



Vesical stone management by percutaneous cystolitholapaxy versus open vesicolithotomy among children.

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ABSTRACT... Objective: To compare outcomes, safety and complications of vesical stone management among children by open vesicolithotomy versus percutaneous cystolitholapaxy. **Study Design:** Cross Sectional study. **Setting:** Department of Urology and Kidney Transplantation Pir Abdul Qadir Institute of Medical Sciences Gambat. **Period:** July 2020 to December 2020. **Material & Methods:** Children with vesical stone, having age 1-12 years and fulfilling inclusion criteria were selected for this study. Total 50 cases were selected using non-probability consecutive sampling technique. Patients were divided into two groups Group-A and Group-B on the basis of given treatment each group containing 25 cases. Patients in Group-A were underwent open vesicolithotomy and those in group-B were underwent percutaneous cystolitholapaxy. Procedure was done under general anesthesia. Alken metallic dilators were used for the dilatation of tract. Adult nephroscope with 24Fr sheath was used. Postoperative outcomes of both methods were compared with each other. Pneumatic fragmentation was used to break stones > 1.5cm in size. **Results:** Total 50 cases were studied, 25 cases in each group-A and group-B. Stone size was 1-3 cm in both groups. Age range of the patients was 1-12 years with mean age of 4.25 ± 1.4 years. Mean hospital stay was 2.6 days in group-A and 1.3 days in group-B. Mean requirement of analgesia (ketorolac) was 30.2mg in group-A and 14.8mg in group-B. Most common postoperative complication was fever observed in 28% cases in group-A and hematuria observed in 24% cases in group-B. **Conclusion:** Percutaneous cystolitholapaxy is a minimal invasive procedure suitable among children with high success rate and minimum complications like postoperative fever, hematuria, urinary leakage and pain.

Key words: Open Vesicolithotomy, Percutaneous Cystolitholapaxy, Vesicolithotomy, Vesical Stone.

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INTRODUCTION

Urolithiasis is a very common disease in Asian countries.¹ Among children vesicolithiasis is very common. Bladder stones are crystals formed by protein and minerals in urine which precipitate and accumulate in bladder ultimately converting to a solid stone.² Vesicolithiasis account for 5% of total urinary tract stones. Vesical stone is also called bladder calculi or cystoliths.³ In developed countries its incidence has been reduced but in underdeveloped and developing countries like Africa, South and East Asia and Middle East it is still a very common problem. In Pakistan its incidence is 31%.⁴ Its incidence is more among boys than girls and especially high incidence in age above 50 years.^{3,4} Peak incidence among

children has been noted at the age of 5 years. According to a report about 1-19.1% population suffer from urolithiasis.⁴ Epidemiological data revealed that stone formation among children is due to nutritional deficiency of phosphates due to replacement of milk products by carbohydrates leading to the formation of insoluble salts and high excretion of ammonia.⁵ Other causes include excessive use of oxalate rich foods and low animal proteins. Among girls due to short urethra mostly stone debris is excreted easily and does not retain in bladder so that's why incidence of vesicolithiasis is low. In males stone debris is retained in bladder and accumulates to form vesical stone.⁶ Growth of stone depends on deposition and reabsorption of insoluble salts

which continue for years.⁷ Common presenting complaints among patients with vesical stone are lower abdominal pain, burning micturition, urinary interruption and rubbing and pulling of penis, frequency, dysuria and urinary retention.⁸ Usually vesical stone is removed by open vesicolithotomy but with the advancement in medical field minimal invasive procedures are now being used for vesical stone removal.⁹ These procedures include trans-urethral stone fragmentation using holmium laser or intra-corporeal cystolithotripsy, percutaneous cystolithotripsy and vesicolitholapaxy. These all methods are cost effective with low morbidity, minimum complications and short hospital stay required.¹⁰ This study has been conducted so that we may document our experience.

MATERIAL & METHODS

This is a cross sectional study conducted in urology and kidney transplantation Pir Abdul Qadir Institute of Medical Sciences Gambat. Study was completed in six months duration from July to December 2020. Sample size was calculated using WHO sample size calculator. Patients' selection was done using non-probability consecutive sampling technique.

