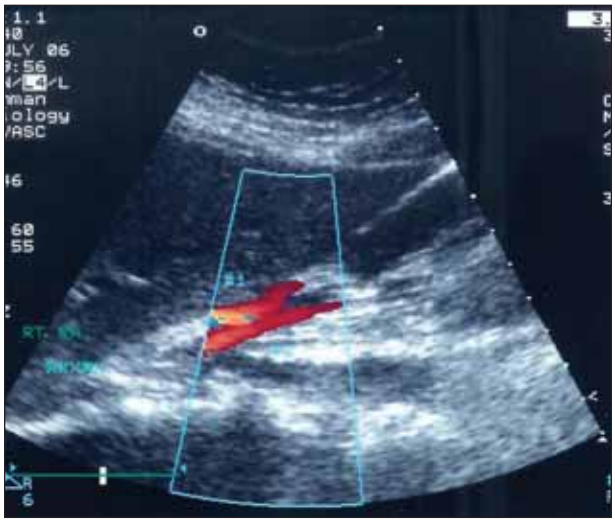

Figure 4. Two-year follow-up duplex renal study showing normal renal artery velocities and normal renal:aortic velocity ratio.

artery stenting, as is illustrated in this case.[6] Renal "hibernation" should be considered in recently occluded renal arteries with preserved renal size. It should also be considered in patients with risk factors and overt evidence of atherosclerosis who experience acute renal failure.[6] A recent case series by Dwyer and coauthors demonstrated the efficacy of percutaneous renal revascularization in achieving renal salvage and preventing permanent need for hemodialysis in five patients with acute renal failure.[6]

Renal duplex is a useful technique for screening patients with suspected renovascular hypertension and for evaluating of recurrent renal artery stenosis after renal artery intervention.[7,8]

Recanalizing total occlusions of the renal arteries demands knowledge of available coronary artery technology and techniques. Cutting balloons and cryoplasty are useful in our experience in recanalizing total occlusions and/or restenosed renal arteries. Although renal stent thrombosis is rare,[5,6] the use of antiplatelet agents in renal artery stenting is mandatory to decrease the incidence of acute, thrombotic occlusion of the stented artery. If aspirin and clopidogrel cannot be administered due to concomitant medical conditions or surgeries, angioplasty alone may be the preferred approach to prevent acute renal artery thrombosis. ■

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