CLINICAL VIGNETTE

Acute Onset Hypertension due to Unilateral Atherosclerotic Renal Artery Stenosis

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Case

A 67-year-old man with prediabetes, hyperlipidemia, and a 40-pack-year history of tobacco use was seen for new-onset hypertension. Seven weeks prior, the patient underwent endovascular repair of an infrarenal fusiform abdominal aortic aneurysm. The AAA measured 5.7 x 5.7 cm and extended over a distance of 10.5 cm. It began 6.8 cm distal to the renal arteries and terminated just proximally to the aorto-iliac bifurcation. Perioperative blood pressure was 107-149/39-74 mm Hg. Two weeks after the repair, the patient did not feel well while out of state and found his blood pressure to be 230/115 mm Hg. He was admitted to the ICU where his blood pressure was controlled and was prescribed opiates for periodic headaches. He was discharged on daily amlodipine 10 mg, carvedilol 6.25 mg, hydrochlorothiazide 25 mg, and PRN clonidine 0.1 mg.

Vital signs showed blood pressure 138/88 mm Hg, heart rate 67 beats/minute, temperature 36.5C, respiratory rate 16 breaths/ minute, BMI 24.01 kg/m2. Physical examination was unremarkable with normal heart sounds, nondisplaced PMI, no edema, and no JVD. There were no abdominal bruits. Chemistries were significant for creatinine 1.41 mg/dL and urea nitrogen 26 mg/dL, increased from a baseline of 0.9 mg/dL and 17mg/dL, prior to AAA repair. Hemoglobin a1c was 5.7%. Serum renin was not checked with a serum aldosterone 20.4 ng/dL. TSH was 2.2 mcIU/mL. Urinalysis was not significant for RBC, WBC, or protein. 24-hour urine collection revealed normal values for cortisol 24.3 ug, metanephrines 92 mcg, and normetanephrines 410 mcg.

Renal artery doppler revealed a right kidney of 12.2 cm and left kidney of 10.5 cm with an elevated peak systolic velocity at the right renal artery ostium (297 cm/sec) with elevated right renal artery-to-aorta ratio of 4.3, most compatible with renal artery stenosis. However, there were no alteration of downstream waveforms. There was blunted intrarenal waveforms and decreased resistive indices 0.4-0.52 within the left kidney which may reflect upstream stenosis. The evaluation of the left renal artery was limited due to artifact from aortic endograft.

The patient was referred back to his vascular surgeon who had noted left renal artery stenosis at the time of AAA repair without an indication to intervene at that time. Renal angiography showed a patent right renal artery and high-grade proximal left renal artery stenosis of the left renal artery. A left renal artery stent was placed under direct fluoroscopy.

Postoperatively, the patient stopped all of his blood pressure medications. Two subsequent office visits within 1 week of stent placement showed a blood pressure of 130/78 mm Hg and 136/65 mm Hg. Nine months after stent placement the patient was started on olmesartan 20 mg daily which he remains on 3 years later. Serum creatinine improved to a 0.95-1.09 mg/dL.

Discussion

Renal artery stenosis is the most common cause of secondary hypertension and should be considered in patients with resistant hypertension; hypertension of abrupt onset or worsening or increasingly difficult to control; flash pulmonary edema; and early-onset hypertension, especially in women. Evaluation for renovascular disease is pursued with imaging: duplex doppler ultrasound, magnetic resonance angiography, or spiral CT with CT angiography.[1]

Doppler ultrasound is frequently the initial imaging study to evaluate for renal artery stenosis. Because it is technically difficult and operator dependent, a positive result is more informative than a negative one. Doppler ultrasound criteria for renal artery stenosis can be split into direct and indirect signs. Direct signs are seen at site of the stenosis and include peak systolic velocity (PSV) >200 cm/s, renal/aortic PSV ratio >3.5:1, absence of Doppler US signal consistent with occlusion, and aliasing with post-stenotic turbulent flow/spectral broadening. Indirect downstream effects are detected distal to the stenosis site and correspond to an acceleration index <3 m/s, an acceleration time >70 msec, and a resistive index <0.5.[2]

In addition to medical therapy, revascularization by percutaneous angioplasty with stenting should be pursued if the intervention is likely to provide benefit. A short duration of blood pressure elevation prior to diagnosis of renal artery stenosis is a strong predictor for improvement after revascularization.[3] Other indications for revascularization include failure/intolerance of optimal medical therapy as well as recurrent flash pulmonary edema or refractory heart failure.

Our patient with known peripheral artery disease and no history of hypertension was documented to have an acute rise in blood pressure requiring four anti-hypertensive medications with swift clinical improvement after unilateral renal artery stenosis was identified and a stent was placed.

REFERENCES

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