

Research Article

# Life-threatening Bleeding After Optical Internal Urethrotomy: Successfully Managed by Super- Selective Angioembolization, a Case Report and Review of Literature

Satish Ranjan<sup>1,\*</sup> , Avinash Kumar<sup>2</sup> , Prabhat Ranjan<sup>1</sup> 

<sup>1</sup>Department of Urology and Kidney Transplantation, Jayprabha Medanta Superspeciality Hospital, Patna, India

<sup>2</sup>Department of Radiodiagnosis and Imaging, Jayprabha Medanta Superspeciality Hospital, Patna, India

## Abstract

Minor bleeding after internal urethrotomy is quite common and often subsides spontaneously. Mild to moderate persistent bleeding responds well with conservative management. Severe, life-threatening bleeding that necessitates invasive intervention is seldom seen these days. Selective or super-selective angioembolization is highly effective in these cases and has minimal associated morbidity. Here, we present a case of refractory urethral bleeding after optical internal urethrotomy (OIU) successfully managed by super-selective angioembolization. A 59-year-old man was referred to us with massive pericatheter bleeding after a cold knife internal urethrotomy done at a peripheral center 5 days ago. There was recurrent clot retention and a clinically significant drop in hemoglobin while on conservative management. Two units of LDPRBC were transfused. There was no history of chronic liver or kidney disease or any coagulation disorders. After Initial conservative measures failed, the patient underwent a computed tomography angiogram of the pelvis, which revealed a pseudoaneurysm arising from the bulbourethral artery. Different invasive management approaches like endoscopic fulguration, angioembolization, and open surgical repair have been explained and discussed with the patient and their relatives. Following shared decision-making and informed consent, angioembolization of the bulbourethral artery was performed. The bleeding stopped after the procedure, and the patient was discharged after 24 hours of observation. The present report highlights the use of super-selective embolization in severe urethral bleeding if initial conservative measures failed.

## Keywords

Optical Internal Urethrotomy (OIU), Bleeding Per Urethra, Angioembolization, Case Report

## 1. Background

Bleeding after an optical internal urethrotomy (OIU) is one of the common complications after a cold knife incision. Minor bleeding subsides spontaneously, and the persistent minor bleeding responds well with perineal compression. Massive bleeding after internal urethrotomy is quite rare.

Only a few cases of massive bleeding after urethrotomy have been reported. In case of massive or refractory bleeding, ultrasound-guided compression and angioembolization have been described [1, 2]. Hereby, we report a case of life-threatening bleeding after an internal urethrotomy

\*Corresponding author: docsatis48@gmail.com (Satish Ranjan)

