Original Article

TRANSURETHRAL CYSTOLITHOTRIPSY FOR LARGE VESICAL CALCULI

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Objective: To asses efficacy and safety of transurethral cystolithotripsy in the management of large vesical calculi.

Material and Methods: Adult patients with large vesical calculi (>2.5cm) were selected for this prospective study. Patients with associated urethral stricture and big adenomas were excluded. Stone size was measured on ultrasound in the largest diameter. Patients were operated under spinal or general anaesthesia. Nephroscope with 28 fr sheath was used transurethrally along with 2 cm lithoclast probe. Initial fragmentation was achieved with Swiss lithoclast. Later bigger fragments were dealt with stone punch. In the end all fragments were evacuated with Ellick evacuater. Bladder was drained with Foley catheter for 24 hours. TURP (transurethral resection of prostate) was done if required. Patients with bigger glands were excluded to restrict operating time. Patients were followed up for two weeks.

Results: Forty patients were selected. Mean age of the patients was 55 years (range 18-73 years). There were 32 males (80%) and 8 females (20%). Mean+ SD stone size was 4.72+ 2.52 cm with range of 2.5-7.0 cm. five patients had multiple stones, four of them had associated neurogenic bladder. Procedure time ranged from 20-90 minutes (mean 45.8 minutes). Complete fragmentation of calcululi was achieved in all patients. Twelve patients underwent TURP under same anaesthesia. Time consumed on resection of prostate was not included in procedure time. There were no major complications.

Conclusion: Transurethral cystolithotripsy is very effective and safe for large vesical calculi (>2.5cm). It is time consuming but saves patients from hazards of open surgery.

Key words: Vesical calculus, cystolithotripsy, swiss lithoclast.

Introduction

Bladder stones are formed because of bladder outlet obstruction, infection, neurogenic voiding dysfunction or foreign bodies. In developing countries children are at high risk to form bladder stones in endemic areas. [1] Conventional cystolithotomy is still a standard procedure for bladder stones. It is generally a simple and short operation but is associated with inherent complications of tissue damage, scar formation, extended hospitalization and risk of wound infection.[2] With the advent of urological endoscopy, search has continued for minimally invasive procedures. Classical endoscopic treatment is mechanical fragmentation of bladder stones (up to 2.5cm) with stone punch. Bigger bladder stones have been a dilemma for urological endoscopist for a long time. Different modalities have been evolved to fragment urinary calculi. They are electrohydrolic, ultrasound, pneumatic and laser lithotriptors.[3] We used combination of Pneumatic lithoclast and Stone punch for transurethral fragmentation of large vesical calculi. Although procedure may be time consuming yet associated with less morbidity and is free of hazards of open surgery. Patients requiring TURP may undergo this procedure with cystolithtripsy under same anaesthesia.[3,4]

Patients and Methods

Patients with big vesical calculi (>2.5cm) were selected for this prospective study. Stone size was measured on ultrasound in the largest diameter. Exclusion criteria were patients less than than 18 years, associated urethral stricture and prostatic adenomas more than 40 grams (on abdominal ultrasound). Patients were evaluated with history, physical examination, routine urine examination, routine blood examination, serum creatinine, plain radiograph **(fig 1)** and ultrasound. Intravenous urography (IVU) and urethrogram were done, if required. Patients were operated under spinal or general anaesthesia. Nephroscope with 28 fr sheath was used per urethra along with 2 cm lithoclast probe. Initially lithoclast probe was drilled into the calculus using continuous mode of Swiss lithoclast and later on bigger fragments were dealt with stone punch **(fig 2).** In the end all fragments were evacuated with Ellick evacuator **(fig 3).** Bladder was drained with Foley

Figure-1: Plain radiograph showing big vesicle calculus.

Figure-2: Nephroscope & stone punch.

Figure-3: Stone Fragments.

Catheter for 24 hours. TURP (transurethral resection of prostate) was done in patients with obstructive glands. Patients with bigger glands were excluded to limit operating time. Patients were followed up for two weeks.

Results

Forty patients were selected. Mean age of the patients was 55 years (range 18-73 years). There were 32 males (80%) and 8 females (20%). Mean$\pm$SD stone size was 4.72$\pm$ 2.52 cm with range of 2.5-7.0 cm. five patients had multiple stones, four of them had associated neurogenic bladder. Procedure time ranged from 20-90 minutes (mean 45.8 minutes). Complete fragmentation of calculi was achieved in all patients. Twelve patients underwent TURP under same anaesthesia. Time consumed on resection of prostate was not included in procedure time. There were no major complications.

Discussion

Swiss lithoclast has become a standard modality to fragment ureteric and kidney stones for the last so many years. It has proved to be effective, safe and economical.[5-8] Nephroscope sheath can also be used transurethrally to pulverize bladder calculi with lithoclast probe. Once bigger calculus is broken, the smaller fragments are difficult to chase and stabilize against bladder wall with lithoclast probe. Stone punch is very effective and quick to deal with smaller stone fragments. Fragmentation of hard stones may be time consuming and cumbersome but associated with much minimal morbidity as compared to cystolithotomy. Cystolithotripsy of bladder calculi may be combined with TURP if required. Sinik et al have reported a series of 52 patients who underwent transurethral cystolithotripsy of bladder calculi and TURP under same anaesthesia. They found combination of two procedures safe and economical.[3] Similar results have also been reported by razvi et al.[4] In our series 12 patients had combined cystolithotripsy of bladder calculi and TURP with excellent results. However,we suggest that patients with large adenomas may be done in two sessions to limit operating time. Patients with neurogenic bladders are more prone to bladder stone formation. Some of them present with recurrent calculi. They are more likely to end up with complications after open surgery. Transurethral cystolithotripsy is a very useful and safe modality for such patients.[9] In our series four patients had associated neurogenic bladders.

Nephroscope sheath can also be used through

suprapubic route to fragment bladder calculi using pneumatic lithoclast. Shen et al found it very effective and quick as compared to transurethral cystolithotripsy and vesicolithotomy for large stones averaging 5.4cm.[2] Suprapubic route has also been effectively used in children for cystolithotripsy. It prevents urethral damage.[10]

Holmium laser has also been used in some centres to achieve fragmentation of big bladder stones with excellent results. Toshiyuki et al reported a comparative study of homium Yag laser and Swiss lithoclast for cystolithotripsy of bladder calculi. They found both modalities equally effective, however, they recommended holmium laser for bigger calculi.[11]

In children smaller bladder calculi may also be fragmented with pneumatic lithoclast through ureterorenoscope(URS) and fragments may be washed through cystoscope sheath. At times it becomes a nuisense to remove all stone fragments through smaller sheath. Degnari et al have reported 99 percent success in a series of one hundred patients using Swiss lithoclast and URS.[12]

A new version of intracorporeal lithotripter (Lithoclast ultra) has been developed which provides benefits of pneumatic and ultrasound lithotripsy (rapid fragmentation and fragment removal). Initial studies have revealed considerable reduction in procedure time. This device will be especially useful for giant bladder calculi.[13,14]

Conclusion

Combined use of pneumatic lithoclast and stone punch is very effective and safe for bigger vesical calculi. It can be safely combined with TURP. Procedure is time consuming but saves patients from hazards of open surgery. It is especially useful for patients with neurogenic bladders and patients unfit for open surgery.

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