microcatheter was repositioned in the right pudendal artery, and final angiography showed patency of the penile branches with complete devascularization of the right prostatic lobe. Two weeks after the procedure, the patient successfully voided and no penile skin discoloration or ulceration were noted.

Atherosclerosis commonly affects pelvic vessels and can be a cause of technical failure in elderly patients undergoing PAE. It can lead to complete or partial occlusion of the prostatic artery. Successful crossing of the atherosclerotic occlusion of the prostatic artery has been reported previously (3). Long-standing CTO of the prostatic artery leads to development of prominent collaterals from nearby pelvic branches. This patient had significant medical comorbidities for atherosclerotic disease who presented with CTO of the right prostatic artery with a prominent collateral from the right internal pudendal artery supplying the entire right prostatic lobe. This procedure shows that in the presence of long-segment CTO of the prostatic artery, retrograde prostatic embolization is feasible via catheterization of collaterals. Before embolization, cone-beam CT is helpful to confirm the prostatic enhancement and to rule out any extraprostatic supply (4).

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Prostatic Artery Embolization with Ethylene Vinyl Alcohol Copolymer: A 3-Patient Series

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Editor:

Prostatic artery embolization (PAE) is a technically challenging procedure because catheterization can be difficult and there is the potential for complications secondary to nontarget embolization (1). There is no consensus for the optimal embolic agent and its size. Embolic agents of various types (spherical and nonspherical polyvinyl alcohol particles, hydrogel microspheres) have been used. Particle sizes vary from 50 to 500 μm. Smaller embolic particle size may lead to greater prostatic ischemia but may magnify the risk of nontarget embolization (1,2). Ethylene vinyl alcohol copolymer (EVOH) injection can be halted if extension of the agent into a nontargeted vessel is detected and then resumed once the product has solidified. In this retrospective study of data collected from February 2017 to January 2018, we report 3 patients in whom PAE was performed using EVOH for treatment of complete urinary outflow obstruction secondary to benign prostatic hyperplasia. The institutional review board does not require approval for case reports.

The first patient was a 96-year-old man who was living independently at home and was admitted with acute urinary retention. Suprapubic ultrasound showed an enlarged prostate with an estimated volume of 300 cm^3. The patient was treated by endoscopic partial resection of the median lobe, which was protruding into the bladder. Following the operation, transfusion of 2 U of packed red cells was needed. On day 10, the patient still had macroscopic hematuria and was still catheterized. After a multidisciplinary staff discussion, it was decided to perform embolization under local anesthesia. Via a 4-F right common femoral artery access, the left internal iliac artery was catheterized by means of a 4-F Berenstein catheter (Cordis Corp, Miami Lakes, Florida) in which a 1.3-F Headway Duo microcatheter (MicroVention Europe, Saint Germain en Laye, France) was placed coaxially. The left superior prostatic pedicle was catheterized proximally, showing an important prostatic blush. The microcatheter was then placed more distally, and 1.0 mL of EVOH was injected several times. The injection was stopped when reflux was observed in the obturator artery to obtain a plug (**Fig 1**). The microcatheter was removed, and the Berenstein catheter was placed in the right internal iliac artery. A new Headway Duo microcatheter was placed in the right superior prostatic pedicle occluded with 0.1 mL of EVOH. The final cast can be seen in **Figure 2**. The hematuria stopped 3 days after embolization, and the patient's catheter was definitively removed on day 7. At 11 months, the International Prostate Symptom Score was 18, the quality of life index was 3, and postvoid residual was 30 mL. The volume of

