

Case Report

Intravesical Explosion during Endoscopic Transurethral Resection of prostate

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Introduction

Transurethral resection of prostate (TURP) and bladder tumors is one of the most common surgeries in urology.⁽¹⁾ This approach is frequently being performed in most medical centers in Iran. Several intra-operative and postoperative complications of these surgeries have been reported in literature; but, one of the most uncommon complications of this technique is intravesical explosion during the surgery. Few cases of this complication have been reported.⁽¹⁻³⁾ We report 3 cases of intravesical explosion during TURP in patients with benign prostatic hyperplasia (BPH) and discuss its mechanism and the possible preventive measures.

Case Report

During our 15-year surgery experience, we had 3 cases of intravesical explosion in 3 patients with BPH who underwent TUR. The type of anesthesia was spinal and the bladder washing liquid was sterile distilled water. The cautery device used for these operations was a Martin ME 400 surgical unit (Gebruder Martin, Tuttlingen, Germany) and the coagulation and cutting powers were 60 W and 70 W, respectively. The resectoscope sheath used was 24 F with intermittent irrigation.

In all cases, the explosion occurred at the end of the operation while anterior lobe resection was being performed at 12 o'clock position. The noise of the explosion was heard and its vibration was

sensed in the suprapubic area. In 2 patients, the explosion was not accompanied by any significant complications, but in 1, the bladder was ruptured in the dome region. After the explosion, the returned amount of washing liquid decreased. On cystoscopy, a rupture was noted in the bladder dome, from which the intestinal loops were seen. The patient was secured in a position suitable for achieving a median suprapubic incision. On laparotomy, we noticed a 3- to 4-cm rupture in the bladder dome. The remained liquid was immediately evacuated and the rupture was repaired in 2 layers. A urethral catheter was inserted, and after 1 week, the patient was discharged without any complications.

Discussion

Intravesical explosion is an extremely rare complication during endoscopic prostate and bladder surgeries. A case of pelvic explosion during endoscopic pelvic tumor resection has been reported in 1991.⁽⁴⁾ Explosion is more prevalent during TURP than transurethral resection of pelvic and bladder tumors, because TURP is being performed more frequently.⁽³⁾ A mild explosion in the bladder generally does not cause complications; but, if it is severe, bladder rupture may occur, leading to severe complications especially when the surgeon does not notice the rupture and the treatment is delayed.

The explosion is caused by the explosive gases, mainly oxygen and hydrogen, which are formed during the procedure. About 30% and 3% of the released gases in bladder are H₂ and O₂, respectively.⁽⁵⁾ A flammable mixture of these

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gases and the air introduced into the bladder during TURP explode when resectoscope loop contacts the gases.⁽⁵⁾ The accumulated hydrogen, itself, does not cause explosion, but when mixed with oxygen, becomes flammable.⁽⁴⁾ These mechanisms have been demonstrated through in vitro studies.⁽²⁾ Intracellular fluid electrolysis results in the release of the explosive gases during cutting and resection of the organs due to the high temperature of resectoscope. The more is the temperature of the resectoscope, the more is the gas accumulation.^(5,6)

All the 3 cases of intravesical explosion occurred during the first 4 years of our experience. Thereafter, we considered some technical points which were anticipated to reduce the risk of explosion and subsequently, did not encounter this complication. Thus, to prevent intravesical explosion, we recommend the following measures: avoiding a high-temperature cautery during TURP; decreasing the mean time of tissue resection; using continuous irrigation sheets (because with intermittent sheet, some air enters the bladder during its evacuation that causes explosion); and evacuating the air in the

bladder using suprapubic catheter or suprapubic pressure during bladder dome tumor fulguration or during prostate anterior lobe resection (at 12 o'clock position). Gas enters the bladder, especially after tissue resection using an Ellik evacuator.

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