ORIGINAL ARTICLE

A Comparative Study of Percutaneous Suprapubic Cystolitholapaxy Versus Open Cystolithotomy in Children

Rafique Ahmed Sahito, Muhammad Sharif Awan,Tufail Ahmed Baloch

ABSTRACT

Objective — *To compare the outcome of percutaneous suprapubic cystolitholapaxy with open cystolithotomy in children.*

Study design — *Comparative study.*

Place & Duration of study — *Department of Urology & Surgery, Peoples Medical College Hospital Nawabshah, from 2004 to 2007.*

Methodology — *Hundred patients (87 boys and 13 girls), from 1 to 10 years of age were enrolled in the study. The size of stones ranged from 8mm to 25mm. Patients were divided in two equal groups A and B. Group A submitted for percutaneous suprapubic cystolitholapaxy and group B for open cystolithotomy. The procedure was done under spinal and caudal anesthesia with intravenous sedation.*

Results — *Postoperative complications noted in group A patients included transient hematuria in 2 cases (p 0.495). Operative time in group A was 10 to 15 minutes while in group B it was 25 to 40 minutes (p 0.0005). Urinary leakage (n=2 - p 0.495) and wound infection (n=3 - p 0.242) were observed in group B. Duration of catheter placement was 2-3 days in group A, while 5 to 7 days in group B (p 0.0005). Hospital stay of group A was 2-3 days while 5-7 days in group B (p 0.0005). All patients became stone free.*

Conclusion — *Percutaneous suprapubic cystolitholapaxy is an efficient, safe, minimally invasive and cost effective method.*

Key words — *Bladder stone, Percutaneous suprapubic cystolitholapaxy, Open cystolithotomy, Spinal & caudal anesthesia, Children.*

INTRODUCTION:

Urolithiasis is common clinical problem since ages. Anthropologic history provides evidence that urinary calculi existed for ages as more than 7000 years old stone has been found in the pelvis of the Egyptian mummy.[1] Urinary calculi, especially bladder calculi, are rare in children in developed countries while they are common in developing countries.[2] During the past decade, transurethral lithotripsy has become an alternative to open cystolithotomy; however, the method is hampered in children with narrow caliber urethra.[3]

Correspondence:
Dr. Rafique Ahmed Sahito
Department of Urology, Peoples Medical College Hospital Nawabshah
E-mail: drrafiqueahmedsahito@yahoo.com

Bladder lithiasis treatment has been controversial at different points in history. Starting with first bladder cuts in Egypt and India, techniques were perfected over time leading to the procedure of open cystolithotomy.[4] This procedure was described by Hippocrates as early as the 3rd century BC. This operation remained the only method of treatment till Bigelow perfected the use of blind lithotrites.[5] Since then various surgeons have carried out work on cystolitholapaxy.[6]

In modern era of urology, the treatment of vesical calculi comprises of open suprapubic lithotomy, percutaneous suprapubic litholapaxy, endoscopic litholapaxy, electrohydraulic lithotripsy and extracorporeal shockwave lithotripsy.[7,8] There are reports in the literature about percutaneous treatment of bladder lithiasis that use same techniques as those employed in percutaneous nephrolithotomy.[9]

In Mexico Rodriguez-Esqueda and Cols used the percutaneous techniques, creating a tract with laparoscopic trocar and cannula for bladder stones.[10] Nazar and colleagues used percutaneous technique, creating tract with ordinary trocar and cannula to perform suprapubic litholapaxy. [11]

Conventional cystolithotomy is widely used as first line of treatment in Pakistan due to limited availability of endoscopic equipments and experience in endoscopic surgery.[12] Based on this information we have conducted a study of comparison of the two procedures i.e. open cystolithotomy and percutaneous suprapubic cystolitholapaxy in respect of operative time, hospital stay, duration of catheter placement and morbidity.

METHODOLOGY:

This comparative study with prospective data collection of 100 patients was conducted in the Departments of Urology & Surgery at Peoples Medical College Hospital Nawabshah from 2004 to 2007. All patients were evaluated with history and clinical examination, abdominal ultrasound and urine culture and sensitivity. Those patients who had vesical stones less than 30mm, age ranged from 1 to 10 years, of both sexes were included.

