TRANSURETHRAL NEPHROSCOPIC FRAGMENTATION OF LARGE URINARY BLADDER CALCULI USING PNEUMATIC SWISS LITHOCLAST

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ABSTRACT

Objective: To assess the out-come of Transurethral Nephroscopic Cystholithotripsy using pneumatic Swiss lithoclast in treatment of large urinary bladder calculi.

Material and Methods: This descriptive prospective study was conducted in the Institute of Kidney Diseases, Hayatabad Peshawar from January 2014 to May 2017. In this study we included all those patients with bladder stone size 3 cm or more assessed by pelvic ultrasonography and x-ray pelvis. Patients with bladder stone less than 3cm, age less than 25 years, previous bladder neck surgery were excluded. The outcome regarding stone clearance, length of procedure, any intra-operative complications were noted down in preformed proforma.

Results: A total number of 34 patients fulfilling the criteria were included in this study. There were 32 males and 2 female patients, and male to female ratio was 16:1. Mean age was 52.5years;mean stone size was 42.46mm. Stone clearance rate was 94.1%. In 2 (5.8%) patients, the procedure was abandoned due to bleeding. mean length of procedure was 55 minutes.

Conclusion: Transurethral nephroscopic cystholithotripsy with pneumatic Swiss lithoclast is a safe and effective procedure for the treatment of patients with large bladder stones.

Key words: Bladder stone, Cystholithotripsy, Nephroscope, Swiss lithoclast. etc.

INTRODUCTION

Bladder stone account for only 5% of overall urinary tract calculus disease. Most common cause of bladder stone formation is bladder outlet obstruction, apart from those which migrate from upper urinary tract and lodge in bladder[1,2]. Bladder stone affect males commonly in their forties and fifties, though 5% of bladder stone occur in female patients as well, most commonly due outlet obstruction, encrustation over foreign body or detrussor abnormalities.[3]

Bladder stone treatment has evolved too much throughout the medical history. Ammoniusin 200 BC, Celsius in the first century and the Hindu surgeon Susrutawere among the first to write about perinea lithotomy to treat bladder calculi.[4] Several treatment modalities are described for treatment of bladder stone, ranging from extracorporeal shock wave lithotripsy, percutaneous approach, open vesicolithotomy and most commonly employed transurethral route with variety of Endoscopic armamentarium.[5]

Factor determining the treatment modality include size, number and morphology of stone, status of lower urinary tract, concurrent pathology if any, surgeon preference, treatment cost and patient age.[5] The primary goal of any treatment modality is to achieve stone free status at cost of least morbidity, hospital stay and complication rate.

Suprapubic vesicolithotomy was introduced by Pierre Franco in 1500 AD[4,6] and still it is considered better option for large urinary bladder calculi due to limitations of transurethral minimal invasive procedures.

Open access has increased morbidity including prolong hospital stay, wound infection, urinary leaking, more pain, wound scar and prolong catheterization[8]. Another problem with open surgery is that subsequent surgery if ever needed again makes open surgical access to bladder technically challenging due to adhesions formation.

Perurethral approach decreases the morbidity but for large stones most of times, is not feasible. There are several energy sources available for stone fragmentation like mechanical (lithoclast), ultrasonic, electro hydraulic, manual lithotrite and laser[7]. Despite all these improvement in stone fragmentation the treatments of large stones is still challenging and oblige the urologist to go for an open surgical procedure in this era of minimal access surgery.

In this study we have shared our experience of treating large bladder stones via urethral approach using Nephroscope and Swiss pneumatic lithoclast for fragmentation of the stone and retrieval of fragments by

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evacuation with cystoscope and ellik.

MATERIAL AND METHOD

This study was conducted in the Institute of Kidney Diseases, Hayatabad, Peshawar between Jan 2014 to May 2017. In this study we included those patients having bladder stone size $\geq$3 cm of either gender, age $\geq$25 years, assessed by x-ray pelvis and ultrasound and who were clinically fit for the procedure. After explaining the procedure an informed consent was taken. We excluded those patients who did not consent; patient aged less than 25 yr or had previous bladder neck surgery in past or very large projecting median lobe.

After spinal anesthesia, each patient received pre-operative antibiotic. Initial cystouretherascopy was done with 30 degree Karl Storz cystoscope, to assess size, number, morphology and concurrent pathology if any prior to procedure. After that 26 Frnephroscopic sheet along with obturator was introduced. Sheet is left in situ and obturator removed and water irrigation started. Nephroscope along stout nephroscopic probe was introduced through sheet. Lithotripsy was performed with Swiss pneumaticlithoclast. Stone were crushed to small fragments. Fragments were removed by evacuation with ellik. Again cystoscopy was performed to assess clearance.16 Fr two-way folly catheters were placed in all patients and removed on first post-operative day if procedure was uneventful.

