Balloon-Assisted Endovascular Embolization of High-Flow Renal Arteriovenous Fistula

Arjun Lokesh Netaji1 Pawan Kumar Garg1 R Deepak Prakash Bhirud2 Rengarajan Rajagopal1

1 Department of Diagnostic & Interventional Radiology, All India Institute of Medical Sciences, Jodhpur, Rajasthan, India 2 Department of Urology, All India Institute of Medical Sciences, Jodhpur, Rajasthan, India

Address for correspondence Rengarajan Rajagopal, MD, DM, EBIR, Department of Diagnostic & Interventional Radiology, All India Institute of Medical Sciences, Basni Industrial Phase II, Jodhpur 342005, Rajasthan, India (e-mail: heraghava@gmail.com).

High-flow renal arteriovenous fistula (AVF) can lead to complications such as hematuria, hypertension, high-output cardiac failure, and renal insufficiency.1,2 A 52-year-old female patient with no prior risk factors presented with dull aching pain in right lumbar quadrant for 1 month and hematuria for 7 days. There was no history of trauma to abdomen. She was hemodynamically stable at presentation. Her hemoglobin was 6.9 g/dL. Abdominal ultrasound showed a large anechoic cystic lesion in the right lumbar quadrant with only upper pole of right kidney being visualized and intense color flow within the lesion in color Doppler with low resistance biphasic waveform (Fig. 1A). Chest radiograph was normal. Computed tomography angiography revealed a large vascular pouch in the right kidney with a large arterial feeder and had high risk of embolization into venous pouch if detached and hence, the coil was retrieved back. Subsequently, to arrest the high flow, a balloon catheter (Ultra- verse, Bard Peripheral Vascular, Arizona, USA; size 10mm×40mm) was introduced through contralateral femoral artery access and was inflated across the large arterial feeder, following which a mixture of 70% of N-butyl cyanoacrylate (NBCA) glue and lipiodol was injected. However, there was residual filling of the venous pouch (Fig. 1C). Hence, two additional 0.018” pushable coils (Micronester, Cook Medical, Indiana, USA; size 8mm×14cm) were deployed proximal to the glue cast. Post-deployment angiography showed complete arrest of flow through the arterial feeder without any residual filling of the large venous pouch. There was normal contrast opacification of the upper polar segmental branch with normal renal parenchymal blush in the upper pole (Fig. 1E). Post-procedural ultrasonography showed complete thrombosis of large venous pouch (Fig. 1F). Immediate post-procedure course was uneventful. On 6-month follow-up, she was asymptomatic.

Acquired renal AVFs are uncommon entities that are hypothesized to occur due to erosion of an aneurysm of an intraparenchymal renal artery into an adjacent vein.1 These can be treated by surgery or by endovascular techniques. Surgical techniques such as nephrectomy are more invasive as compared with transarterial embolization and also incur higher blood loss. The risk of pulmonary nontarget embolization and possibility of renal deterioration post-embolization of AVFs with large venous pouches demands careful planning prior to endovascular therapy. Various embolic agents have been used for treating high-flow renal AVFs such as IDC, Amplatzer vascular plug, and atrial septal occluders.3-7 The use of liquid embolic agent like NBCA glue is counterintuitive in high-flow AVFs and previously...
sparsely reported in literature. However, with complimentary techniques like flow arrest, liquid embolic agents can be safely used in these situations.

Conflict of Interest
None declared.

References
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Fig. 1 A 52-year-old female patient with high-flow renal arteriovenous fistula (AVF): (A) ultrasonography (USG) Doppler showing turbulent flow within the large venous pouch, (B) volume rendered image of the computed tomography angiogram showing the high-flow AVF with large venous pouch, (C) right renal angiogram showing the AVF with a single dilated tortuous arterial feeder from right renal artery, (D) fluoroscopic image showing proximal occlusion with balloon catheter and distal glue cast in the feeding artery, (E) angiogram showing complete cessation of antegrade flow in the AVF and filling of the normal upper polar branches, and (F) post-procedure Doppler USG showing echogenic contents with no flow suggestive of complete thrombosis.