Prostate Artery Embolization Used in the Management of Transfusion-Dependent Hematuria After Prostatic Urethral Lift Procedure in a Patient with Thrombocytopenia: A Case Report

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Abstract

Background: The prostatic urethral lift (PUL) procedure is a novel therapeutic method to treat lower urinary tract symptoms (LUTS) caused by benign prostatic hyperplasia (BPH). Gross hematuria after this procedure has been reported to be mild and transient. This report highlights a case of refractory transfusion-dependent hematuria after the PUL procedure in addition to its management with selective prostatic arterial embolization (PAE).

Case Presentation: A 78-year-old Caucasian man with a history of myelodysplastic syndrome, thrombocytopenia, and intermittent urinary retention secondary to BPH underwent a PUL procedure. Before the procedure he received a platelet transfusion making his platelet count 58,000/ μ L. The day after the procedure he was admitted to a hospital for gross hematuria with clot retention. He was started on continuous bladder irrigation and taken to the operating room for clot evacuation and fulguration of prostate. His thrombocytopenia and anemia were managed with transfusions. He was treated with desmopressin, aminocaproic acid, and intravesical 1% alum without improvement. He returned to the operating room for clot evacuation in addition to photo-selective vaporization of the prostate laser ablation of the prostatic fossa. He eventually required a total of four transurethral fulgurations without improvement in transfusion-dependent hematuria. Ultimately, resolution of the hematuria was achieved through bilateral PAE with Embosphere[®] Microspheres performed by interventional radiology. He was discharged home 2 days after the embolization procedure without recurrence of hematuria or urinary retention at a 6-month follow-up visit.

Conclusion: The PUL procedure has been shown to be an effective alternative to more invasive surgical options for LUTS caused by BPH. Despite careful consideration in an attempt to alleviate urinary retention, PUL still resulted in significant bleeding in this patient with thrombocytopenia. This is the first report to highlight the use of bilateral PAE as a method for achieving control of severe refractory hematuria after PUL.

Keywords: hematuria, UroLift, prostatic artery embolization

Introduction

THE PROSTATIC URETHRAL LIFT (PUL) procedure is a minimally invasive transurethral treatment for lower urinary tract symptoms (LUTS) caused by benign prostatic hyperplasia (BPH). The UroLift[®] system is the only PUL method currently approved for use in the United States. More than 5 years since its introduction, the UroLift procedure has been shown to significantly improve bothersome LUTS based on the International Prostate Symptom Score (IPSS), Quality-of-Life (QOL) scale, the Benign Prostatic Hyperplasia Impact Index (BPHII), as well as maximum urinary

flow rate, with typically only transient mild hematuria after the procedure and minimal risk of transfusion.¹ In this report, we present a case of a patient who experienced persistent significant bleeding after the UroLift procedure that was refractory to endoscopic management and was eventually controlled with prostatic artery embolization.

Case Presentation

A 78-year-old man with a history of myelodysplastic syndrome (MDS) and thrombocytopenia who experienced longstanding LUTS and urinary retention secondary to BPH. The

patient's prostate size was 42 g on transrectal ultrasonography, with a postvoid residual urine volume of 200–300 mL. Cystoscopy revealed bilobar hypertrophy with no intravesical component. His serum PSA level was 2.78 ng/mL and serum creatinine level was 0.8 mg/dL. Despite maximal medical management with doxazosin 4 mg and finasteride 5 mg daily, he continued to have significant bothersome LUTS. Given the patient's high risk of bleeding, it was felt that the PUL procedure would incur the lowest risk of postoperative bleeding.

Before the procedure the patient received a transfusion of 2 U of platelets and his platelet count was 58,000/ μ L at the time of the procedure. He was discharged home after an uncomplicated UroLift (Teleflex, Inc., Wayne, PA, USA) procedure. He returned the next morning unable to void because of urinary clot retention. He was admitted to a local hospital and was started on continuous bladder irrigation. The next day, he was taken to the operating room for clot evacuation and fulguration of the prostate with removal of 200–300 mL of clot. During the procedure, it was also confirmed that his UroLift implants were in appropriate position. He required packed red blood cell and platelet transfusions to maintain his hemoglobin >8 g/dL, and his platelet count $>50,000$ / μ L. After consultation with hematology service, he was started on intravenous desmopressin. Three days after the initial clot evacuation procedure, he was taken back to the operating room for an additional clot evacuation of 200 mL of clot and underwent repeat fulguration of the prostate caused by persistent gross hematuria. During the procedure no arterial bleeding was identified.

After the second clot evacuation procedure, he continued to have persistent transfusion-dependent hematuria. He was started on intravenous aminocaproic acid and his platelet transfusion goal was increased to 70,000–80,000/ μ L. Despite

these efforts, he continued to bleed. He returned to the operating room for a third time for clot evacuation and underwent intravesical instillation of 1% alum. In addition, photoselective vaporization of the prostate (PVP) using Greenlight™ (Boston Scientific Corporation, Marlborough, MA, USA) laser therapy was used to coagulate the prostatic fossa, and again there was no arterial bleeding noted. There was continued bleeding despite these interventions.

