

Prostate Artery Embolization (PAE) in the Management of Refractory Hematuria of Prostatic Origin Secondary to Iatrogenic Urological Trauma: A Safe and Effective Technique

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INTRODUCTION

Incidence of refractory hematuria of prostatic origin (RHPO) is extremely rare, with an iatrogenic etiology even rarer. When conservative methods fail to control bleeding, more invasive surgical methods are needed. In this article we describe our experience with prostatic artery embolization (PAE) as a minimally invasive alternative treatment option in patients with RHPO secondary to iatrogenic urologic trauma.

TECHNICAL CONSIDERATIONS

Three patients presented with RHPO. The etiologies were transurethral resection of prostate surgery, Foley catheter removal with a suprathreshold international normalized ratio and self-traumatic Foley catheter removal respectively. Stepwise management with conservative and medical methods failed to control bleeding. Under local anesthesia and moderate sedation, bilateral PAE was performed via a right common femoral artery access and using cone beam computed tomography. An embolic mixture containing 300–500 μ m Embosphere® Microspheres (Biosphere Medical, Rockland, MA) was injected under fluoroscopic guidance until stasis was achieved. PAE using the described technique was a technical and clinical success in all three patients. Hematuria resolved within a period of 24 hours. There were no intra- or periprocedural complications.

CONCLUSION

PAE offers a reasonable option in treatment of RHPO, regardless of the cause and may be attempted prior to surgical techniques or sometimes in conjunction. Being minimally invasive and performed under local anesthesia, PAE is especially useful when excessive bleeding prevents adequate visualization of a bleeding source during cystoscopy and in the elderly age group with several comorbidities. An added advantage is the prostatic parenchymal ischemia leading to significant prostate volume reduction and alleviation of the obstructive symptoms. UROLOGY 88: 218–221, 2016. © 2016 Elsevier Inc.

Prostatic hematuria is a source of much distress to a patient and a challenging clinical problem to the treating physician. The most common causes of prostatic hematuria include benign prostatic hyperplasia (BPH) and prostate cancer. Moreover, external beam radiation therapy and brachytherapy may predispose a patient to hematuria. Iatrogenic prostatic hematuria is rare and may be associated with prostate biopsy, transurethral resection of

prostate (TURP), and urethral catheterization.¹⁻³ Irrespective of the cause, most episodes of prostatic hematuria resolve with conservative methods, and in failing which, a life-threatening situation called Refractory hematuria of prostatic origin (RHPO) can develop.² We report three patients who presented with RHPO secondary to iatrogenic trauma who were treated with bilateral superselective prostatic artery embolization (PAE).

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CASE SCENARIOS

Institutional review board approval was obtained for the retrospective review of the medical records of our patients.

Case 1

A 69-year-old man presented with acute urinary retention due to benign prostatic hyperplasia. α -Blockers did

not significantly improve symptoms. He reported multiple prior episodes of urinary retention in the past 18 months needing clean intermittent catheterization. Digital rectal examination revealed a soft and enlarged prostate. A foley catheter was placed for bladder drainage. Computed Tomography (CT) revealed an enlarged prostate of 240 cc with a prominent median lobe. The patient subsequently underwent TURP surgery. During the procedure, incessant bleeding developed while the median lobe was being resected. Despite temporizing pressure applied for over 45 minutes, the bleeding could not be stopped. The procedure was aborted and the patient was placed on continuous bladder irrigation (CBI). The patient's hemoglobin (Hb) was stable at 13.2. There was temporary cessation of bleeding with resumption of bleeding next day. Emergent bilateral PAE was performed.

Case 2

An 82-year-old man presented with hematuria and clot retention following foley catheter removal. The patient had a recent exploratory laparotomy for a perforated viscus during a TURP procedure. He had been discharged with a foley catheter, which was removed 2 weeks afterwards. Of significance, he had history of atrial fibrillation and was taking Coumadin. In addition, he also had BPH, status post-operatively TURP. Rectal examination revealed a soft but enlarged prostate with an estimated size about 196 g. He had a supratherapeutic international normalized ratio of 3.76, which was corrected by transfusing fresh frozen plasma. His Hb level decreased from 11 to 8.2 mg/dL requiring blood transfusion. He then underwent cystoscopy with bladder irrigation and evacuation of clots. No source of bleeding could be identified. In spite of this, hematuria resumed post-operatively. At this point in time, an emergent bilateral PAE was performed.

