

ORIGINAL ARTICLE

The Efficacy, Safety and Complications of Litholapaxy for Bladder Stones

SAADAT HASHMI, IKRAM ULLAH KHAN, SHERGUL KHAN

Obaid Noor Hospital Mianwali

Correspondence: Saadat Hassan Hashmi, Consultant Urologist Obaid Noor Hospital Mianwali.

Mob: 03009487908 Off: 0459-235325 Email:saadathashmi2@gmail.com

ABSTRACT

Aims and Objectives: The study was conducted to evaluate the efficacy, safety, complications and the results of Litholapaxy for bladder stones

Study Type; Case Study

Place and Duration of study; Obaid Noor Hospital Mianwali from July 01, 2010 to June 30, 2013.

Material & Methods: This was a prospective case study conducted at Obaid Noor Hospital Mianwali in Urology Department. The patients were selected by simple random means. The procedure was based on the principles of endoscopic removal of bladder stones using mauremayer stone punch. The patients were evaluated by detailed history, clinical examination, ultrasonography, radiography, routine urine examination and urine culture and sensitivity test. We studied the results of 70 patients with bladder stones treated by cystolitholapaxy. The other concomitant pathologies were BPH, Stricture Urethra, and Bladder diverticuli which were treated by TURP and Optical Urethrotomy along with cystolitholapaxy. We also studied the complications and limitations of the procedure.

Results: All the patients were treated successfully with fewer complications. The overall success rate was 95.17%. There were no bladder perforation or excessive bleeding in any case requiring exploration. The complications included mild hematuria in 19(27.14%), pyrexia in 10(14.28%) and Suprapubic pain in 07(10%) patients.

Conclusion: The study shows that litholapaxy has reduced post operative complications and morbidity rate, shorter operative time and reduced period of hospitalization. Therefore it is safe, convenient and cost effective method for treatment of bladder stones.

Key Words: Bladder stone, Hematuria, Optical urethrotomy, Litholapaxy, Stone Punch

Acronyms: USG; Ultrasonography, BPH; Benign Prostatic Hyperplasia, KUB; Kidney Ureter Bladder, COPD; Chronic Obstructive Pulmonary Disease, TURP; Trans Urethral Resection Prostate

INTRODUCTION

Urolithiasis is a common clinical problem. The bladder stones have affected the human beings since ancient civilization. The famous historical personalities who developed bladder stones include King Leopold of Belgium, Napoleon Bonaparte, George V and Benjamin Franklin. The oldest bladder stone to be known in the history was found in the grave of a young man having age of 16 years, during excavation dated 4800 BC.^{01,02}

The bladder stones account for about 5% of urinary calculi.

There are various factors involved in the etiology and pathogenesis of vesical stones. These factors differ in children and adults. In children the risk factor for the bladder stones includes individual susceptibility to form bladder stone, genetic predisposition, metabolic abnormalities,

and environmental factors such as dietary practices, hydration status and climate⁰³. Vesical calculi may be classified as primary or secondary. Primary stones are found in kidney and make their way to bladder and stay there, while the secondary stones are due to bladder outlet obstructions especially in adults (BPH, stricture urethra). Prolonged catheterization, neurogenic bladder and foreign body are also a risk factor for bladder stone formation⁰⁴. The majority of bladder calculi are struvite (infection stones), but calcium oxalate and uric acid stones are also commonly seen⁰⁵.

Historically operations to remove bladder stones via the perineum were performed by Hindus, Greeks, Romans and Arabs. Celsus and Hindu surgeon Susruta first performed perineal lithotomy. Pierre Franco introduced suprapubic lithotomy. In early 1800s transurethral lithotomy was

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developed to avoid incision. This technique developed gradually until the Professor Henry J Bigelow performed and popularized the famous procedure litholapaxy in 1878. Thus dangerous operations by extravesical routes have been replaced by very safe transurethral and percutaneous procedures^{06,07}.