At this point he was transferred to a tertiary care facility for further management of his refractory hematuria. Upon transfer, he continued to be anemic and thrombocytopenic with a poorly draining urethral catheter. Thus, he was taken to the operating room for a fourth clot evacuation and fulguration procedure. Of note, during this procedure the UroLift implants were not able to be viewed, and thus it was assumed that his UroLift implants had been displaced during a prior fulguration procedure. For the first 24 hours postoperatively his urine remained clear and his catheter was removed. But after 1 day, his urine became dark red with clots and his platelet count and hemoglobin decreased to the point of requiring transfusions again.

At this point, it was clear that further endoscopic interventions were unlikely to help resolve his bleeding and we consulted interventional radiology (IR) for evaluation for prostate artery embolization. He was taken to the IR suite where the right and left prostatic arteries arising from the internal pudendal arteries were identified and contrast extravasation was noted from the left prostatic artery, filling the bladder with contrast. Both prostatic arteries were embolized with 300–500 μ m Embosphere® microspheres (Merit Medical Systems, Inc., South Jordan, UT, USA), until hemostasis was achieved. After embolization, no further contrast extravasation was noted on arteriogram (Fig. 1).

FIG. 1. Prostatic artery angiography demonstrating (A) contrast extravasation from left prostatic artery into bladder, (B) left and (C) right prostatic arterial embolization with Embosphere® microspheres, and (D) postembolization arteriogram showing resolution of contrast extravasation.

After the embolization procedure, the patient's hemoglobin remained stable at 8 g/dL and his urethral catheter was removed. Two days after the embolization procedure he was discharged home with a stable hematocrit and clear urine. He has since done well at 6-month follow-up with stable hemoglobin (8.3 g/dL), improved LUTS, and no hematuria.

Discussion

The PUL procedure is a novel alternative to transurethral resection of the prostate (TURP) for treatment of LUTS in patients with BPH. In follow-up studies of up to 5 years, the PUL procedure has been shown to improve LUTS, as measured by IPSS, QOL scale, BPHII, and maximum urinary flow rate. Retreatment after PUL is 13.6% at 5 years.¹ Comparing TURP with the PUL procedure, patients undergoing PUL were also found to have faster recovery time and report better ejaculatory function as measured by the Male Sexual Health Questionnaire–Ejaculatory Dysfunction (MSHQ-EjD) compared with patients undergoing TURP.² Other crossover studies from sham to PUL procedures have found that PUL remains a safe treatment method for LUTS, leading to significant symptomatic relief with minimal adverse events, most of which involve encrustation of the device or misplacement.^{1,2}

Gross hematuria after PUL as reported in the literature appears to be mostly transient and mild with minimal risk of transfusion-dependent hematuria.¹ However, two cases of postoperative pelvic hematomas have been reported after PUL procedures, one of which required emergent exploratory laparotomy, hematoma evacuation and ligation of a bleeding vessel.³ To our knowledge, ours is the first reported case of refractory transfusion-dependent gross hematuria after a PUL procedure treated with prostatic artery embolization.

Given this patient's significant perioperative risk factors (e.g., MDS and thrombocytopenia), he chose to undergo the PUL procedure. This patient's thrombocytopenia led to significant postprocedural bleeding that was refractory to common endoscopic and pharmaceutical treatments. Patient selection and preoperative evaluation were not inappropriate in this case, but we want to highlight the use of prostatic artery embolization as a potential therapy for refractory prostatic bleeding. Only one study has reported the need for prostatic artery embolization after PUL. However, this was used as a treatment for unresolved LUTS after PUL and not for control of persistent gross hematuria.⁴

As this case demonstrates, even with rigorous control of thrombocytopenia in a patient with MDS, thrombocytopenic patients can have life-threatening bleeding after the PUL procedure for treatment of BPH. Although adverse bleeding events have been reported, it is unclear if PUL is a better alternative to PVP in cases of a bleeding diathesis. In addition of interest is the angiographic imaging showing arterial bleeding with extravasation into the bladder, further demonstrating the diagnostic and therapeutic usefulness of IR in the management of refractory hematuria after the PUL procedure.

Conclusion

The PUL procedure has been shown to be an effective alternative to more invasive surgical options for treatment of LUTS caused by BPH. Despite careful consideration in an

attempt to alleviate urinary retention, PUL still resulted in significant bleeding in this patient with thrombocytopenia. This is the first report to highlight the use of bilateral prostatic artery embolization as a method for achieving control of persistent severe gross hematuria after the PUL procedure.

Disclosure Statement

No competing financial interests exist.

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Abbreviations Used

BPH = benign prostatic hyperplasia
 BPHII = Benign Prostatic Hyperplasia Impact Index
 IPSS = International Prostate Symptom Score
 IR = interventional radiology
 LUTS = lower urinary tract symptoms
 MDS = myelodysplastic syndrome
 PAE = prostatic arterial embolization
 PUL = prostatic urethral lift
 PVP = photoselective vaporization of the prostate
 TURP = transurethral resection of prostate

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