Patients with stone greater than 30mm, above the age of 10 years, history of previous bladder surgery, congenital anomalies had small capacity bladder were excluded. Cystouretheroscopy was performed in all patients for the confirmation of stones and other abnormalities of bladder.

Patients were divided in two equal groups A and B, 50 cases in each group. Group A were submitted for percutaneous suprapubic cystolitholapaxy and group B for open cystolithotomy. Surgery was done under caudal and spinal anesthesia with intravenous sedation. Bladder was filled with normal saline. A transverse incision of 1-2 cm, was made about one finger above the pubic symphysis. The ordinary trocar and cannula were used to enter the bladder. Stone punch was used through trocar, and the stone crushed in small pieces and removed with flushing. Finally stone clearance was confirmed. The wound was closed with one or two stitches. The catheter was placed to drain the bladder. Comparative data regarding operative time, hospital stay, duration of catheter placement and morbidity were collected. Patients were followed up for one year. Mann – Whitney test and Fisher's Exact Test were applied to analyze the data.

RESULTS:

Complete clearance of stone was achieved in all cases. No significant intra-operative and postoperative complications (Table I) were noted in group A patients except transient hematuria in 2 cases (p 0.495), which resolved spontaneously. Operative time in group A was 10 to 15 minutes while in group B it was 25 to 40 minutes (p 0.0005). Less amount of analgesia was required in group A as compared to group B. Urinary leakage in 2 cases (p 0.495), wound infection in 3 cases (p 0.242) were observed in group B. Duration of catheter was 2-3 days in group A, while 5 to 7 days in group B (p 0.0005). Hospital stay of group A was 2-3 days while 5-7 days in group B (p 0.0005).

DISCUSSION:

Bladder lithiasis is one of the oldest pathologies known to man and its treatment has been a subject of discussion throughout history.[13] Vesical calculi are common urological problem in Pakistan. Pakistan is included among those countries where the prevalence of this disease is higher.[14] About 25% of the patients with urinary stone have a family history.[15] A solitary bladder calculus is usual, although multiple stones are found in 25% of cases. Vesical calculi are either primary or secondary.[16] Majority of the patients present with irritative bladder symptoms.

Table II: Comparison of Two Surgical Procedures

Parameters	Purcutaneous suprapubic cystolitholapaxy (Group A)	Open cystolithotomy (Group B)	p- value
Incision	1-2 cm	3-4 cm	0.0005
Operative time	10-15 minutes	25-40 minutes	0.0005
Duration of catheterization	2-3 days	5-7 days	0.0005
Hematuria	2 cases (transient)	--	0.495
Wound infection	--	n=3	0.242
Urinary leakage	--	n=2	0.495

Various techniques have been used to remove calculi from the bladder including open cystolithotomy, transurethral lithotripsy.[17,18] Open surgery has the inherent problems of long scar, prolonged catheterization, extended hospitalization and risk of infection.[19] In children, specially in boys, because of the size limitation secondary to the small urethra and concerns about iatrogenic urethral stricture, transurethral endoscopic removal may be more difficult and fraught with danger. Gopala Krishnan and colleagues were the first to report the use of a percutaneous suprapubic approach in managing bladder calculi.[20] The morbidity of percutaneous suprapubic approach is significantly less than that of open cystolithotomy.[2,3]

In the study, an incision of 1 to 2 cm above the pubic symphysis with distended bladder without fluoroscopy was used while Salah and co-workers made puncture under fluoroscopy.[2] Agrawal and colleagues had also performed the procedure without fluoroscopy.[3] In our series the operative time was 10 to 15 minutes in group A while Nazar and colleagues reported 15 minutes.[11] In Group B operative time was 25 to 40 minutes. Transient hematuria occurred which resolved spontaneously in group A while Camacho and co-workers also observed hematuria, which resolved within 24 hours.[13] The hospital stay was 1 to 3 days in group A while 5 to 7 days in group-B, which was also reported by Bhatia and Biyani.[21] They also reported that the duration of catheterization after cystolitholapaxy was less, which was similar to our group A patients. It seems that percutaneous suprapubic approach for vesical calculi in children is efficient, with a low frequency of complications and offers shorter hospital stay compared to open surgery.