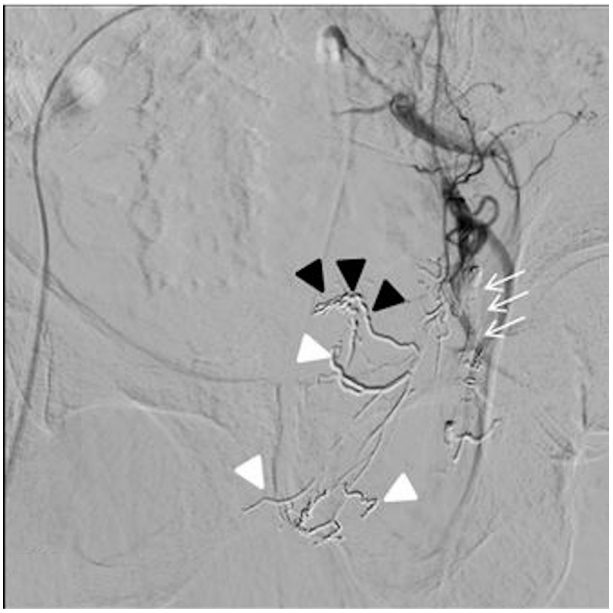

Figure 1. The microcatheter was first placed in the left superior prostatic pedicle and then advanced more distally. The first injection of EVOH filled the intraprostatic vessels (white arrowheads). A reflux was created via the prostatic-vesical artery up to the obturator artery to obtain a plug (arrows). Afterward, a new injection allowed embolization in other intraprostatic vessels (black arrowheads).

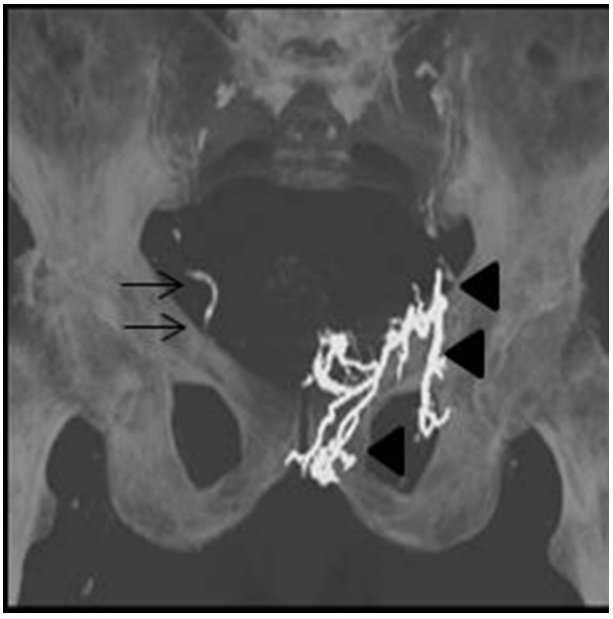

Figure 2. Maximum intensity projection frontal computed tomography scan. Arrows indicate cast of EVOH in the right prostatic-vesical artery; arrowheads indicate cast of EVOH obtained from the injection of the left superior prostatic pedicle with reflux up to the obturator artery. The cast of the left side is more important than the cast of the right side; the procedure was stopped on the right side because of patient agitation.

the prostate was estimated at 186 cm^3 on magnetic resonance imaging, a 38% decrease from baseline prostatic volume.

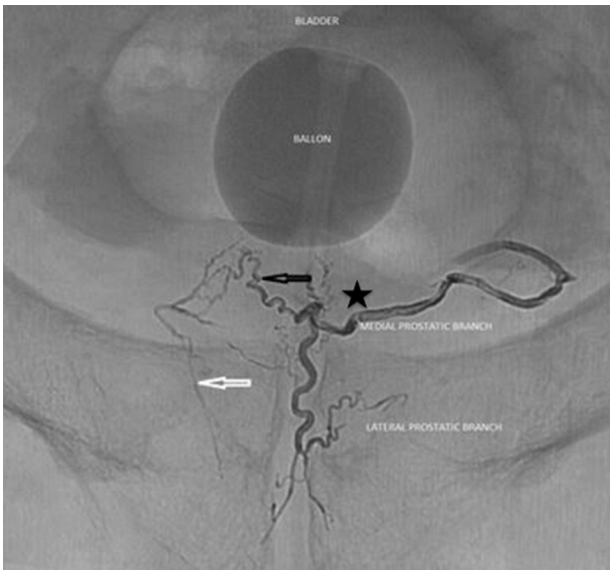

Figure 3. Image without injection of contrast agent. Occlusion by EVOH of the left medial and lateral prostatic branches as well as the right medial prostatic branch (black arrow) and right lateral prostatic branch (white arrow). The black star indicates the microcatheter trip.

Figure 4. Injection of contrast agent in the right internal artery showed no opacification of the right prostatic-vesical artery and absence of prostatic gland opacification.

The second patient was an 80-year-old man with chronic oxygen-dependent respiratory failure who was admitted with bronchopulmonary superinfection. While in the hospital, he developed acute urinary retention, and the volume of the prostate was estimated by suprapubic ultrasound to be 40 cm^3. Because several attempts at removal of the urethral catheter failed, it was decided to perform PAE. Under local anesthesia, the left internal iliac artery was