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BENIGN PROSTATIC HYPERPLASIA
ORIGINAL ARTICLE

Simultaneous antegrade and retrograde endoscopic surgery for benign prostatic hyperplasia with vesical calculi – A single-centre experience

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Cystolithotripsy

Abstract ***Objective:*** To describe the effectiveness and safety of our novel technique of simultaneous percutaneous cystolithotripsy with transurethral resection of prostate (TURP) for patients with benign prostatic hyperplasia (BPH) complicated with large vesical calculi.

Patients and methods: This was a retrospective analysis of 25 patients who underwent simultaneous percutaneous cystolithotripsy with TURP between January 2012 and January 2016. Technique: A 28-F Amplatz sheath was inserted percutaneously into the bladder after sequential dilatation under cystoscopic guidance. Percutaneous cystolithotripsy using a nephroscope and pneumatic lithoclast was then performed simultaneously along with monopolar TURP. Preoperative parameters

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ABBREVIATIONS

Q_{max}, maximum urinary flow rate

reviewed included: patient's symptoms, International Prostate Symptom Score, uroflowmetry pattern, prostate volume, and stone burden on ultrasonography of the abdomen and pelvis. Postoperative parameters analysed included: duration of irrigation, time until catheter removal, length of hospital stay, and complications.

Results: The mean age of the patients was 67.8 years. The mean prostate size was 62.28 mL and the mean stone burden was 3.18 cm. The mean operating time was 54.2 min. The mean time until catheter removal was 3.2 days.

Conclusion: Simultaneous percutaneous cystolithotripsy with TURP in patients with BPH with large bladder calculi is safe and feasible.

Introduction

Vesical calculus with BPH is a common problem encountered by the endourologist. Several options for management have been described including: non-invasive methods, such as lithotripsy; invasive techniques, such as open cystolithotomy; and minimally invasive transurethral and percutaneous cystolithotripsy. Each of these procedures has its own pros and cons, and the ideal management technique is still debated. The aim the present study was to describe our technique and analyse the outcomes of simultaneous percutaneous cystolithotripsy with TURP in patients with BPH complicated by large vesical calculi.

Patients and methods

Between January 2012 to January 2016, 25 patients with BPH with vesical calculus underwent simultaneous percutaneous cystolithotripsy with TURP. Patients with an IPSS of $\geq$20, maximum urinary flow rate (Q_{max}) of <15 mL/s, prostate volume >50 mL with significant post-void residue, and a stone burden of >2 cm or multiple stones with >2 cm diameter, were included in our study. Obese patients with a body mass index of >30 kg/m^2 were excluded. However, the presence of abdominal/pelvic scars was not a contraindication for surgery.

The records of the patients were retrospectively reviewed. Preoperative parameters reviewed included: patient's symptoms, IPSS, uroflowmetry pattern, prostate volume, and stone burden on ultrasonography of the abdomen and pelvis. Stone burden was estimated ultrasonographically by measuring the largest diameter of the vesical calculus. The operative details including operative time and blood loss were analysed. Postoperative parameters analysed included: duration of irrigation, time until catheter removal, length of hospital stay, and complications. All the surgeries were performed by the same operating team.

Surgical technique

With routine antibiotic prophylaxis (with a third-generation cephalosporin), all surgeries were performed under spinal anaesthesia in lithotomy. The operating room set-up is as shown in Fig. 1. The operative procedure included a combined antegrade and retrograde approach with two surgeons and two endoscopic monitors. Initial cystoscopy was done in all patients to assess the urethra, prostate, bladder, and stone burden. Under cystoscopic guidance with a distended bladder, suprapubic puncture was done and a 0.089 cm (0.035 in.) guidewire was passed (Fig. 2), the tract was dilatated with Alken metal dilators and a 28-F Amplatz was placed. The second surgeon simultaneously started the TURP and the median lobe was first resected using only the inner sheath and monopolar cautery with gravity assisted irrigation. Once the median lobe resection was complete, a 27-F nephroscope was placed through the Amplatz and stone fragmentation was started with a standard pneumatic lithotripter. Simultaneously, the lateral lobe resection was completed by the second surgeon. At the end of the procedure, a 16-F suprapubic catheter was placed and clamped. An 18-F three-way per urethral Foley catheter was placed and irrigation with normal saline was commenced.

Postoperative care included release of traction and removal of the suprapubic catheter on the first postoperative day. The Foley catheter was removed on the third postoperative day and the patient was discharged. Follow-up data included IPSS, uroflowmetry, and ultrasonographic post-void residual volume estimation at 3 and 6 months.

