


Case Report

Angioembolization for massive pelvic hematoma after prostatic urethral lift

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Abbreviations & Acronyms

BPH = benign prostatic hyperplasia
 CT = computed tomography
 IPSS = International Prostate Symptom Score
 LUTS = lower urinary tract symptoms
 OCAS = oral controlled absorption system
 PUL = prostatic urethral lift
 QoL = quality of life
 TURP = transurethral resection of prostate

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Introduction: Pelvic hematomas are a rare complication of prostatic urethral lift. We would like to report the first case of massive pelvic hematoma after prostatic urethral lift that was successfully managed by selective angioembolization.

Case presentation: An 83-year-old gentleman with benign prostatic hyperplasia underwent prostatic urethral lift. Although the procedure was uneventful, he developed shock while in the recovery room. Urgent contrast computed tomography scan showed a large heterogenous hematoma at the right pelvis extending to the right retroperitoneum with contrast extravasation noted. Urgent angiogram confirmed extravasation from the right prostatic artery. Angioembolization with coils and 33% N-butyl cyanoacrylate glue was successfully performed.

Conclusion: Prostatic urethral lift can be complicated by the rare massive pelvic hematoma, possibly more common in small prostates. With a prompt contrast computed tomography scan, pelvic hematomas can be managed with angioembolization first and hopefully prevent open exploratory surgery.

Key words: angioembolization, BPH, pelvic hematoma, prostatic urethral lift, Urolift.

Keynote message

PUL can be complicated by the rare, massive pelvic hematoma, which may occur more commonly in smaller prostates. Alteration of PUL technique may be beneficial in preventing the complication. With prompt contrast CT scan, pelvic hematomas can be managed with angioembolization first before considering open exploratory surgery.

Introduction

PUL (The UroLift® System, NeoTract, Inc., Pleasanton, CA, USA) is a novel treatment of BPH, which was introduced in 2011.¹ It has proven to be minimal invasive with minimal morbidity, especially in terms of sexual function.^{1–6} Due to the short operative time and nonablative method of alleviating obstruction due to BPH, there have been PUL procedures performed under sedation or even local anesthesia.^{7,8} However, with any new procedure, there is the possibility of rare and catastrophic complications that may occur. Pelvic hematomas are one such example. To illustrate this point, we would like to report the first case of massive pelvic hematoma after PUL that was successfully managed by selective angioembolization.

Case presentation

The patient is an 83-year-old man who presented with bothersome LUTS despite receiving tamsulosin OCAS 0.4 mg daily for 6 months. Preoperative uroflowmetry demonstrated a voided volume of 104 mL with a maximum urinary flow rate (Q_{max}) of 3.9 mL/s and a residual urine of 82 mL. He had an IPSS of 27 points and a QOL score of 4. Transrectal ultrasound of his prostate revealed a 14.4 cm³ prostate. In view of his mixed storage and voiding symptoms, urodynamic study was performed and confirmed bladder outflow obstruction (Bladder Outflow Obstruction Index 51). After discussing the different surgical options with the patient, he decided to proceed with the PUL procedure.

Intraoperatively, the patient suffered from lateral prostate lobes enlargement without any obstructing median lobe. Two implants were placed in each lateral lobe at the 10 and 2 o'clock positions, with a total of 4 implants inserted. The procedure was completed uneventfully within 15 min under monitored anesthetic care. No urethral catheter was placed. While in the recovery room, the patient developed tachycardia with a pulse rate of 122 bpm and hypotension with a blood pressure of 78/30 mmHg, which transiently responded with fluid resuscitation. Urgent blood tests subsequently revealed a hemoglobin level of 4.8 g/dL (from a baseline of 10 g/dL). Also, the platelet count was $70 \times 10^9/L$ and there was a deranged clotting profile which indicated consumptive coagulopathy.

Urgent contrast CT scan showed contrast extravasation along the PUL needle path of one of the 10 o'clock implants (Fig. 1a) with a large heterogenous hematoma at the right pelvis extending to the right retroperitoneum (Fig. 1b). The patient proceeded with angiogram, which showed extravasation from the right prostatic artery (Fig. 2a). Angioembolization with coils and 33% N-butyl cyanoacrylate glue was successfully performed (Fig. 2b). The patient subsequently recovered although he required 3 weeks of in-hospital physiotherapy due to muscle deconditioning. On discharge, he was able to void without catheter and walk unaided.

On follow-up 2 months after the procedure, the patient was satisfied with his voiding. Uroflowmetry revealed a voided volume of 137 mL, a Q_{max} of 16 mL/s and a residual volume of 50 mL. The massive hematoma took 1 year to completely resolve on imaging.

Discussion

PUL has been shown to be effective in relieving LUTS due to BPH. The L.I.F.T. (Luminal Improvement Following