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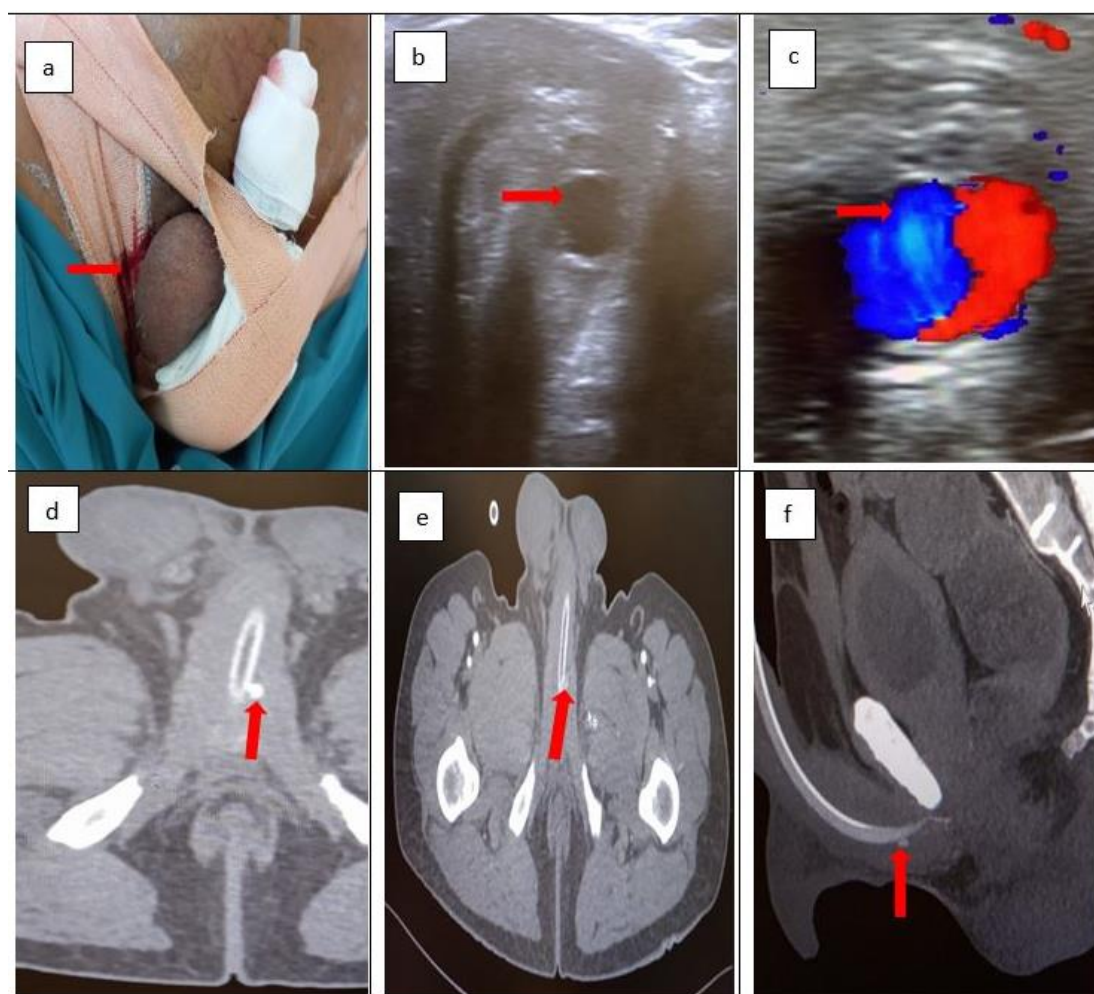
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successfully managed with angioembolization.

## 2. Case Presentation

A 59-year-old man was referred to us with massive per urethral bleeding five days after cold knife OIU for bulbar urethral stricture. On evaluation, his vitals were within normal limits. His hemoglobin level was 6.4g/dl. Other laboratory parameters, including Liver function test, kidney function test, and coagulation profile, were within normal limits.” Because of the massive persistent bleeding, a firm perineal and penile compression was applied (Figure 1a).

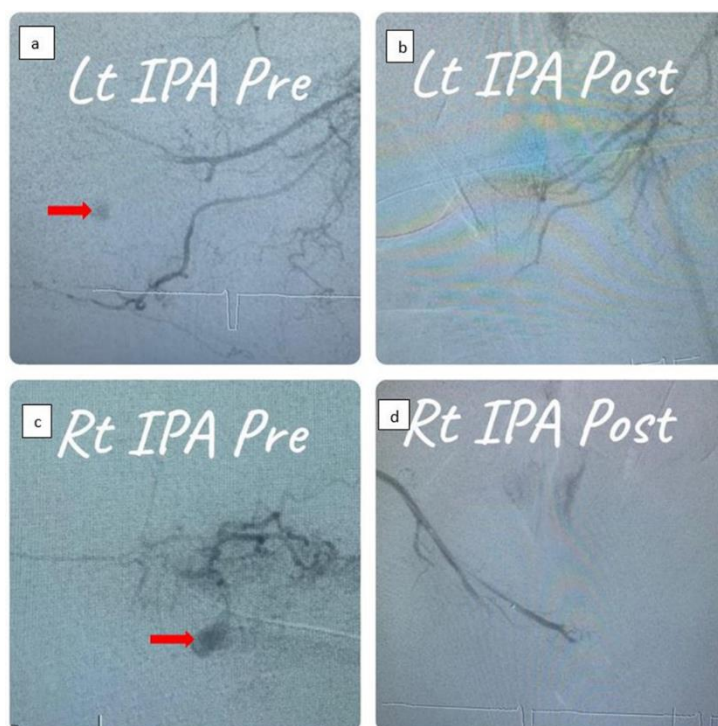
One unit of LDPRBC was transfused, and the patient was kept under observation. Even after compression, he had a few episodes of massive bleeding and clot retention at night. The next day, hemoglobin was 6 gm/dl. One more LDPRBC was transfused. Color Doppler ultrasonography showed a pseudoaneurysm around the bulbar urethra (Figure 1 b, c). The patient and his attendants were explained about USG-guided compression and further conservative management, but they denied it. Hence, the decision to go ahead with CT pelvic angiography was taken. Angiography showed contrast extravasation from the bulbourethral artery, likely pseudoaneurysm (Figure 1 d, e, f).