Nowdays There are several modalities for the treatment of bladder stone. Amongst them includes Transurethral cystolitholapaxy, lithotripsy in form of electrohydraulic, laser, ultra sonic and pneumatic lithotripsy. Others include percutaneous cystolitholapaxy and open vesicolithotomy. Open surgery has been the recommended modality for large stones⁰⁸.

In small or medium size bladder calculi upto 2.5cm endoscopic procedure such as cystolitholapaxy is very good modality of treatment⁰⁹. Litholapaxy should be avoided in patient with very large stone, small capacity bladder or stones within the diverticula because of fear of damage to bladder mucosa¹⁰. Thus cystolitholapaxy is an effective mode of treatment for small to medium sized stones¹¹.

As the bladder stone is a very common problem in Pakistan, its management needs special attention. So the purpose of the study was to observe the results, limitations, efficacy and complications litholapaxy for bladder stones

MATERIALS AND METHODS

EXCLUSION CRITERIA

The following Patients were excluded from the study

- 01 Children due to small caliber of urethra
- 03 Patients with small capacity bladder
- 04 Patients having bladder growth
- 05 Stones larger than 03cm in size
- 06 Patients having bleeding disorders.
- 07 Patients having skeletal anomalies, where it was not possible to place the patients in lithotomy positions.

INCLUSION CRITERIA

- 01 All the patients having signs and symptoms suggestive of bladder stones
- 02 Patients having radiological or ultrasonic evidence of bladder stones

This was a case study. The patients were selected by convenient simple random means. The study was conducted at Obaid Noor Hospital Mianwali. The duration of study was 03 years from Jul 01,2010 to Jun 30,2013.

Preoperative evaluation including history, clinical examination, complete blood examination, Renal function tests, Urine Complete examination, Urine Culture and sensitivity, Ultrasonography for KUB and X RAY pelvis were done before planning for surgery.

The patients were admitted on the day or one day before the surgery. Informed consent was taken. 45 patients were given spinal anaesthesia, 19 required epidural anaesthesia. 12 were given general anaesthesia, and 03 among 04 paraplegic patients required only local instillation of xylocain 2% gel because of loss of sensations. The antibiotic prophylaxis consisted of 03 doses of 1Gm of ceftriaxon at induction, 12 hours and 24 hours after the procedure. Prior to procedure cystourethroscopy using 30 and 0 degree telescope with 23Fr sheath was performed to look for size, number of stones and presence of other bladder and urethral pathologies.

The apparatus used for the procedure was mauremayer stone punch. The definitive procedure was started with introduction of visual obturator over stone punch sheath and bladder examination was done in both full and partially filled status. Then stone punch was inserted into the visual obturator and procedure was started. The stones were gradually fragmented by stone punch bites and relatively big stone fragments were removed by withdrawal of stone punch from visual obturator keeping the sheath in the bladder. The bladder was evacuated intermittently with Ellic evacuator for removal of small stone fragments. At the end of procedure the urinary bladder was completely cleared of stone fragments with ellic evacuator. The stone punch and sheath were removed and final check cystoscopy was performed to rule out bladder clearance. The duration of procedure ranged from 15 to 50 minutes with an average of 25 minutes. The patients were catheterized with 18Fr 02 way or 22Fr 03 way Foley catheter depending upon the hematuria. Usually the patients were discharged on the next morning after removal of Foley catheter. For patient having concomitant pathology, the hospital stay was 02 to 03 days for TURP and 01 to 02 days for Optical urethrotomy. The duration of catheterization was prolonged in these patients ranging 03 to 06 days for TURP and 10 to 14 days for Optical urethrotomy. In some cases bladder irrigation was required with normal saline upto 04 to 06 hours due to bladder trauma during the procedure. They were discharged

with advise for follow up visits at one week, one month, 12 months and 18 months intervals.