Prostatic tissue Approximation for the treatment of LUTS secondary to BPH) study has shown 44% reduction in IPSS, 50% improvement in QOL, and 44% improvement in Q_{max} , with such improvements seen by 2 to 4 weeks, and has persisted for 5 years after the procedure.^{4,9} More importantly, there is minimal morbidity, especially in terms of sexual function.¹⁻⁶ According to the BPH6 study, PUL was superior to TURP in terms of quality of recovery, ejaculatory function, incontinence at 2 weeks and 3 months, and improved sleep quality.⁶ All these studies seem to indicate PUL has only benefits without drawbacks. However, with any new procedure, there is the possibility of rare, catastrophic complications that may occur. As we have shown in our patient, pelvic hematomas can result in significant hemodynamic instability and can quickly turn a simple procedure into a life-threatening event. Luckily, such pelvic hematomas are quite rare. Grange *et al.* had previously stated that according to the MAUDE (Manufacturer and User Facility Device Experience), there is a 0.009% estimated occurrence of intervention for pelvic hematoma after PUL and an occurrence of 0.0006% hematoma requiring open surgical intervention in 2020.^{10,11} In reality, there is likely underreporting and thus underestimation of the true incidence. In the current literature, there are three case reports on pelvic hematomas after PUL. Pollack *et al.* first described a patient with pelvic hematoma after PUL in 2019.¹² Intraoperatively, the patient had a short prostatic urethra of 2 cm and only required 2 implants (at 10 and 2 o'clock position) to restore patency to the prostatic urethra. The patient later suffered from edema and ecchymosis of the external genitalia with laboratory findings of anemia. Subsequent contrast CT scan revealed a large pelvic hematoma tracking to bilateral pelvic side wall. There was no mention of intervention to the pelvic hematoma. Cai *et al.* also reported a patient with large pelvic hematoma after PUL

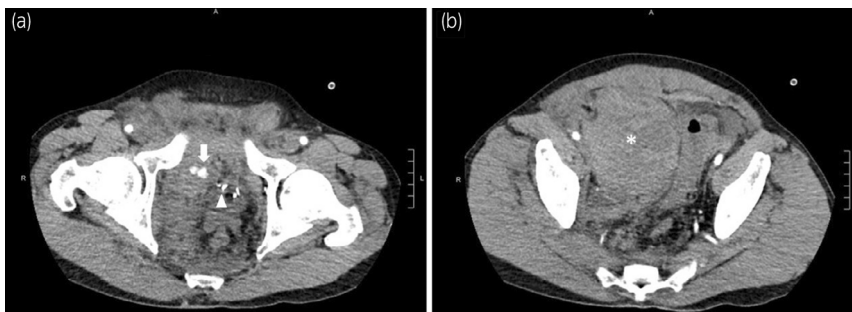


Fig. 1 Urgent contrast CT scan of the patient after the developing hypotension. (a) The white arrowhead denotes the PUL tabs. The white arrow indicates the site of contrast extravasation, which is directly in line with the path of the PUL needle. (b) The white asterisk denotes the large retroperitoneal hematoma extending superiorly.

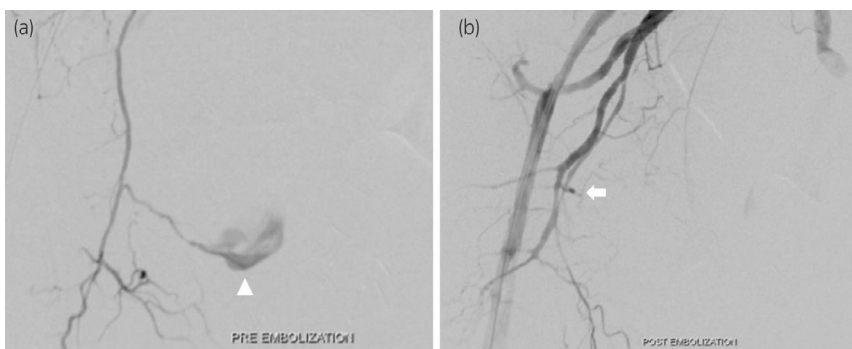


Fig. 2 (a) Pre-embolization angiogram shows contrast extravasation from the right prostatic artery, denoted by the white arrowhead. (b) The right prostatic artery has been successfully embolized, denoted by the white arrow.

but their patient deteriorated rapidly within 12-h post-PUL that necessitated an exploratory laparotomy.¹³ Intraoperatively, 1.5 L of hematoma was discovered in the pelvis with a small bleeding vessel noted on the left pubis. The third report of pelvic hematoma after PUL was described by Ewing *et al.*¹⁴ The patient had a history of prostate cancer treated with radiotherapy. The preoperative prostate size was 25 g on transrectal ultrasound. The patient also developed hemodynamic instability after the procedure and contrast CT scan revealed a 15 cm pelvic hematoma in the space of Retzius. Unfortunately, the patient subsequently developed acute on chronic renal failure requiring hemodialysis. The hematoma was treated conservatively and resolved on imaging by 8 months.

Including our case, three of the four reports had patients with small prostates, with the largest documented prostate size of 25 cm³.^{12,14} There is less margin of error in small prostates where the structures are more compact and the arteries of Flock would be in closer proximity to the 10 and 2 o'clock implant positions. Thus, it would be more prudent to direct the implants toward the 9 and 3 o'clock position when performing PUL in patients with small prostates of less than 25 cm³. Admittedly, with the numerous variations of the pelvic vascular anatomy, it may be a matter of pure luck whether the needle strikes an arterial branch.¹⁵ It is possible that other more traditional surgical interventions (such as TURP) may be safer than PUL in patients with small prostate. Further studies are needed to help shed light on the possible association between increased post-PUL complications and small prostates.

Conclusion

PUL can be complicated by the rare massive pelvic hematoma, possibly more common in small prostates. With a prompt contrast CT scan, pelvic hematomas can be managed with angioembolization first and hopefully prevent open exploratory surgery.

Author contributions

Brian Sze Ho Ho: Conceptualization; data curation; writing – original draft; writing – review and editing. James Hok-Leung Tsu: Supervision; writing – review and editing.

Conflict of interest

The authors declare no conflict of interest.

Approval of the research protocol by an Institutional Reviewer Board

Not applicable. This is a retrospective reporting of a rare complication and subsequent management.

Informed consent

Yes, agreed by patient to discuss details of his disease and management without any personal identification.

Registry and the Registration No. of the study/trial

Not applicable.

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