CONCLUSIONS:

Percutaneous suprapubic cystolitholapaxy is efficient, safe with low incidence of complications and minimally invasive technique for treating bladder calculi in children. It has definite edge on open cystolithotomy. It had reduced hospital stay and overall cost with imperceptible scar.

REFERENCES:

1. Riches E. The history of lithotomy and lithotripsy. Ann R Coll surg Engl 1968; 43:185.

2. Salah MA, Holman E, Toth C. Percutaneous suprapubic cystolithotripsy for pediatric bladder stones in a developing country. Eur Urol 2001; 466-70.

3. Agrawal MS. Percutaneous suprapubic cystolithotripsy for vesical calculi in children. J Endourol 1999; 13:173-5.

4. Sevilla CC, Garcia PX, Villavicencio MH. Breve historia del tratamien to de la lithisis vesical. Actas Urol Esp 2005;29:923-6.

5. Bigelow HJ. Lithotripsy-a single operation: Boston Med Surg J. 1879;98:259-91.

6. Barnes RW, Bergman RT, Worton E. Litholapexy versus cystolithotomy J Urol 1963;89:680-1.

7. Diamond DA. Clinical patterns of pediatric Urolithiasis. Br J Urol 1991;68:195-8.

8. Bukhari AQS. Urolithiasis: its incidence in Pakistan, its prevention and treatment. J Coll Physicians Surg Pakistan 1993;3:129-32.

9. Ikari O, Netto NR, D'Ancona CA, Palma PC. Percutaneous treatment of bladder stones. J Urol 1993;149:1499-1500.

10. Rodriguez EM, Ricardez EA, Pamanes OA, Torres SJ, Silva NE, Campos CJ, Villasenor LM, Aguilera PO, Nader OT, Tratamiento con lithoclast de litiasis vescial. Rev Mex Urol 2000; 60:20-4.

11. Nazar AM. Percutaneous use of stone punch in the management of vesical calculi in children: a new treatment modality. Gomal J Med Sci 2006;4:28-31.

12. Ullah S, Chaudhary IA, Masood R. Comparison of open vesicolithotomy and cystolitholapexy. Pak J Med Sci 2007; 23:47-50.

13. Camacho-Trejo VF, Aragon-Tovar AR, Puente JC, Castillo-Gonzalez JM, Vargas Valtierra P. Percutaneous treatment of bladder lithiasis: comparison of two surgical techniques. Rev Mex Urol 2008; 68:318-23.

14. Menon M, Resnick MI. Urinary litihisasis; etiology, diagnosis and medical management. In: Relic AB, Vaughen ED, Wein AJ ED Compell's urology 8th edition saunders London, 2002;30229-35.

15. Curhan GC, Willett WC, Rimm EB, Stampfer MJ. Family history and risk of kidney stones. J Am Soc Nephrol 1997; 8:1568-73.

16. Qureshi K, Oakley N, Hastiek management of urinary tract calculi. Surgery Int 2003; 60:285-90.

17. Cain PM, Casale AJ, Kaefer M, Yerkes E, Rink RC. Percutaneous cystolithotomy in the paediateic augmented bladder. J Urol 2002; 168:1881-2.

18. Mehran MR, Dawaba MS. Cystolitholapexy versus cystolithotomy in children. J Endourol 2000; 14:423-6.

19. Maheswari PN, Oswil AT, Bansal M. Percutaneous cystolithotomy for vesical calculi: a better approach. Tech Urol 1999; 5:40-2.

20. Gopalakrishnan G, Bhaskar P, Jehangir E. Suprapubic lithotripsy. Br J Urol 1988;62:389.

21. Bhatia V, Biyani CK. Vesical lithiasis: open surgery versus cystolithotrispy versus extra corporeal shock wave therapy. J Urol 1995; 151:560-62.