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PERCUTANEOUS CYSTOLITHOTRIPSY IN THE MANAGEMENT OF VESICAL CALCULUS AS DAY CARE PROCEDURE: OUR EXPERIENCE IN JAWAHARLAL NEHRU INSTITUTE OF MEDICAL SCIENCES.

Urology

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ABSTRACT

Aim: The aim of this study was to report the outcome of percutaneous cystolithotripsy (PCCLT) under local anesthesia (LA) as a day care procedure in patients with vesical calculus.

Materials and Methods: Patients with vesical calculus attending Urology Clinic of Jawaharlal Nehru Institute of Medical Sciences (JNIMS) Hospital during January 2015 to December 2020 underwent PCCLT under LA-analgesia as day care procedure. The results are analyzed on aspects of perioperative pain, completion of procedure, stone clearance, hospital stay, complications and patient compliance. Written informed consent for the procedure was taken from all patients for the study.

Results: A total of 30 patients with vesical calculus with size ranging from 15 to 40 mm underwent PCCLT under local anesthesia. 29 patients completed the procedure successfully under LA, while 1 required to be completed under spinal anaesthesia as patient could not tolerate the pain as he had hard stone resistant to intracorporeal pneumatic lithotripter. None of the patients required overnight hospital stay following the procedure except for these two patients who were converted to spinal anesthesia. Pain score using visual analog scale was mild in 15 patients, moderate in 10 and severe in 5 patients. Dysuria with hematuria were the most common complications which could be managed conservatively. Overall patient compliance for this procedure was excellent.

Conclusion: Vesical calculus disease can be a urological emergency when urinary retention or hematuria occurs. Due to the long waiting period for routine OT, patients needing emergency catheterisation for relieving urinary retention had to stay long with indwelling catheter waiting for routine operation, the initiative of PCCLT under LA as a day care procedure started in our unit and our experience of this procedure in carefully selected patients is having encouraging results.

KEYWORDS

Day care surgery, local anesthesia, percutaneous cystolithotripsy.

INTRODUCTION

Urinary stone disease is a major health problem that concerns millions of patients worldwide affecting 2-3% of the human population with a high recurrence rate of almost 50%. Vesical calculus accounts for nearly 5% of urinary system calculus.[1] Calculus disease can affects any parts of the urinary tract - kidneys, ureter, urinary bladder, and urethra. Most patients with calculus diseases are symptomatic but in few cases they can be asymptomatic.

Vesical calculi are commonly classified as primary or secondary. Primary vesical calculus are stones which passes from kidney via ureter and lodges in the urinary bladder while, secondary vesical calculus are due to the bladder diverticulum, bladder outlet obstruction, trauma, catheterization, neurogenic bladder, foreign body, etc.

Surgical treatment of vesical calculi has evolved over years from "blind" insertion of crushing forceps into the bladder to open surgical removal or extracorporeal fragmentation. Open surgery has been the best-recommended modality for large stones.[2] In small or moderate calculi, endosurgical procedures as optical mechanical cystolithotripsy have an added advantage as it can be combined with corrective procedure for bladder outlet obstruction.[3] Zhaowu et al. have recommended that electrohydraulic shockwave lithotripsy (EHSWL) preferably to be avoided in large, hard vesical calculi and if the stone is in the diverticulum or stuck to the mucosa.[4] Kemal et al. in their randomized study concluded that the transurethral nephroscopic removal of bladder stone is fast and effective method compared to endoscopic treatment via cystoscope.[5] All these procedures have been usually performed under spinal or general anesthesia. PCCLT under LA is not usually performed largely due to the fear of patient intolerability and complications which might need to convert the procedure under spinal or general anesthesia. In this study, we present our experience of performing PCCLT under local anaesthesia as day care procedure on aspects of per operative pain, completion of procedure, stone clearance, hospital stay, complications and patient compliance.

MATERIALS AND METHODS

Between January 2015 and December 2020, 30 patients with vesical calculus disease who attended the Urology Clinic of Jawaharlal Nehru Institute of Medical Sciences (JNIMS) Hospital underwent PCCLT under LA. Written informed consent for the procedure was taken from all patients at the start of the study.

Our inclusion criteria were patients aged above 18 years of either sex having vesical calculus with size ranging from 15 to 40 mm. We excluded younger patients (< 18 years), larger calculi, multiple calculi, those with bladder diverticulum, Bening prostatic hyperplasia and patients with co-morbid conditions such as uncontrolled Diabetes Mellitus, Hypertension, Bronchial Asthma and uncontrolled coagulopathy. Febrile patients with or without positive urine culture were also excluded. Patients with ankylosis who are not able to maintain lithotomy position were also excluded.

Preoperative assessment of the study subjects included history and thorough physical examination, complete hemogram, kidney function test, urine culture and sensitivity, X-ray KUB, and Ultrasound abdomen. All patients received prophylactic antibiotics 24 hours prior to surgery. Cystourethroscopy was performed initially after administering local anesthetic jelly to the patient. Cystoscopy (Karl Storz 15 F) was performed to determine the size, number and presence of associated pathology.