Case 3

A 64-year-old homeless male with hypertension, chronic kidney disease, BPH, and cognitive impairment was brought to the emergency room in altered mental status and septic shock. Hematuria developed after self-traumatic foley catheter removal, attributable to his altered mental status. The patient had severe bacteremic shock with persistent hypotension resulting in secondary anoxic brain injury due to hypoperfusion. He was started on antibiotics and supportive care by the medical team in the intensive care unit. He was also started on CBI but his hematuria did not resolve. He continued bleeding and his Hb dropped from 11 to 6 mg/dL. Two units of packed red blood cells were transfused and his Hb increased just marginally. Because he was not a surgical candidate due to his clinical status, an emergent bilateral PAE was performed.

THE PAE TECHNIQUE

A single-wall arterial puncture needle (21 gauge micro-puncture, Cook Medical) is used to access the right common femoral artery. After a series of exchanges, a 0.035-inch

double-ended J wire (Bard Medical) is used to guide a 4 French Omni Flush catheter (Angiodynamics Corp) which is placed in the infrarenal abdominal aorta. Digital subtraction angiography (DSA) is performed through the flush catheter to delineate the vascular anatomy and to evaluate the source of the prostatic neovascularity, presumably responsible for the hemorrhage. A 4 French Cobra catheter (Cook medical) is then used to selectively catheterize the major pelvic branch artery supplying the neovascularity. Once again, DSA is performed, to better delineate the branch anatomy and to further characterize the prostatic branch arteries. DSA in the neutral position usually reveals the hemi-prostate blush. Selective catheterization of the prostatic artery is performed using a 2.4 French Progreat micro catheter (Progreat, Terumo) and a 0.014-inch Fathom wire (Boston Scientific). Axial cone-beam CT image is used to confirm the position of the catheter tip in a selective branch of the prostate artery. Embolization is then performed. Just prior to embolization, 100-300 ug of nitroglycerine is injected intraarterially. 2 mL of Embosphere Microspheres (Biosphere Medical), typically of 300-500 um from a single vial, is diluted with 10 cc of saline and 10 cc of contrast iodixanol 320 (Visipaque, GE Healthcare) to make a total embolic mixture of 22 cc. The embolic mixture is delivered to the left and right lobes, respectively, under fluoroscopy guidance. End point is stasis and pruning of neovascularity. To monitor progress, assess reflux, and prevent nontarget embolization, DSA is used before, during, and after embolization. Catheters and wires are removed, and hemostasis is usually achieved with a 6 French Angioseal (St. Jude Medical) closure device (Fig. 1).

RESULTS

Technical success, defined by superselective catheterization and embolization of bilateral prostatic arteries and confirmation with cone-beam CT, was achieved in all patients. There were no intra- or periprocedural complications. In case 1, hematuria resolved within 24 hours and the patient was discharged on the 4th day of hospital stay. At 9 months follow-up, he remained asymptomatic without hematuria. Magnetic resonance imaging showed a shrunken prostate of 82 cc with a resolution of his urinary retention, an International Prostate Symptom Score score of 1, and an International Index of Erectile Function score of 32. In case 2, hematuria resolved within 4 hours of the procedure. Hb remained stable at around 9 mg/dL. At 6-week follow-up, there was no macroscopic hematuria, his urinary retention resolved with a reduction of his International Prostate Symptom Score score to 3, and no sexual dysfunction was reported. There was reduction of the prostatic volume from 196 cc to 95 cc, and a reduction of the prostate-specific antigen level from 11.9 to 0.56 ng/mL. In case 3, hematuria stopped within 12 hours of the procedure and Hb remained stable. However, his sepsis and general health continued to worsen. He had severe cognitive impairment and was in a vegetative state with

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