RESULTS

A total no of 70(n=70) patients were included in the study. Amongst these there were 42(60%)male and 28(40%) female patients. The male to female ratio was 1.5:1. The various age groups of patients were, 18 patients with age 21-40 years, 30 patients with age 41-60 years and 22 patients with age 61-72 years. The age of patients ranged from 21-72 years with mean age of 33+3.1. (Table 01). These patients presented with different urological symptoms comprising 20 (28.5%) presented with dysuria, 12 (17.14%) presented with frequency of urine, 07 (10%) presented with urgency, 15 (21.42%) presented with pyuria, 10 (14.28%) presented with suprapubic pain and 06 (8.5%) presented with hematuria. 03 (4.2%) had history of hematuria due to traumatic catheterization due to retention of urine (Table 02).

All the patients were clinically evaluated regarding co morbid conditions, fitness for anaesthesia and choice of anaesthesia. Amongst these 15 (21.42%) had COPD, 11 (15.71%) had ischaemic heart disease, 04 (5.71%) were paraplegic bedridden patients and 07 (10%) had mild chronic renal insufficiency. The size of stone ranged from 0.9cm to 3.0cm with an average size of 1.9+1.4cm. The stones were solitary single in 57 (81.42%) patients and multiple small stones in 13 (18.57%) patients.

Amongst 70 patients 03 (4.28%) required open surgical procedures due to relatively large size, hard texture, smooth rounded shape of stones.

The common complications during the procedure were hematuria / bleeding in 19 (27.14%) patients, pyrexia in 10 (14.28%) patients due to showering of bacteria during stone fragmentation, and nausea vomiting in 14 (20%) patients due to effects of anaesthesia. There was no bladder perforation in any case. The delayed complications at one week and one month follow up included burning micturition in 30 (42.85%) patients, hematuria in 19 (41.42%) patients, pyuria in 29 (41.41%), fever in 12 (17.14%) and suprapubic pain in 07 (10%) patients. The late complications at 12 and 18 months follow up were stricture urethra in 05 (7.14%) patients and bladder neck contractures in 03 (4.2%) patients. These strictures were soft and managed easily by optical internal urethrotomy (Table 03).

The data was recorded on excel (MS office) and

analysed by simple averages and means.

Table 1: Age Group of patients

AGE GROUP	NO OF PATIENTS
21-40	18
41-61	30
61-72	22

Table 2: Symptomatology of patients

DYSURIA	20(28.5%)
FREQUENCY	12(17.14%)
URGENCY	07(10%)
PYURIA	15(21.42%)
SUPRAPUBIC PAIN	10(14.28%)
HEMATURIA	06(8.5%)

Table 3: Complication of Cystolitholapaxy

HEMATURIA	19(27.14%)
PYREXIA	10(14.28%)
VOMITTING	14(20%)
BURNING MICTURATION	30(42.85%)
STRICTURE URETHRA	5(7.14%)

DISCUSSION

Bladder stones are hard built up of minerals that form in the urinary bladder. In under developed countries bladder stones are common in children due to environmental factors and malnutrition. The other causes in the children include anatomical abnormalities, genetic predisposition and metabolic abnormalities. Low protein diet, high carbohydrates diet and chronic dehydration also predispose to bladder calculi.

In adults the usual causes of stone bladder are bladder outlet obstruction such as benign prostatic hyperplasia and stricture urethra. The other cause of bladder stone include neurogenic bladder, foreign bodies and bladder diverticula.

Bladder stone may be found incidentally during evaluation of the patient with obstructive and irritative symptoms. Recurrent urinary tract infections are common with stones and UTIs are the risk factors for stone formation in urinary bladder. Small bladder stones may pass spontaneously but large stone, causing symptoms

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and retention of urine definitely required some form of surgical treatment.