**Figure 1.** a. Perineal and penile compression, note the bleeding (red arrow), b. grey scale ultrasonography showed a hypoechoic area surrounding the bulbar urethra, c. color Doppler showed pseudoaneurysm, d, e, f. CT angiogram of pelvis suggestive of pseudo aneurysm of the bulbourethral artery (red arrow).

Different invasive management approaches like endoscopic fulguration, angioembolization, and open surgical repair have been explained and discussed with the patient and their relatives. They opted for angioembolization

because of its minimally invasive nature. Superselective embolization of the bulbourethral artery was performed via transfemoral approach bilaterally with Polyvinyl alcohol particles (300-500 microns) (Figure 2).



**Figure 2.** Digital subtraction angiography. A, c. contrast extravasation from the branches of the internal pudendal artery, likely bulbourethral artery (red arrow). b, d. No extravasation after embolization.

The bleeding completely stopped after the procedure. Per urethral catheter was removed two days after the procedure, and the patient voided well. After twelve months of follow-up, there was no episode of bleeding, and the patient is voiding well.

### 3. Discussion

Urethral stricture is fixed anatomical narrowing of the anterior urethra, resulting in poor urine flow or complex instrumentation without mucosal disruption. Internal Urethrotomy with the cold cutting knife is a frequently used endosurgical treatment of short-segment, non-dense bulbar urethral stricture. Despite the higher recurrence rate compared to urethroplasty, it is preferred by surgeons and patients because of its minimally invasive nature. The goal of surgery is to get a larger luminal diameter after healing. Most surgeons prefer to incise the urethra at a 12-clock position. Some degree of bleeding is almost always after the incision, which resolves spontaneously or through external compression. Bleeding is 2<sup>nd</sup> most common complication of OIU next to recurrence. Massive bleeding, which requires blood transfusion or some invasive intervention, is rare. In the index case, the patient had a history of recurrent stricture and previous OIU. He presented with bleeding and a significant drop in hemoglobin from baseline (10.4 to 6.4 gm/dl), which was managed successfully with selective embolization. For angioembolization, the PVA particle was preferred over the coil. Because no specific feeder was

supplying the pseudoaneurysm, this pseudoaneurysm was fed from multiple tiny branches of bilateral internal pudendal arteries. Before PVA particle embolization, the pre-embolization Angio from the microcatheter was carefully accessed to make sure there was no other branch getting opacified & Once it was made sure that only tiny feeders that supplied the pseudoaneurysm were getting opacified then only PVA particles were used to embolize, these tiny feeders thus preventing non-target embolization.

Causes of profuse bleeding after urethrotomy were cited as a deep cut through scar tissue into the corpus spongiosum, injury to the bulbourethral artery, and a deep cut into corpora cavernosa [1-3]. The bulbourethral artery can be injured due to abnormal location because of previous surgery or anatomical variations. Location of urethral arteries in the bulbar urethra was found to be at the 1 to 2 o'clock position in 14% of patients, 3 to 4 o'clock in 22%, 5 to 6 o'clock in 17%, 7 to 8 o'clock in 18%, 9 to 10 o'clock in 18%, and 11 to 12 o'clock in 11% patients in a study by Chiou et al. [3]. Although bulbourethral arteries are symmetrically located at the 3 and 9 o'clock positions, asymmetric location in stricture cases was noted by Kishore et al. [4]. Abnormal location increase the risk of injury while doing cold knife cutting. Sometimes, a vigorous cut is required to gain the optimal diameter, which can lead to bleeding. These vigorous cut-through dense stricture/spongiofibrosis are found to be unnecessary and don't help prevent the recurrence of stricture. There is a limited report on massive bleeding post-OIU. Successful management by USG-guided compression has been reported by Attri et al. [1]. Compression

temporarily stops the bleeding and helps develop a hemostasis plug, which converts small pseudoaneurysms into a simple hematoma. USG-guided localization and compression of small pseudoaneurysms are well described in the literature with a moderate success rate. It was also described for high-flow priapism as an alternative to angioembolization [5]. Only a few cases of angioembolization for massive per urethral bleeding after OIU have been reported in the literature [2]. After embolization, bleeding was controlled in almost all cases. However, transfemoral embolization is not only invasive; it also requires a lot of expertise, a DSA suite for the procedure, and an extra cost. Like other invasive procedures, it has its complications also, i.e., bleeding, pain, hematoma, thrombosis, migration of coil, arterial dissection, impotence, and ischemic stricture. In the index case, no complications were noted. Sexual performance was not evaluated in this case because the patient was not sexually active. The study expands the horizon of super-selective embolization, which is already being used in case of bleeding from kidney post-surgery trauma & tumors.

