Reducing the Risk of Non-target Prostatic Artery Embolization

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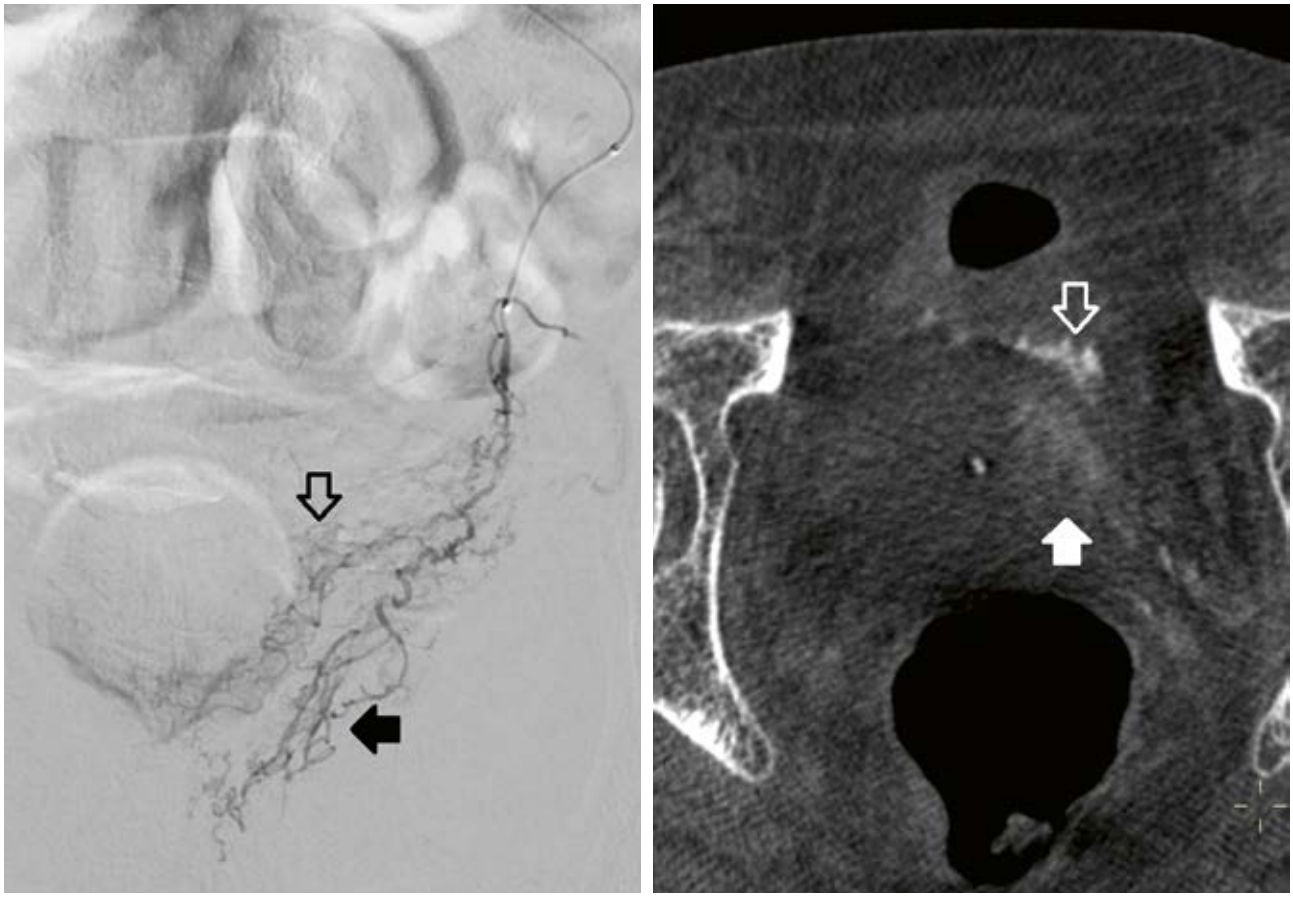