Several management options for the bladder stone include cystolitholapaxy, percutaneous cystolithotomy and open cystolithotomy. The decision making for these different modalities depends upon the size, composition, location of stone, previous stone treatment, previous lower urinary tract surgery, patient morphology, age, concomitant medical condition, cost effectiveness and risks associated with the procedure.

Cystolitholapaxy with stone crushing forceps or optical stone punch/lithorite has been in the practice since 1800's. The stone is crushed manually with procedure, repeated several times until small fragments are produced which can be evacuated by Ellic evacuator¹². This is also very useful procedure where combined TUR-P for benign prostatic hyperplasia and litholapaxy for bladder stone is required^{13,14}.

Despite its efficacy, litholapaxy has certain contraindications like small capacity bladder, stone larger than 2.5 cm, hard stones, stones in children and inadequate urethra^{15,16}.

Kaur et al (1990) performed cystolitholapaxy in 45 patients over a period of 03 years. The overall success rate was 91%. They found that associated anomalies like enlarged prostate, stricture urethra and bladder neck contracture could also be dealt along with the procedure. The common complications associated with the procedures were burning micturition and mild hematuria in few patients¹⁷.

Marikar YM, Nair N et al (2009) also conducted study on 60 patients using different methods for bladder stones retrieval and found litholapaxy a feasible, convenient and safe method for treatment of bladder stones. The patients tolerated the procedure well and the results were comparable in different modalities¹⁸.

kamaal et al (2011) also conducted study on 67 patients. They performed different endoscopic techniques for removal of bladder stones. The techniques used were 01) Transurethral removal of bladder stone using nephroscope, 02) transurethral removal of bladder stone through stone punch and 03) percutaneous removal of bladder stones through nephroscop. Although superior results were obtained in group 03, the patients were completely cleared of stones in group 02 patients using stone punch for bladder stones¹⁹.

Sofer et al (2004) conducted study on 12 patients with bladder stones having size more than

40mm. They used both suprapubic and transurethral mechanical lithotripsy for removal of bladder stones simultaneously and found satisfactory results.²⁰

Samiullah et al (2007) compared the results of vesicolithotomy and transurethral cystolitholapaxy. The total no of patients in the study was 40 divided into two equal groups. They found optical cystolitholapaxy as a better way managing vesical stones as compared to vesicolithotomy due to minimal invasiveness and shorter hospital stay.²¹

Salman Tippu et al (2011) conducted study on 100 patients to compare the results of extracorporeal shockwave lithotripsy and litholapaxy in treating vesical calculi. The stone free rate after a single procedure was 76% in ESWL group and it was 72% in litholapaxy group. They also found litholapaxy as an effective procedure for removal of bladder stones.²² Nazar Ali Memon et al (2006) studied the results and efficacy of newer technique using Mauremayer stone punch for the percutaneous removal of bladder stones in the children. The total number of children was 130. The results were satisfactory in all cases having solitary and multiple stones.²³

Regarding efficacy, complications, hospital stay and post operative catheterization the results of various international and national studies were comparable to our study. The strength of the study could not be defined exactly as it was a case study and did not compare the results of litholapaxy with another modality for management of bladder stones.

In short bladder stone treated by cystolitholapaxy has reduced post operative complication and morbidity rate, shorter operation time and reduced period of hospitalization.

CONCLUSION

The study shows that litholapaxy has reduced post operative complications and morbidity rate, shorter operative time and reduced period of hospitalization. Therefore it is safe, convenient and cost effective method for treatment of bladder stones.

REFERENCES

1. ELLIS H A History of bladder stones. Journal Of the Royal Society of medicine Thomalla JV (JR SOC MED April 1979;72(4) :248-251
2. Thomalla JV. The Myth Of Stone, lithotomy history and hippocratic Oath. Indiana med 1989 June;82(6):434-9.

