Percutaneous Management of a Large Renal AVM

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INTRODUCTION

A 30-year-old man with no significant medical history experienced blunt trauma to the right flank while playing flag football. Subsequently, he developed gross hematuria and visited the emergency room. The imaging workup revealed a large right renal vascular lesion (Figure 1). At the patient's initial evaluation by the urology department, it was suggested that the lesion might be a congenital arteriovenous malformation (AVM), which can be managed surgically, but would likely require a nephrectomy. The other option was to pursue a percutaneous nephron-sparing intervention.

PROCEDURE DESCRIPTION

Abdominal aortography was performed to identify the location and number of renal arteries (Figure 2). This revealed single renal arteries bilaterally. A diagnostic catheter was exchanged for a 5-F, RC-1 catheter, which was advanced into the right renal artery. Right renal arteriography was performed, and the images showed a massive right renal AVM arising from a dilated branch of a lower pole right renal artery.

The 5-F catheter was then exchanged for a 6-F Ansel sheath. Through the sheath, a 5-F Cobra 2 catheter was used to select the lower pole right renal artery branch, which supplied the AVM. There was a very small vessel supplying a small segment of normal renal parenchyma arising at the origin of the AVM (Figure 3). We decided to start coil embolization in this small branch vessel and then allow the coil to prolapse into the large vessel supplying the AVM. This allowed the coil to be anchored and was a good starting point for our coil nest by ensuring that the coil would not migrate through the AVM to the venous outflow. As an additional safety measure to prevent the coil from migrating, an Interlock™ Coil was chosen for the first coil. The coil was deployed in the appropriate position, without prolapse into the outflow vein.

A total of three Interlock™ 0.035-inch Coils were placed: first, a 15-mm X 40-cm coil, followed by two 12-mm X 20-cm coils. Two pushable vortex-shaped coils were then used as fillers. Follow-up arteriography showed no flow within the AVM. Flow was maintained to 80% of the right renal parenchyma (Figure 4).

Figure 1. The imaging workup revealed a large right renal vascular lesion.

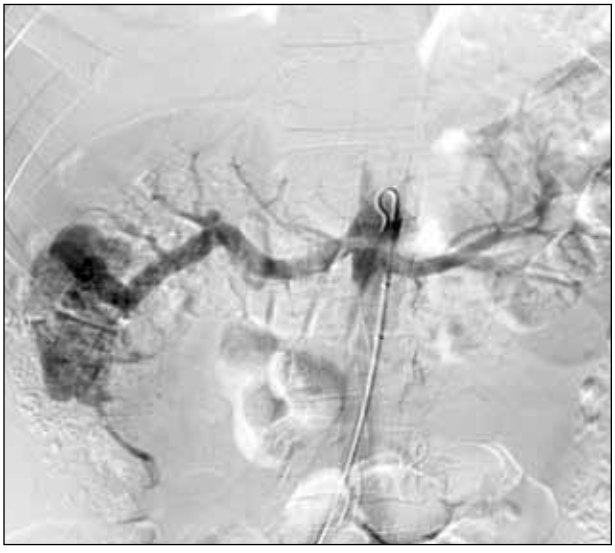

Figure 2. Abdominal aortography was performed to identify the location and number of renal arteries.

Figure 3. Through the sheath, a 5-F Cobra 2 catheter was used to select a lower pole right renal artery branch, which supplied the AVM.

Figure 4. Three Interlock™ 0.035-inch Coils were placed.

DISCUSSION

AVMs refer to a congenital type of malformation and are found more often in women. Renal AVMs are very rare. There are two types of congenital renal AVMs described in literature: the cirsoid type, which is more common, and the cavernous type. The cirsoid type consists of multiple small, dilated arteriovenous communications with corkscrew appearances and tends to be adjacent to the collecting system. Patients present with gross hematuria. Cavernous AVMs have a single dilated vessel. We suspect that our patient had a cavernous AVM.

In comparison, arteriovenous fistulas (AVFs) are acquired and typically have a single feeding artery and a single draining vein. Acquired AVFs are the most common type of renal arteriovenous communication, and represent 75% to 80% of renal vascular anomalies. These are usually a result of trauma, surgery, biopsy, tumors, or erosion of aneurysms into a vein. Renal AVMs and AVFs are potentially lethal conditions, but most remain small and resolve spontaneously. If symptomatic, the most common clinical manifestation is hematuria. Cardiomegaly or congestive heart failure can occur. Ischemia in the renal parenchyma distal to the AVM or AVF may induce renin-mediated hypertension and/or impaired renal function. On imaging, the cirsoid AVM has tortuous varix-like vessels.

Embolization is considered the primary treatment option in cases of renal AVM or AVF because it preserves maximal normal renal parenchyma while eliminating the risk of recurrent hemorrhage. The goal of AVM or AVF embolization is eradication of the nidus. Recent reports describe the ablation of feeding vessels with various embolic agents, including particles, metallic coils, and liquid embolics. AVM radiofrequency ablation has also been attempted. ■

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