Patients were divided into two groups depending on the treatment given. In group-A patients underwent open vesicolithotomy and in group-B percutaneous cystolitholapaxy was done for vesical stone removal. Age range of patients was 1-10 years. Male and female both types of patients were included. Patients not operated previously and having stone size <3cm were included in this study. Postoperative outcomes were evaluated in terms of hematuria, requirement of drain placement, postoperative pain, analgesia requirement and mean duration of hospital stay. Informed consent was taken from all the study patients in written form. Ethical approval was taken from ethical review board of the study institution (AMC/PGMI/LGH/Article/Research No/00-175-20). Cystoscopy was done in all patients. Stones in urethra were pushed back into bladder to examine properly. Nephroscope with 24Fr sheath was used for PCCL (percutaneous cystolithotomy). PCCL was done in modified lithotomy position after filling urinary bladder fully

with 8fr feeding tube. 18 gauge spinal needle was inserted into bladder via suprapubic route, guide wire passed, serial dilatation done, nephroscope with 24Fr sheath passed into bladder and stone examination was done. Stone removed with triple jaws stone grasper. Among the patients undergoing open vesicolithotomy nelton drain placed in perivesical area for 24 hours and foleys catheter retained for 03 days and among the patients undergoing PCVL only Wound closed and foleys catheter retained for 3 days. Ketorolac 10mg was given I/V for pain relief. Data was documented and analyzed using SPSS-21. Chi square test was applied. P-value < 0.05 was considered statistical significant. Percentage and frequencies were calculated for qualitative variables. Means and standard deviation were calculated for quantitative variables using student t-test. Results were depicted using tables and graphs.

RESULTS

Total 50 cases were included in this study. Two groups were made each comprising on 25 cases. In group-A 15(60%) were male and 10(40%) were female cases, mean stone size was 2.8cm, mean age was 4.8 ± 2.6 years. In group-B 17(68%) were male and 08(32%) were female cases, mean stone size was 1.9cm and mean age of the patients was 3.7 ± 1.4 years.

In group-A fever was observed in 07(28%) cases and hematuria in 06(24%) cases, while in group-B fever was observed in 02(08%) cases and hematuria in 03(12%) cases. Foleys catheter was retained for 03 days and nelton drain for 24 hours in group-A, and in group-B foleys cystostomy tube was retained for 24 hours. Ketorolac was given as analgesia 10-40mg mean dose 30.2 ± 5.38 mg in group-A and 10-20 mg mean dose 14.8 ± 9.65 mg in group-B.

Hospital stay was 2-3 days with mean stay of 2.6 ± 0.65 days in group-A, and 1-2 days with mean stay of 1.3 ± 0.52 days in group-B. Duration of surgery was 60-80 minutes with mean duration of 70.5 ± 13.24 minutes in group-A, and 30-50 minutes with mean duration of 40.6 ± 8.86 minutes.

Patients Characteristics	Group-A (%=N/50)	Group-B (%=N/50)	P-Value
Age (years)			
1-3	02 (04%)	03 (06%)	>0.05
4-6	05 (10%)	07 (14%)	
7-9	10 (20%)	06 (12%)	
10-12	08 (16%)	09 (18%)	
Total	25 (50%)	25 (50%)	
Mean stone size (cm)	2.8 ± 0.78	1.9 ± 0.43	<0.05
Mean requirement of analgesia (mg)	30.2 ± 5.38	14.8 ± 9.65	
Mean duration of hospital stay (days)	2.6 ± 0.65	1.3 ± 0.52	
Mean operative time (minutes)	70.5 ± 13.24	40.6 ± 8.86	

Table-I. Characteristics of patients in study group. (n=50)

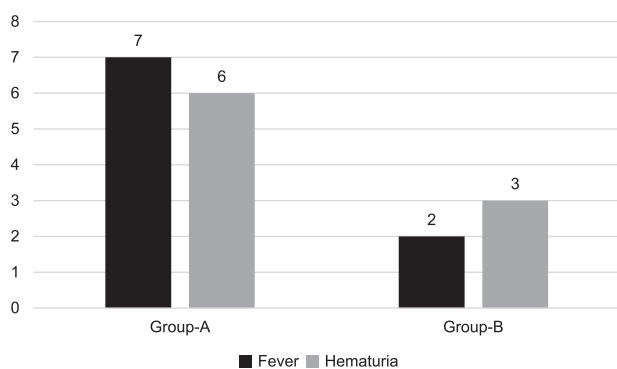


Figure-1. Frequency of common postoperative complications in both groups.

