Positionally Dependent Renal Artery Restenosis

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A 63-year-old woman with extensive atherosclerotic vascular disease, including long-standing renal artery stenosis, was evaluated for newly uncontrolled hypertension with frequent headaches despite the use of 4 antihypertensive agents. Her blood pressure had been well controlled previously. She had a remote history of right renal artery occlusion and had undergone left renal artery stenting 9 years before presentation. In-stent restenosis had been treated twice with balloon angioplasty since that time. Repeat duplex ultrasound was ordered for suspicion of recurrent in-stent restenosis.

Duplex ultrasound of the left renal artery with the patient in the supine position demonstrated peak systolic and end-diastolic velocities of 286 and 70 cm/s, respectively, with a renal artery–to-aorta ratio of 3.4 (Figure 1). With the patient in the right lateral decubitus position, velocities increased to 453 and 117 cm/s, respectively, and the renal artery–to-aorta ratio increased to 5.4, consistent with significant renal artery stenosis (Figure 2). The patient was referred for renal angiography, which demonstrated mild to moderate in-stent restenosis of the left renal artery in the supine position (Figure 3) and severe, >70% stenosis in the right lateral decubitus position, with a translesional gradient of 40 mm Hg (Figure 4). The dynamic narrowing was localized within the stent, rather than in the bent segment beyond the stent, which would be expected with decubitus positioning. Balloon angioplasty was performed, which resulted in 20% residual in-stent restenosis and no translesional gradient. Postprocedural renal ultrasound performed 1 month later showed normal left renal artery velocities, and no changes in peak systolic or end-diastolic velocities were noted in the right lateral decubitus position.

At a follow-up visit 5 months later, 1 of the 4 blood pressure agents being used by the patient was discontinued owing to symptomatic hypotension. To the best of our knowledge, this is the first reported case of angiographically proven positionally dependent renal artery stenosis resulting in uncontrolled hypertension in a patient with a single functioning kidney. This case could represent a variant of nephroptosis, but the mechanism of this unusual finding, as well as its potential significance in clinical practice and the vascular laboratory, is unknown.

Disclosures

None.

Reference

Figure 3. Digital subtraction angiography of the left renal artery demonstrated mild to moderate in-stent restenosis in the supine position.

Figure 4. Digital subtraction angiography of the left renal artery demonstrated >70% in-stent restenosis when the patient was in the right lateral decubitus position, with a translesional pressure gradient of 40 mm Hg.
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