Results

In all, 25 patients were retrospectively analysed. The mean (range) age of the patients was 67.8 (54–78) years. Table 1 gives the patient details. The mean preoperative IPSS was 24.7. All patients were evaluated with preoperative uroflowmetry showing a mean (range) Q_{max} of 9.24

Fig. 1 Operative set-up including the two operating surgeons and the video consoles.

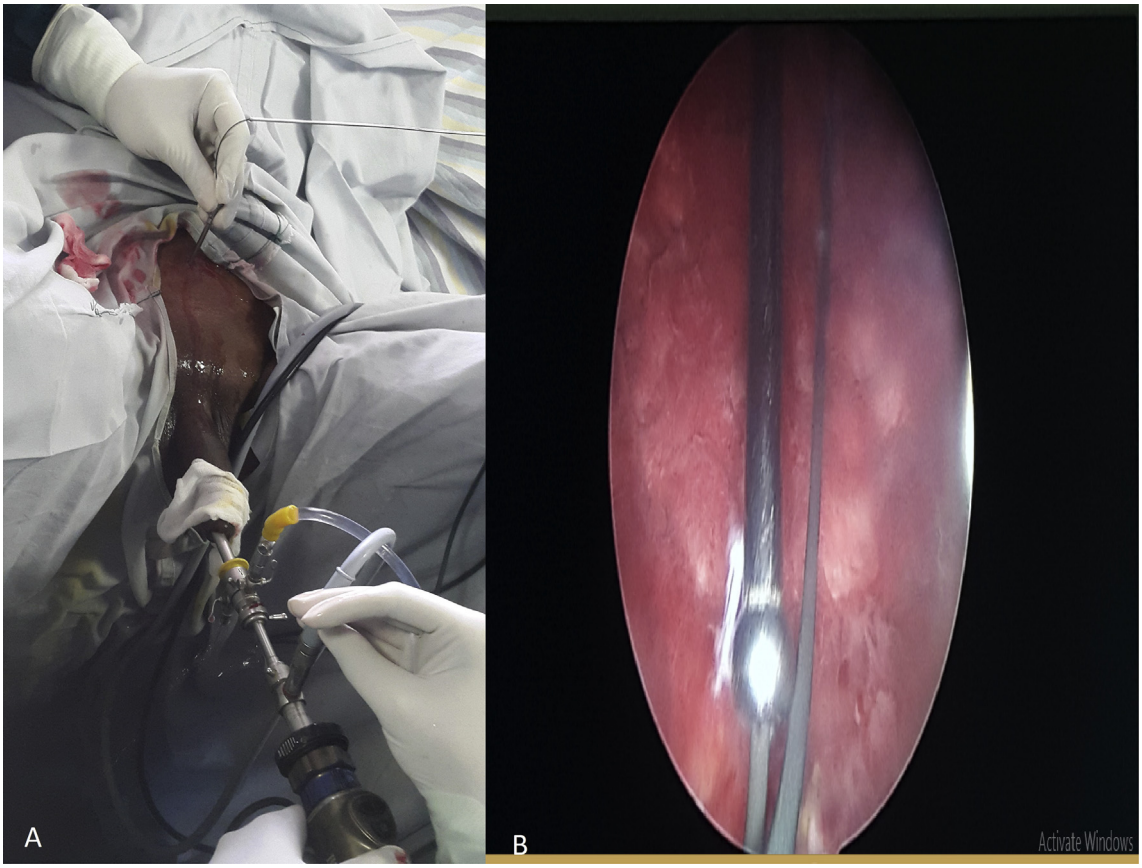

Fig. 2 (A) Placement of the suprapubic working port and (B) the central rod used along with guidewire prior to dilatation of the suprapubic tract.

Table 1 Patients' characteristics.

Characteristic	Value
Age, years, mean (range)	67.8 (54–78)
IPSS	24.7
Q_{max}, mL/s, mean (range)	9.24 (6–12)
Prostate size, mL, mean (range)	62.28 (50–68)
Number of vesical calculi, n/N (%)	
1	20/25 (80)
2	4/25 (16)
3	1/25 (4)
Stone burden, cm, mean (range)	3.18 (2–5)
Operative time, min, mean (range)	54.2 (30–90)
Mean time for catheter removal, days	3.2

(6–12) mL/s. On reviewing the ultrasonography reports, the mean (range) prostate size was 62.28 (50–68) mL and most of the patients had a solitary vesical stone (80%), with a mean (range) stone burden of 3.18 (2–5) cm.

