

# PERCUTANEOUS USE OF STONE PUNCH IN THE MANAGEMENT OF VESICAL CALCULI IN CHILDREN: A NEW TREATMENT MODALITY

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## ABSTRACT

**Background:** To evaluate the efficacy, safety and results of a newer technique, using Mauermayer stone punch for percutaneous bladder stone removal in children.

**Material and Methods:** It was a prospective study from November 2000 to November 2004, in the Department of Urology, Peoples Medical college hospital Nawabshah, Pakistan. One hundred and thirty children having vesical calculi of various sizes were included in this study. The procedure is based on principal of percutaneous removal of bladder stones, using ordinary trocar cannula under video-cystoscopic visualization and Stone punch to extract/fragment the stones. These children were evaluated by detailed history, clinical examination, ultrasonography, Radiography of urinary tract, urine routine examination, urine culture and blood urea. These patients, who were otherwise candidates for open cystolithotomy, were treated percutaneously using suprapubic approach.

**Results:** Satisfactory results were obtained in almost all cases having solitary and multiple stones. In selected cases urethral damage, operating time, hospital stay and cost can be decreased to minimum with this simple technique.

**Conclusion:** This study shows that suprapubic percutaneous route can be employed as an alternative procedure to previously reported different percutaneous modalities where percutaneous nephrolithotomy instruments, laparoscopic instruments, percutaneous vacuum sheaths and other trocar and stone forceps have been utilized for removal of vesical calculi.

**Key words:** Percutaneous cystolithotomy, Litholapaxy, Vesical calculi.

## INTRODUCTION

Bladder stones in the paediatric age group are a common problem especially in developing countries and are conventionally managed by open cystolithotomy irrespective of stone size. Open cystolithotomy is definitely associated with problems of postoperative pain, long scars, prolonged catheterization, extended hospitalization, risk of wound infection and increased over all cost of treatment. Transurethral litholapaxy also requires special instruments that carry a risk of urethral trauma particularly in children, which could lead to urethral stricture.<sup>1</sup>

Open cystolithotomy was described by Hippocrates as early as the 3<sup>rd</sup> century BC. This operation remained the only method of treatment till Bigelow<sup>2</sup> perfected the use of blind lithotrites. Since then various surgeons have carried out work on cystolitholapaxy.<sup>3-7</sup>

Transurethral Optical litholapaxy has established itself as the procedure of choice for the treat-

ment of vesical calculi in adults. How ever it is potentially dangerous in children due to disparity between the size of instrument and urethral caliber. More over transurethral cystolitholapaxy in children can not be safely employed for larger and hard stones.<sup>8</sup>

Recently other treatment modalities have been utilized in the form of ultrasonic lithotripsy,<sup>9</sup> pneumatic lithotripsy and ESWL<sup>10,11</sup> to disintegrate bladder stones in children. All these newer technologies require special equipments and are time consuming and may prove difficult to operate at times due to lack of control on the stone. Hence to solve these problems, use of an other newer simple percutaneous treatment modality has been utilized and evaluated in peadiatric vesicolithiasis.

## MATERIAL AND METHODS

One hundred and thirty children having vesical calculi were underwent for percutaneous removal

of stone(s) over a period of four years, extending from November 2000 to November 2004 in the department of urology, PMCH Nawabshah. Patients age ranged from 11 months to 14 years and stone size ranged from 5mm to 2.5 cms. Of these 130 patients, 15(11.53%) were females and 115 (88.46%) were males. Fifteen 15 (11.53%) had recurrent stones after open surgery.