Patient history

The patient was a 72-year-old male with lower urinary tract symptoms caused by benign prostatic hyperplasia. Symptoms consisted of straining, hesitancy, and weak stream, with a frequency of almost every hour during the day, and 8 episodes of nocturia. Prostatomegaly was present with a total volume of 53 mL. Prior to treatment, the patient's International Prostate Symptom Score (IPSS) was 22, with a peak urine flow rate of 4 mL/s. One year after treatment, his IPSS was 4, and peak flow rate was 6 mL/s. Nocturia improved to 3 episodes per night, down from 8. Straining, hesitancy, and weak stream were all improved to the patient's satisfaction.

Diagnosis

Benign prostatic hypertrophy with lower urinary tract symptoms.

Treatment

Particle embolization was performed using 100-µm Embozene via right common femoral artery access. Angiograms were initially performed with 35 degrees of obliquity ipsilateral to the hemipelvis being treated, with 10 degrees of caudal tilt. Subsequent angiograms were performed with projections that were best suited to the prostatic artery after identification.

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1 Left: Digital subtraction angiogram (DSA) in the left anterior oblique projection of the left prostatovesical trunk showing the prostatic branches (solid black arrow) and the inferior vesical branches (hollow arrow).

Right: *syngo* DynaCT injection with the catheter in the same position at 0.2 mL/s for 2 mL confirms bladder wall enhancement (hollow arrow) and prostatic parenchymal enhancement (solid white arrow).

2 *syngo* DynaCT with power injection after advancing the microcatheter into the left prostatic artery distal to the vesical branches at 0.4 mL/s for 9 mL: No bladder wall enhancement (solid white arrow), enhancement of the left hemiprostate parenchyma (hollow arrow), and visualization of the periprostatic venous plexus (solid black arrow).

Comments

Five DynaCT runs were performed with injections ranging from 0.2 mL/s to 0.5 mL/s, and volumes ranging from 2 mL to 9 mL, each with 10–14 seconds X-ray delay. Injection parameters were specified at the operator's discretion to facilitate filling of the vascular bed distal to the catheter tip but avoiding reflux into vessels proximal to the tip. The first *syngo* DynaCT was performed to visualize the left prostatic artery, with the catheter in the left iliac artery. The second DynaCT run was performed after advancing the microcatheter into the left prostatovesical trunk, which showed enhancement of the bladder wall and seminal vesicles. Advancing the microcatheter more distally into the prostatic artery showed prostatic parenchymal enhancement and no enhancement of the bladder. *syngo* DynaCT in the right prostatovesical trunk also showed bladder enhancement, which resolved after advancing the microcatheter into the distal right prostatic artery. The five DynaCT runs that were performed during the procedure had an average DAP of 34,937 mGycm².

Protocol

The following standards regarding cone beam CT acquisition and injection protocols – depending on catheter position and vascular bed – have been established at the University of Virginia in the meantime:

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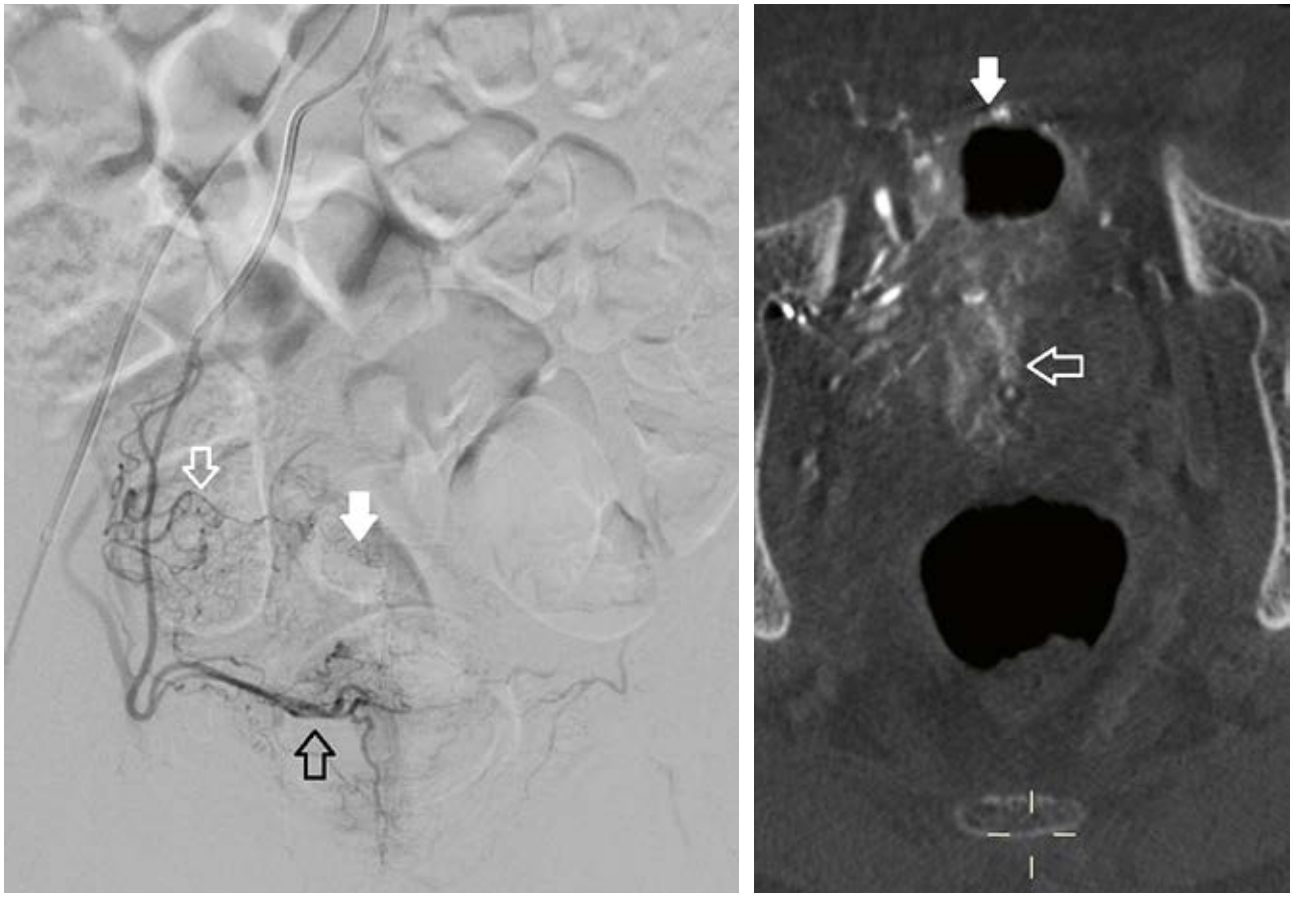

Acquisition protocol	5s DCT Body CARE
Injection protocol	
Dilution	No
Injection volume	2–4 mL
Injection rate	0.2 mL/s
Duration of injection	10–20 s
X-ray delay	10–14 s

The outcomes by Siemens' customers described herein are based on results that were achieved in the customer's unique setting. Since there is no "typical" hospital and many variables exist (e.g., hospital size, case mix, level of IT adoption) there can be no guarantee that other customers will achieve the same results.

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3 **Left: DSA of the right prostatovesical trunk through a 4F catheter showing numerous vesiculodeferential branches (hollow white arrow), bladder branches (solid white arrow), and prostatic branches (hollow black arrow).**

Right: *syngo* DynaCT with the catheter in this position at 0.5 mL/s for 9 mL showing enhancement of the bladder wall (solid white arrow) and prostatic parenchyma (hollow arrow).

4 **Left: DSA with the catheter advanced as distally as possible into the right prostatic artery.**

Right: Coronal projection from MPR of the *syngo* DynaCT in this position at 0.4 mL/s for 7 mL showing no enhancement of the bladder wall (hollow arrow) and prostatic parenchymal enhancement (solid white arrow).

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