

Intravesical explosion during transurethral resection of prostate: Prevention and management

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Abstract

The blast during transurethral surgery is a rare but known complication of transurethral resection of prostate (TURP) or transurethral resection of bladder tumors. It may lead to bladder rupture, which can be either extra- or intra-peritoneal requiring urgent laparotomy. It occurs due to the generation and trapping of explosive gases under the dome of the bladder. Even though this complication is rare, but the morbidity associated with this complication is high. Here, we present an interesting case report of an intravesical explosion during TURP leading to bladder rupture to remind urologists of this rare complication with suggestions on how to manage and prevent this complication.

Keywords: Bladder rupture, intravesical explosion, prostate

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INTRODUCTION

The blast during transurethral resection of prostate (TURP) is an extremely rare complication with high morbidity.^[1] It may lead to bladder rupture, which can be either extra- or intra-peritoneal requiring urgent laparotomy.^[1] Here, we present an interesting case report of an intravesical explosion during TURP leading to bladder rupture during TURP to remind urologists of this rare complication with suggestions on how to manage and prevent this complication.

CASE REPORT

A 71-year-old male planned for TURP for bladder outlet obstruction due to benign prostate enlargement (56 g). The procedure was started using a 26-Fr continuous flow

resectoscope with 1.5% glycine as irrigant. The monopolar electrocautery current was set at 80W for coagulation and 110W for cutting. During the last phase of the procedure, while hemostasis was being attempted at 12 O'clock position, a loud explosion was heard along with a sudden movement of the lower abdomen of the patient. The abdomen was soft and nondistended on examination. The endoscopic examination of bladder revealed a small rent at the dome. The procedure was concluded and a 20-Fr three-way Foley catheter was left indwelled per-urethra. We started irrigation with normal saline which returned clear fluid. The patient was planned for conservative management as he was hemodynamically stable. After 4 h, the patient complained of lower abdominal pain and abdominal distension. We did cystogram which showed an irregular margin near the dome of the bladder and free

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flow of contrast material in the peritoneum [Figure 1]. In view of the above findings, we explored abdomen by lower midline incision which revealed 1 liter hemorrhagic fluid in the peritoneal cavity and a 4 cm rent in the bladder at dome which was freely communicating with peritoneal cavity. Intestine, mesentery, liver, and spleen were inspected for any associated injury. Bladder was closed with 3-0 Vicryl in two layers in a water-tight fashion after indwelling a 20-Fr per-urethral three-way catheter and an 18-Fr two-way suprapubic catheter. The abdomen was closed with a drain in suprapubic region. The patient recovers well, and drain was removed after 2 days. On the 12th postoperative day, both catheters were removed after retrograde cystography which revealed normal intravesical wound healing without any leak. There was a remarkable improvement in urinary symptoms after surgery and patient is voiding well.

DISCUSSION

The most common cause of bladder perforation in transurethral surgery is overdistension of the poorly compliant bladder due to excess infusion of irrigation fluid when a continuous drainage system is not used. Intravesical explosion leading to bladder rupture is a rare event, and only 26 patients have been described till now in 20 case reports.^[2] Kretschmer was the first to describe two cases of a bladder rupture following TURP in 1934.^[3] Seitz *et al.* reported a case of intravesical explosion during TURP while attempting hemostasis at 12 O'clock in 2008.^[4] The intravesical explosions during TURP can present as minor pop sound suggesting a subclinical explosion to a loud explosion associated with bladder rupture.^[1] We routinely use continuous flow resectoscope which prevent overdistension of the bladder and also reduce entry of air bubble by reducing the frequency of manual irrigation.