Midline suprapubic puncture was made using the 3 part puncture needle under cystoscopic guidance. Guide wire was passed and the tract dilated to place 28 F Amplatz sheath suprapubically under cystoscopic control. 19.5 F nephroscope (Richard Wolf) was inserted through the sheath and stone fragmented using intracorporeal pneumatic lithotripter and then the fragments were retrieved. At the end of the procedure, the Amplatz sheath was replaced with a longitudinally slit Amplatz sheath of exact size. The Amplatz sheath was removed after placing a suprapubic catheter through it. All patients had per urethral catheter as a safety measure. Patients were kept for observation for 3 hours after the procedure and discharged on the same day if no major complications develop. Patients were called back on the 5th post-operative day along with post-operative X-ray KUB and Ultrasound KUB report, and if no residual stones were seen,

both suprapubic catheter and per urethral catheter were removed. Eight patients required additional procedures—optical internal urethrotomy for short urethral stricture and meatotomy. Two patients had to be converted to spinal anaesthesia as they could not tolerate the procedure since the stones were hard to break with pneumatic lithotripter.

Accordingly, all the procedures were recorded on various aspects of perioperative pain, completion of procedure, stone clearance, hospital stay, complications and patient compliance.

RESULTS

The overall success rate in our series of local PCCLT was 97% (29/30).The age ranged from 18 to 45 years including 28 males and 2 females. The stone size ranges from 15 mm to 40 mm. The average duration of the procedure was 35 $\pm$ 10 mins. Twenty nine patients (97%) completed the procedure under local anaesthesia while one patient needed to be converted to spinal anesthesia as the patient could not tolerate the procedure. None of the patients required conversion into open procedure. Twenty-one patients with stone size ranging from 15-27 mm (70%) completed the procedure within 25 minutes while 9 patients (30%) required longer duration. One patient needed to be converted to spinal anethesia as he could not tolerate the procedure since he had a hard stone; thus the overall success rate was 97% (29 out of 30). Among male patients, 2 patients (11.11 %) required additional procedures- optical internal urethrotomy for short urethral stricture and meatotomy for meatal stenosis. The visual analog scale record of perioperative pain was mild (0-3) in 15 patients (50%), moderate (4-7) in 10 patients (33%) and severe (8-10) in five patients (17%). Two patients required post-operative overnight admission as one patient had significant hematuria and another patient completed the procedure under spinal anesthesia. The most common complication was dysuria recorded in 15 patients followed by transient hematuria in three patients and fever in one patient. All these patients were managed conservatively. The success rate in our present series was 97% and this was comparable to other series i.e., Singh KJ.

DISCUSSION

Vesical calculi are usually secondary ones as a result of some secondary factors leading to obstruction of the bladder outlet. In some cases, the calculus migrated downwards from the kidney and ureter and lodge in the urinary bladder. These stones are called primary vesical stones.

Varoius treatment options are available for management of bladder stones- open surgical removal, percutaneous and transurethral cystolithotripsy and cystolitholapaxy.[1-6] All these techniques aimed to remove stones completely in shortest possible time, short hospital stay with acceptable minimal or no complications. This study aimed to analyse the safety and efficacy of percutaneous cystolithtripsy (PCCLT) under local anesthesia as day care procedure. The energy used in this study to fragment the stone was pneumatic lithotripter and this happens to be the most widely available and cost-effective energy source in most urological centres. Ener et al. concluded that nephroscope placed through the urethra using pneumatic/ ultrasonic lithotripter are fast and effective treatment modality for large vesical stones.[5] With the development of newer surgical armamentarium, open cystolitholapaxy has been totally replaced by safer and effective endourological methods.[7]

In this study, 19.5 nephroscope (without sheath) was used to fragment the stone via the Amplatz sheath placed suprapubically under local anesthesia. The advantage of performing the procedure under local anethesia is that it can be done as a day care procedure, thereby reducing the health care burden of providing hospital beds. Moreover, the patient tolerability and acceptability of this technique is good. We also found this modality to be faster and more effective in fragmenting bladder stones as compared to other endourological methods in terms of operative time and postoperative stay in other studies i.e. Sathaye UV.[8] Percutaneous placement of Amplatz sheath in the suprapubic area gives the advantage of better visualisation and fragmentation of the calculus. Moreover, there is less chance of overdistension of urinary baldder durinfg the procedure since the intravesical pressure is low due to wide gap between the nephroscope and lumen of Amplatz sheath. Another advantage is entry to the urethra is limited to one or two times during the whole procedure, thereby reducing the chances of developing instrumental trauma to the urethra and later, stricture development is minimal or non-existent.

The only drawback of this procedure is the need for placement of additional suprapubic catheter for few days, which increases the morbidity and discomfort to the patient. The advantage of doing PCCLT in children has been already reported by Ahmadinea et al. since male children have small calibre urethra.[9] Moreover, the benefit of treating bladder stones in neo-bladder by PCCLT have been documented.[10-12]

Over the last decade, there has been an increase in the trend to remove bladder stone using nephroscope and various similar methods have been described in literature. Amplatz sheath had been used transurethrally for management of vesical calculus in various studies in the past.[13] Okeke et al. advocated the used of Amplatz sheath in male patients transurethrally for vesical calculus and concluded that smaller stone fragments get removed by the irrigating fluid easily due to turbulence while the larger fragments need to be retrieved with forceps.[14] The advantage of PCCLT using Nephroscope over transurethral route using cystoscope is that nephroscope has a wide working channel, which facilitates easy removal of the stone fragments. Moreover, cystoscopic fragmentation takes longer OR (operation room) time and the vison quality is comparatively lesser, which parallels the degree of stone fragmentation. We also observed in our study that PCCLT takes less time even for larger stones upto 40 mm.

CONCLUSION

Percutaneous cystolithotripsy under local anaesthesia done as a day care procedure is safe and efficacious method of vesical calculus removal without increasing the morbidity of the patients. The reduction in the treatment cost and advantage of same day discharge from the hospital among these patient also would be tremendous and need to be documented in a larger study.

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