#### 4. Management of Bulbar Urethral Stricture

The bulbar urethra is most frequently affected by urethral stricture, but strictures are also commonly observed in the penile, fossa navicularis, glanular, glanular with meatus, and membranous urethra [6]. It is either traumatic or non-traumatic. Trauma directly to the urethra or pelvis with or without bony injury may result in bulbar urethral stenosis/stricture. The causes of non-traumatic strictures are indwelling catheterization, traumatic catheterization, infection, or idiopathy [7]. The clinical examination must look for associated external meatus stenosis, balanitis xerotica obliterans/lichen sclerosis changes, and degree of spongiofibrosis [8]. Box-shaped obstructed urine flow pattern in uroflowmetry is highly suggestive of urethral stricture. Cystourethrogram, which includes retrograde and antigrade urethrogram, confirms the diagnosis. Urethral ultrasound can delineate the degree and extent of spongiofibrosis. MRI of the urethra or pelvis is reserved for complex cases like associated multiple fistulae or associated rectal injury [7].

Traumatic stricture is often completely obliterating, with an apparent gap between the proximal and distal urethra. The principle of management of the traumatic stricture is excision of the fibrotic segment followed by an end-to-end anastomosis. To bridge the large gap, a “progressive approach” is utilized for tension-free anastomosis [9]. There are well-defined steps of progressive urethroplasty. These are urethral mobilization, crural separation, inferior pubectomy, and supra crural rerouting of the urethra. In certain complex cases where a very large gap or bladder neck is involved,

extended perineal or abdominoperineal approaches are advised [10]. Immediate endoscopic alignment is sometimes successful in a partial tearing of the urethra [11]. Delayed endoscopic alignment or core through light is described in literature, but long-term success is limited [12, 13]. Whenever traumatic injury to the urethra is suspected, a gentle attempt of catheterization can be made by an experienced health care personnel to drain the urine. If it fails, ultrasound guided suprapubic catheter (SPC) should be placed.

Nontraumatic bulbar strictures are often partially obliterating. Management includes urethral dilation, endoscopic incision, anastomotic urethroplasty, and substitution urethroplasty (transecting or non-transecting). Long-term success of urethral dilation and endoscopic incision is very poor. Substitution involve either a graft or a flap, depending on factors such as the length of the stricture, the health of the urethra, penis and perineum, the underlying cause of the stricture, and the experience of the surgeon performing the procedure. Nontransecting buccal mucosal graft urethroplasty is most preferred, with a high success rate for bulbar urethral stricture nowadays [14]. A recent meta-analysis reports that both nontransecting and transecting urethroplasty is equally good in terms of long-term success rate, but results of non-transsecting are better in terms of sexual dysfunction and penile complication [15, 16]. The buccal mucosal graft can be placed dorsally, ventrally, laterally, or in combinations (double-faced) [17, 18].

Endoscopic incision of short bulbar strictures (1-2 cm) using a cold knife is commonly performed by surgeons and preferred by patients due to its minimally invasive nature, shorter hospital stay, and lower cost. However, the long-term success of various endoscopic incision methods, such as a cold knife or laser, is similarly unpromising. While minor bleeding following urethral incision is quite common, severe bleeding that results in changes to vital signs and hemoglobin level is rare. In this report, we describe our experience with embolization of the bulbourethral artery in a patient who experienced significant, uncontrolled bleeding after a cold knife incision of the urethra.

#### 5. Conclusion

Super-selective embolization in life-threatening profuse urethral bleeding is safe and very effective.

#### Abbreviations

OIU	Optical Internal Urethrotomy
PVA	Polyvinyl Alcohol
USG	Ultrasonography
DSA	Digital Subtraction Angiography
LDPRBC	leucodepleted Packed RBC
CT	Computed Tomogram



## Conflicts of Interest

The authors declare no conflicts of interest.

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