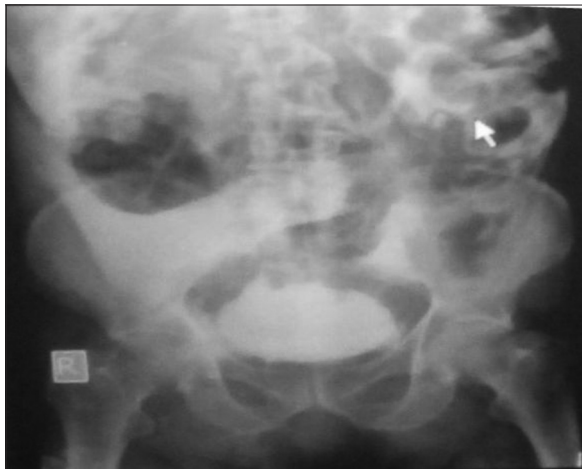


Figure 1: Cystogram showing free flow of contrast in peritoneal cavity

In our case, we heard a loud, explosive noise in a less distended bladder while attempting hemostasis, which strongly favor intravesical explosion. Hansen and Iversen stated that hydrogen (30%–65%) is the predominant gas produced, followed by oxygen (5%) and several other explosive hydrocarbons.^[4] The atmospheric air containing 21% oxygen may enter the bladder accidentally as a result of a leaking irrigation tube or by improper use of the Ellik evacuator bulb or during replacement of irrigation fluid bottles or whenever the resectoscope is opened for any reason during surgery.^[4,5] The high concentration of this accidentally entered oxygen and previously accumulated hydrogen forms a highly explosive gaseous mixture.^[4,5] The nature of the irrigation liquid does not appear to play an important role in bladder explosions.^[4] The amount of gas formed and the risk of explosion are proportional to the operating time which means that decreasing the time of resection decreases the risk of explosion.^[6] Explosion can be prevented by the use of cutting and coagulation current of moderate power, since the higher the temperature of the resectoscope loop the more gas is accumulated in the bladder.^[5,6] A continuous flow resectoscope is beneficial as chances of overdistension is less, and it also avoid entry of air bubble by reducing the frequency of manual irrigation. The entry of atmospheric air into the bladder should be minimized by proper use of the Ellik evacuator, by avoiding faulty irrigation system and by timely replacement of irrigation fluid. Using suprapubic pressure or placing the patient in the trendelenburg or anti-trendelenburg position may shift the air bubble away from areas of interest.^[5,6] The evacuation of air bubbles under the bladder vault continuously by percutaneous cystostomy or by placing a trocar may be done while resection of the large prostate. Trocar placement or percutaneous cystostomy is also beneficial in avoiding entry of air bubble by reducing the frequency of manual irrigation when using a closed system resectoscope. Simply angling the beak of the resectoscope sheath ventrally while emptying the bladder may evacuate air under the dome.^[6]

The loop should never be activated within the air bubble. Most of the cases can be diagnosed during the procedure. In clinical suspicion, the cystogram may be used to confirm any injury.^[6] Small bladder rupture can be managed conservatively by indwelling a per-urethral Foley catheter to provide rest to the bladder.^[6] Monitoring of urine output and hemodynamic parameters are helpful for assessment in conservative management. Large rupture may require either open or laparoscopic repair of bladder. While repairing bladder, we must also inspect other intraperitoneal organ for any injury. This case report highlights the fact that intravesical explosion leading to bladder rupture is a

rare but possible complication of TURP and all possible precautions should be taken to prevent this complication to avoid associated morbidity.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Khan A, Masood J, Ghei M, Kasmani Z, Ball AJ, Miller R. Intravesical explosions during transurethral endoscopic procedures. *Int Urol Nephrol* 2007;39:179-83.
2. Hirai E, Tokumine J, Lefor AK, Ogura S, Kawamata M. Bladder explosion during transurethral resection of the prostate with nitrous oxide inhalation. *Case Rep Anesthesiol* 2015;2015:464562.
3. Kretschmer HL. Intravesical explosions as a complication of transurethral electroresection: Report of two cases. *JAMA* 1934;103:1144.
4. Seitz M, Soljanik I, Stanislaus P, Sroka R, Stief C. Explosive gas formation during transurethral resection of the prostate (TURP). *Eur J Med Res* 2008;13:399-400.
5. Hansen RI, Iversen P. Bladder explosion during uninterrupted transurethral resection of the prostate. A case report and an experimental model. *Scand J Urol Nephrol* 1979;13:211-2.
6. Dublin N, Razack AH, Loh CS. Intravesical explosion during transurethral resection of the prostate. *ANZ J Surg* 2001;71:384-5.
1. Khan A, Masood J, Ghei M, Kasmani Z, Ball AJ, Miller R. Intravesical