Carbon Dioxide Angiography for Prostatic Artery Embolization in a Patient with Massive Prostatomegaly and Chronic Kidney Disease

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Editor:
Chronic kidney disease (CKD) secondary to obstructive uropathy is a known complication of advanced benign prostatic hyperplasia (BPH) (1). Prostatic artery embolization (PAE) effectively treats lower urinary tract symptoms related to BPH and relieves urinary obstruction but requires angiography, typically with iodinated contrast material, which is relatively contraindicated in CKD. This case of obstructive uropathy was treated with PAE performed with predominantly carbon dioxide (CO₂) contrast material.

Figure 1. Sagittal T2-weighted magnetic resonance image demonstrating a markedly enlarged prostate gland (white arrow). Volume was 772 cc.

Figure 2. Carbon dioxide angiography in 45° oblique orientation demonstrating the left prostatic artery (white arrows) arising from the gluteal-pudendal trunk (dashed white arrow). LT = left side.
Uropathy. He was not undergoing dialysis. Magnetic resonance imaging performed six months prior revealed a 772-cc prostate gland (Fig 1). Because the patient was not a good candidate for endoscopic or surgical treatment due to the large gland size and unlikelihood of volitional voiding after simple prostatectomy, he was offered PAE. Given his CKD, the plan was to minimize iodinated contrast by using predominantly CO₂.

Right common femoral artery access was obtained, and CO₂ aortography was performed using the CO2mmander ELITE System (AngioAdvancements, Fort Myers, Florida). The left internal iliac artery was selected, and 45° ipsilateral oblique CO₂ angiography using 15 mL of hand-injected CO₂, filmed at 6 frames per second, demonstrated the origin of the left prostatic artery from the gluteal-pudendal trunk (Fig 2). The superior pedicle of the prostatic artery was catheterized using a Progreat Alpha 2.0 microcatheter (Terumo Medical Corporation, Somerset, New Jersey). Small-volume iodinated contrast digital subtraction angiography (Fig 3) and cone-beam computed tomography (CT) (XperCT, Philips, Hanover, Maryland) (Fig 4) were performed, confirming prostatic blush and absence of nontarget supply to other pelvic organs. Embolization was performed using 1 vial of 300–500 μm Embospheres (Merit, South Jordan, Utah), followed by 10 mL of Gelfoam slurry (Pfizer, New York City, New York). A total of 45 cc of iodinated contrast was used. The procedure was terminated after unilateral embolization in order to distribute the total iodinated contrast dose over separate sessions. Gross hematuria ceased after unilateral embolization, and the patient was discharged from the hospital.

To decrease the risk for recurrent hematuria, the patient returned 3 weeks later for a contralateral embolization procedure. The right prostatic artery was catheterized after identifying its origin from the gluteal-pudendal trunk, using CO₂ (Fig 5). Digital subtraction angiography and cone-beam CT confirmed prostatic supply and absence of nontarget supply to other pelvic organs. Embolization was performed, again using 1 vial of 300–500 μm Embospheres,
followed by 10 mL of Gelfoam slurry. A total of 25 cc of iodinated contrast was used. The patient tolerated both procedures well without untoward side effects. He was asymptomatic with no recurrent hematuria at 4-month follow-up. His renal function remained stable throughout, with serum creatinine concentrations of 2.3 mg/dL at 1 week after the first procedure and 2.1 mg/dL at 3 weeks after the second procedure.

Surgical treatments for BPH should be considered in patients with obstructive uropathy in order to more immediately and completely relieve the obstruction. However, in the present patient, who was not a surgical candidate or in those who refuse surgery, PAE may be performed. CO₂ is a well-described alternative contrast medium which does not carry a risk of contrast-induced nephropathy (2). This property makes CO₂ angiography potentially well suited to PAE in patients with obstructive uropathy, provided the prostatic arteries can be depicted with sufficient contrast and spatial resolution. In this case, given the enlargement of the prostatic arteries, CO₂ angiography allowed clear visualization. Smaller prostatic arteries may be more challenging to visualize. A prior series of 19 patients described CO₂ pelvic angiography prior to PAE and reported that the origin of the prostatic artery was depicted in 21 of 28 hemipelvoses (75%) (3). In this series (3), PAE was then performed using conventional iodinated contrast. The current case used predominantly CO₂ contrast to perform the procedure itself; however, small volumes of iodinated contrast should be used to exclude nontarget supply to other pelvic organs, as small arterial anastomoses may not be well depicted with CO₂. A recent series of 8 patients described intravenous and intra-arterial contrast-enhanced ultrasound in PAE used to confirm correct catheter position, absence of nontarget supply, and nonenhancement of the prostate gland after embolization (4). This technique may allow further reduction in the requirement of iodinated contrast in PAE.

The present case demonstrates that prostatic artery embolization may be safely and effectively performed with predominant use of CO₂ angiography, likely decreasing the risk of contrast-induced nephropathy and expanding the pool of patients who may benefit from this procedure.

REFERENCES


Pregnancy after Superselective Embolization of the Cervicovaginal Arteries for a Bleeding Cervical Fibroid

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Editor:

Despite the success of uterine artery embolization (UAE) for treatment of fibroids, the failure rate has been reported to be high in patients with cervical fibroids (1). The purpose of the current report is to describe a case of successful cervical fibroid treatment using superselective cervicovaginal artery embolization along with cone beam CT to confirm non-target tissue exclusion.

This case report was granted exemption from full review as per the policies set forth by the authors’ institutional review.

Figure 1. Sagittal T2 MRI of patient prior to embolization demonstrating cervical fibroid (marked by white arrows).