DISCUSSION

Urinary bladder is the most common site of stone formation among children. Its incidence is slowly declining in endemic areas due to improved life style, nutrition and better healthcare facilities. There are various techniques for vesical stone removal like open vesicolithotomy, percutaneous vesicolithotomy, transurethral laser fragmentation of stone etc.¹¹ Now minimally invasive techniques have brought revolution in this field with minimum complications and better outcomes.¹² Patients undergoing open vesicolithotomy require longer hospital stay, increased analgesia requirement, wound and catheter related complications, postoperative hematuria, urinary tract infection and fever are also common in this technique. Delayed complications include urethral stricture formation.¹³ Transurethral fragmentation of bladder stones using pneumatic intra corporal lithotripsy method is a minimal invasive method which can be used for small size stones but not

suitable for large size stones.¹⁴ Due to prolonged operative time and urethral manipulation with instruments it is not a treatment of choice now.¹⁵

According to a study 7.4% cases operated with transurethral pneumatic lithotripsy require second surgery for stone fragments removal and prolonged hospital stay is required.¹⁶ Laser or pneumatic and ultrasonic lithoclast combined method can be used for large urinary bladder stones but this technique is very costly and devices need proper care, highly expert person to use it so it is not suitable for small healthcare centers to afford it.^{17,18} According to a study cystolithoclast method reported minor complications in 10% cases, postoperative hematuria developed in 05% cases which was settled after few hours and difficulty in urination was experienced by 04% cases and urinary retention was experienced by 01% cases which was relieved by passing urinary catheter. Success rate was 100% with complete removal of stone with short hospital stay of 10-12 hours.¹⁹ A study conducted by Kamel et al in Egypt on the role of pneumatic and laser techniques in urinary bladder stone removal reported success rate of 97.3% and complications reported in 8.1% while prolonged catheterization was required in 5.4% cases.²⁰ A local study about Transurethral pneumatic lithotripsy role in vesicolithiasis in children reported its excellent outcomes with few minor complications such as fever in 3.5% cases, dysuria in 10.5%, hematuria in 7% acute urinary retention was reported in 1.8% cases.²¹ A previous study conducted in Sheikh Zayed Hospital Rahim Yar Khan compared outcomes

of open vesicolithotomy and percutaneous cystolitholapaxy on 30 children. They reported excellent outcomes with minimum complications reported as fever in 08% cases and hematuria in 12% cases.²²

Akmal et al stated that stone clearance rate was 100% after percutaneous cystolithotripsy with few minor postoperative complications noted such as suprapubic urinary leakage, hematuria, pre-vesical extravasation of urine and postoperative urinary tract infection.²³ Ali et al studied outcomes of open vesicolithotomy for large bladder stones with mean stone size of 38.4 ± 4.2 mm, average hospital stay was 5 ± 0.6 days and postoperative complications were reported in 6.9% cases.²⁴ In our study mean hospital duration was 2-3 days among the patients undergoing open vesicolithotomy and 1-2 days duration among those undergoing percutaneous cystolitholapaxy. Mean stone size was 2.8 ± 0.78 cm and 1.9 ± 0.43 cm. Further studies are required to know outcomes of percutaneous cystolitholapaxy among adults as well with larger stone size. In this study sample size was not large. There should be more studies on large sample size and among those having recurrent stones of urinary bladder.

CONCLUSION

Percutaneous cystolitholapaxy is a minimal invasive procedure suitable among children with high success rate and minimum complications like post-operative fever, hematuria, urinary leakage and pain.



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AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
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2	Abdul Qayoom Khuro	Data analysis collection.	
3	Illahi Bux Brohi	Data collection	