The mean operative time was 54.2 min, and there were no significant intraoperative complications. None of the patients required conversion to open surgery. The mean time to catheter removal was 3.2 days. One patient required a prolonged catheterisation of 4 days due to haematuria needing irrigation. One patient developed fever postoperatively. None of the patients developed stricture or recurrence of stone postoperatively during our short follow-up period of 6 months.

Discussion

Bladder calculi account for ~5% of urolithiasis [1]. Over the last half century, with the improvement in nutrition, the epidemiology of vesical calculus has seen a drastic change and more so with the advances in endourological instrumentation, the management of the vesical calculus has evolved to a great extent.

Traditionally, bladder stones can be classified as migrant, primary, and secondary stones, wherein migratory stones are formed in the upper tract and are passed on to the urinary bladder. Primary calculi are seen in nutritionally deficient children and are endemic in some parts of Africa [2]. Secondary bladder calculi are usually associated with underlying conditions such as BOO, UTI, foreign bodies, urethral strictures, bladder neck contracture, pelvic organ prolapse, and neurogenic bladder dysfunction [3]. BOO accounts for >75% of the cases of secondary vesical calculi [3].

Management of the bladder calculus has undergone significant evolution over the last five decades. Various management options include non-invasive methods, such as chemolysis and shockwave lithotripsy and invasive options include open surgery, transurethral cystolithotripsy, and percutaneous cystolithotomy [4].

As per the guidelines issued by the European Association of Urology (2017), the vesical stone is a complication of BPH and surgical management is strongly recommended [5]. However, some authors have questioned this dogma by the use of shockwave lithotripsy for the management of BPH with bladder calculi. Millán-Rodríguez et al. [6] reported a stone-free rate of 93% when treating 50 patients with bladder stones and BPH in a prospective study, and concluded that the pre-treatment IPSS was the single most predictive factor for the need for prostatic surgery. However, further validation of this hypothesis by prospective randomised studies is required. Several studies report a need for adjunctive procedures such as cystoscopy in up to 17% of the patients treated with shockwave lithotripsy alone [7].

The transurethral and percutaneous techniques have revolutionised the management of vesical calculi. The transurethral approach is an incisionless surgery that uses the natural orifice for access; however, it is a laborious and time-consuming procedure for the endourologist despite advances in endourological instruments. The complication rate associated with transurethral surgery is reported to be in the range of 9–25% [7,8]. The shortcomings include bleeding, urethral trauma, loss of vision, mucosal injury, and the dreaded bladder perforation. The percutaneous approach to the bladder stone avoids the risk of urethral injury, whilst achieving high clearance rates [9]. The potential short-comings of this approach are incision-related injury to bowel/vascular injury, inadvertent loss of access, and extravasation.

Management of bladder calculi along with prostate can prove to be a time-consuming procedure, especially in patients with comorbidities who may not tolerate prolonged surgery. Conventionally, such patients undergo surgery for bladder stone either through a percutaneous or transurethral route followed by TURP and may require staged procedures for the same. Aron et al. [10] compared percutaneous vs transurethral cystolithotripsy and TURP for large prostates and large vesical calculi, and concluded that operative time was significantly lower in patients undergoing percutaneous surgery for bladder stones.

We used a novel technique of performing percutaneous cystolithotripsy simultaneously with TURP for the management of patients with BPH and vesical calculi. The advantages of this surgery being:

- Low pressure irrigation in the bladder with double irrigation.
- Excellent vision for both the operating surgeons.
- Shortened operating time.
- Useful for patients with comorbidities and at risk with prolonged anaesthesia.

The possible shortcomings of the procedure are chances of damage to the instruments that can be avoided with effective communication between operat-

ing surgeons, the dislodged stone fragments or prostate chips might hinder the operating surgeon, and lastly the need for additional man power.

To the best of our knowledge, only one randomised surgery comparing simultaneous TURP with percutaneous cystolithotripsy and transurethral resection of stone followed by TURP has been published [11]. Zhao et al. [11] concluded that ~1 h of operative time could be saved by performing a combined procedure. In our present study, the mean operative time was 54.2 mins compared to 71.6 mins as per the study by Zhao et al. [11]. The mean catheterisation time in our present study was comparable to the study by Zhao et al. [11]. Only one patient in our present study required prolonged catheterisation due to haematuria and none of the patients required conversion to open surgery.

Conclusion

Simultaneous percutaneous cystolithotripsy with TURP in patients with BPH with large bladder calculi is safe and feasible.

Conflict of interest

None.

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