Diagnostic work up included Blood complete, urinalysis, urine C/S, renal function profile, x-ray KUB and ultrasonography of urinary tract. Procedure was done under general anesthesia. Preliminary urethrocystoscopy was routinely carried out in every patient to confirm the presence of calculi and the bladder was filled with saline. After making a 1 cm transverse suprapubic skin deep incision, the distended bladder was entered using sharp ordinary trocar cannula 28 FG. Majority of smaller stones were extruded spontaneously on removal of trocar, while rest of the smaller stones were retrieved using Mauermayer stone punch under direct optical control, while still bigger stones were removed bit by bit using stone punch. Bladder cleared of stone fragments and drained, using Foleys urethral catheter of appropriate size

**RESULTS**

Complete stone clearance was obtained in almost all cases. Mean operating time was 15 min-

**Table-1: Complications during the procedure.**

S. No.	Complications	Number of patients	Percentage
1	Supra-pubic urinary leakage	3	2.30%
2	Bladder rupture	2	1.53%
3	Gross haematuria	4	3.07%

**Table-2: Pre-procedure and post-procedure details of patient.**

Parameter	Range
Age	11 months - 14 yrs
stone size	5mm- 2.5 cm
Operating time	15- 30 minutes
Duration of catheterization	48- 72 Hours
Hospital stay	2- 3 Days
Stone clearance	100%
Complication rate	6.92%

utes, no serious complications were observed except supra-pubic urinary leakage in 3 (2.3%) cases, requiring change of catheter, rupture of bladder during filling of bladder in 2 (1.5%) cases (converted to open vesicolithotomy) and transient gross haematuria in 4 (3.07%) cases which resolved spontaneously. Duration of urethral catheterization was 48-72 hours. Hospital stay was 1-3 days. Punctured wound healed nicely leaving behind imperceptible scar.



Fig-1: Procedure in progress.



Fig-2: Instruments required for the procedure.



Fig. 3: Suniplast Dressing



Fig. 4: Post Operative Scar

## DISCUSSION

Bladder stone disease in children is a very common problem in our locality and all over the country. Different modalities are being used for the removal of bladder stones trans-urethrally like pneumatic, ultrasonic and electrohydraulic lithotripsy, but all these modalities require transurethral instrumentation which is potentially dangerous to urethra resulting into urethral stricture disease. Further more all these techniques need costly equipments and are not suitable for every size and type of stone. Therefore the cost and stone factors limit the use of these procedures. There have been many reports on percutaneous approach to the bladder for removal of stones using various techniques there by limiting the urethral instrumentation to the minimum<sup>12-23</sup>. But all these techniques are associated with certain technical and economical problems in terms of stone retrieval, fragmentation, bladder clearance, expertise and cost of instruments respectively. To overcome these problems our technique of percutaneous removal of bladder calculi in children is relatively simple, cheap, effective and safe and easy to master. In this new technique ordinary trocar and cannula and a stone punch is to be required to approach the bladder supra-pubically and to remove or break the larger stones with direct control over the stones, hence avoiding instrumental urethral injury. In this new percutaneous approach using stone punch, the access to the bladder, optical visualization and control of stone is excellent. The youngest child in our series was 11 months old and the minimum operating time was only 15 minutes. The incision used for insertion of trocar and cannula was very small (1 cm) and requiring a single subcutaneous stitch in almost all cases and dressed with a single strip of suniplast. There was urinary leakage from puncture site in only three cases due to malfunctioning urethral catheter and was managed by changing the catheter. In 2 cases bladder ruptured during filling of bladder with saline which required conversion to open vesicolithotomy. The stone grasping and breaking power with stone punch was superb, hence large and hard stones can be removed easily with complete stone clearance at the end of procedure. Our experience in this large series has clearly shown that supra-pubic percutaneous litholopaxy /vesicolithotomy in children, using Mauermayer stone punch as a new application, is safe, quick and cost effective procedure and is widely applicable for all type of stones irrespective of size, number, morphology, urethral anatomy and age of patient.

## CONCLUSION

Percutaneous endoscopic removal of bladder stones is a minimally invasive approach and has definite edge on open surgery. It is a newly estab-

lished minimally invasive and safe percutaneous endoscopic treatment modality for the management of vesical calculi in children. It could be a simple alternative to other newly described percutaneous and transurethral endoscopic options. It provides excellent access to the bladder and good control of the bigger and harder stone(s) in terms of retrieval / fragmentation.

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