3. Ajay P Sharma, Guido Filler. Epidemiology of Paediatric Urolithiasis. Indian journal of urology , Dec 2010;86(4):516-522.
4. Schawrtz BF, stroller ML. The Vesical Calculi. Urol clin North Am 2000;27:333-46.
5. Menon M, Bhalcondra GP, Drach GW. Urinary lithiasis. Etiolgy, Digonasis and medical management. Campbell Urology, 7th 95 Philadodalpha WB Saunders 1998, pp2661-2733.
6. Satch M, Peters J. History of surgical instruments. 9. Surgical instruments and development of surgical technique of lithotomy incision. Zentralbi Chir, 1999; 124(11): 1059- 66
7. Keeman JN. Bladder stones and Lithotomy. A vanished ailment as the basis of urology Ned. Tijdschr Ggeneesk. 2006 Dec 23; 150(51) :2805- 12.
8. Bhatia v, Biyani CS. A comparative study of cystolitholapaxy and extra corporeal shock wave therapy for bladder stone. Urol Nephrol 1994; 26: 26-31
9. Asci R, Aybek Z, Srikaya, Buyukalpelli, Yilmaz AF. The management of vesical stone with optical, mechanical lithotripsy and transurethra prostatectomy is safe and affective. BJU Inter 1994; 84: 332-6.
10. Zhaowu Z, Xiwan, Fenling Z. Experience with electro hydraulic shock wave lithotripsy in the treatment of vesical calculi. Br J Urol 1988; 61: 498-500.
11. Razvi HA, Song Ty, Denstedt JD. Management of vesical Calculi: comparison of lithotripsy devices. J EndoUrol 1996. 10: 559-563
12. Smith JM, O Flynn JD. Transurethral removal of bladder stones: the place of litholapaxy. Br J Urol. 1977 Oct; 48(5): 401-5
13. Ritcher s, Ringel A, Sluzker D. Combined cystolithotomy and Transurethral resection of prostate best management Of infravesical obstruction and massive or multiple bladder stone. Urology 2002 May; 59(5): 288-291
14. Papastores AG, Verkis I, Dellis A, Deliviliotes C. Bladder lithiasis: From open surgery to lithotripsy. Urol Res. 2006 Jan; 34(3): 163-7 Epub Feb 10
15. Bhatia V, Bayani VG. Vesical lithiasis. open surgery VS cystolithotripsy VS extra corporeal shock wave Lithotripsy. J Urol 1994; 151: 660-62.
16. Mebust WK Transurethral surgery in walsh PC, Retek AB, Vaughan Ed Jr, Wein AJ (EDS): Campbell Urology 7th ed. philadalpha, WB Saunders, 1998, PP1511-1528.
17. Kaur P, Garge KM, Bhandar NS. litholopaxy. A fading art . J indian med- Association 1990 Jun; 88(6): 163-6.
18. Marikar YM, Nair N, et al. Retrieval methods for urinary stones. Urol Res. 2009; 37(6): 369-376
19. Kamal jeet singh, Jaspreet kaur. Comparison of different endoscopic techniques in managements of bladder calculi. Indian Journal of Urology. March 2011; 27(1): 10-13
20. Sofer M, Kover I, Greenstein A, Bar Yousaf Y, Mabjeesh NJ et al. Refinement in treatment of large bladder calculi: Simaltaneous suprapubic and Transurethral litholtripsy. Urology 2004 Oct; 64(4): 651-4
21. Samiullah, Chaudry IA, Masood R. A comparison of open vesicolithotomy and cystolitholapaxy. Pak J med Sci 2007; 23(1): 47-50
22. Salman Ahmad Tippu, Muhammad Jamaullah. Treatment of vesical calculi: Comparison of ESWL with litholapaxy ISMJ. vol 3; issue (1): 16-19
23. Nazar Ali Memon. Jan Muhammad Memon, Syed Qaisar Hussain Naqvi, Shafiq -u-Rehman Memon Percutaneous use of stone punch in the management of vesical calculi in children. A new treatment modality. Gomal J med Sci 2006; 4(1): 28-31.