RESULTS

A total number of 34 patients fulfilling the criteria were included in this study. There were 32 males and 2 female patients and male to female ratio was 16:1. Mean age was 52.5 years with range (30 – 75years). Mean stone size was 42.46mm range (35-59mm). Stone cleared in 32 patients (94.1%). In 2 (5.8%) patient's procedure was abandoned due to bleeding. all 32 patients with successful procedure stayed one day in hospital. total length of procedure was (55 $\pm$5minutes).

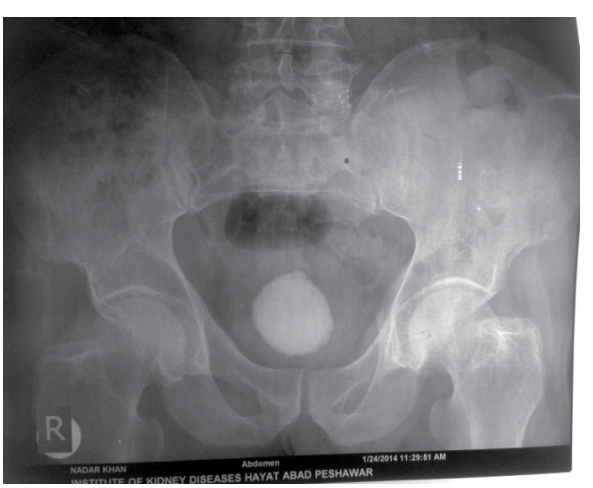

Figure-Large Urinary Bladder Stone

DISCUSSION

Vesicle calculi are common urological problem in Pakistan. Pakistan is included among those countries where the prevalence of this disease is higher[9]. Recurrent nature of urinary calculus disease often precludes open access surgery. Shock wave lithotripsy in the treatment of bladder stone is simple and easily tolerated without any intervention and need for anesthesia however for large stone it is less effective and stone clearance will take longer time.

Development of thinner and easy to use endo-urological instruments has made suprapubic and transurethral approach very attractive to the urologist for treatment of urinary bladder calculi disease. nowadays, open access surgery should be the main treatment modality in patients with heavy stone burden, abnormal anatomy preventing safe access for endo-urological methods or who are undergoing open prostatectomy and diverticulectomy[10,11]. Percutaneous use of nephroscopic cystolithotripsy is described in detail in literature[12,13] but experience with transurethral lithotripsy is limited.

Suprapubic placement of nephroscope compared to per urethral approach is difficult to handle because of difficulty in maintaining the bladder distention due to leakage. Beside this approach needs an open access which makes it disadvantageous[14]. Large size and rounded shape of bladder stone pose particular disadvantage for cystolitholepaxy with stone punch.

We described nephroscopic fragmentation of large calculus, using stout probe and lithotripter with subsequent retrieval with ellik.

In 1998, Maheshwari et al, presented a technique of transurethral cystolithotripsy with use of amplatz sheath for transurethral intervention in female with bladder stone[15]

In 2004, Okeke etc all demonstrated the same technique in male patients[16], where he described, using amplatz sheath after dilatation of urethra to 30 Fr and introduction of nephroscope with ultrasonic cystholithotripsy of large bladder stones.

He concludes that nephroscopic fragmentation with nephroscopic sheath is safe and effective method without any long-term morbidity

In our study the clearance rate was 94.1% which is comparable to the study done by SathayeUV[17]. Singh KJ et al in India compare transurethral nephroscope, cystoscopic and percutaneous nephroscopic for the treatment of bladder stone found 100% clearance rate in all three procedures and declared nephroscopic cystolitholepaxy the best among the three[18]. This proves that nephroscopic cystolithotripsy is safe and effective procedure with a very high rate of stone clearance.

Okeke z et all in New York used amplatz sheath

in cystolitholepaxy to treat large stone that need otherwise open or suprapubic approach.[16] we used only nephroscope which has smaller diameter than amplatz sheath with lesser pressure effect on urethra causing less harm to it theoretically.

Overall transurethral nephroscopic cystolithotripsy is very satisfactory procedure regarding the stone clearance. The only problem is its longer duration of operative time.

CONCLUSION

We concluded that transurethral nephroscopic fragmentation of urinary bladder calculi using pneumatic lithoclast is safe effective and feasible method of treating large bladder stone with a high rate of stone clearance. We suggest further studies in this regard to assess long term safety of procedure.

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