

Push and Perc

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ABSTRACT

OBJECTIVE: To document the feasibility and clearance rate of Percutaneous Nephrolithotomy for proximal ureteric stones.

PATIENTS AND METHODS: This was a retrospective review of patients who presented with upper ureteric calculi of 1.5 cm or more at Department of Urology Liaquat University of Medical & Health Sciences Jamshoro which is one of the busiest Urology centre in Sindh. Patient's demographic data, clinical presentation, radiological findings, operative finding and clearance were noted on a proforma.

All patients who had preoperatively urinary tract infections were treated with appropriate antibiotics. Those who presented with urosepsis, raised creatinine and hydronephrotic kidneys underwent percutaneous nephrostomy tube to drain the infected urine and optimize for definite treatment. Before puncturing the kidney, stones were pushed back in the kidney with the help of ureteric catheter and ureteroscope. Open ended 5 Fr ureteric catheter placed for opacification of pelvicalyceal system followed by percutaneous nephrolithotomy procedure. Data was analyzed on SPSS version 16.

RESULTS: From January 2006 to December 2010, Percutaneous Nephrolithotomies were performed for 101 patients with upper ureteric stone. There were 70 males and 31 females with mean age of 26 years. The location of stone(s) confirmed and function of the kidneys were assessed with an Intravenous Urogram or CT Kidney Ureter and Bladder. Majority of patients had gross hydronephrosis with a stone diameter ranging from 1.5cm to 2.6cm with mean of 1.9 cm in size. Percutaneous Nephrolithotomy was the modality of treatment. At the end of the procedure 18 Fr nephrostomy or 6fr Double J Stent was left for all the patients, which was removed after 2 and 14 days respectively.

Post-operative x-ray KUB or Ultrasound KUB was done to confirm the clearance. Complete clearance was noted in 99 (98.7%) patients. Regarding complications, 2 patients had post-PCNL Urosepsis and 4 patients required blood transfusions secondary to hemorrhage.

CONCLUSION: Percutaneous Nephrolithotomy is safe, economical and effective method in treating impacted upper ureteric stone.

KEYWORD: PCNL, stone clearance, upper ureteric calculi.

INTRODUCTION

Urolithiasis is significant source of morbidity in developing countries especially in Pakistan as patients do present with complications like urosepsis, renal failure etc⁽¹⁾. It is utilizing national health resources at much higher extent. Stone disease is major portion of operative workload on urologists in this part of the world⁽²⁾. In one study it is estimated that 10-15% of Pakistani population is suffering from stone disease⁽³⁾. Various non-invasive, minimally invasive and open surgical procedures may be performed for stone disease depending upon its location and size⁽⁴⁾. Complete clearance depends upon the mode of surgical treatment. Proximal ureteric stones are very much challenging for operative management⁽⁵⁾. In ureteroscopic lithotripsy chances of inadvertent push back are high due to significant proximal dilatation⁽⁶⁾. In ESWL improper fragmentation and incomplete clearance is the main issue

due to edema and poor localization, while open surgery has got its own morbidity^(7,8). Percutaneous Nephrolithotomy is becoming procedure of choice in reasonably bigger stones in kidney but now people are also considering it for upper ureteric calculi because of above mentioned reasons⁽⁹⁻¹¹⁾. We are sharing our experience of managing upper ureteric calculi with PCNL.

MATERIALS AND METHODS

This is a retrospective record of those patients who presented with upper ureteric calculi from January 2006 to December 2010 at Liaquat University Hospital Jamshoro which is one of the busiest urology center of Sindh. We studied patients who had stone size of 1.5 cm or more. The patients' demographic data including age, sex, clinical presentation, duration of symptoms, laboratory and radiological investigation, pre-operative

ancillary procedures, definitive surgical procedure, postoperative clearance rate and complications were noted. All patients who met the inclusion criteria had urine culture and sensitivity done. In cases of positive culture, infection managed with appropriate antibiotics. Those patients who were having urosepsis or had either raised serum creatinine and/or systemic signs their kidneys were drained through Percutaneous Nephrostomy till their sepsis and renal insufficiency was managed adequately. Before puncturing the kidney, stones were pushed back under fluoroscopic guidance either with the help of 5 Fr Ureteric catheter or Ureteroscope. Percutaneous Nephrolithotomy was performed with standard technique via access through one of the dilated calyx depending upon the surgeon's choice and location of pushed back stone. Clearance of stone noted under fluoroscopic guidance at the end of procedure and on the 1st post-operative day with an X-ray KUB for radio-opaque calculi and Ultrasound KUB for radiolucent stones. Post-operative complications observed were noted on proforma. Data was analyzed on SPSS version 16. Frequencies and percentages were calculated for qualitative data i.e. age (in groups), size of stone (in groups), duration of symptoms (in groups), type of calyx used for access and outcome.

RESULTS

From January 2006 to December 2010 total of 101 patients underwent PCNL for proximal ureteric calculi. Male patients were 70 (69.3%) and female were 30.7%. Mean age of the patients was 26.3 years with range from 19-62 years as shown table no. 1. Mean duration of symptoms was 12.1 months (6-30 months) see table no 2. Mean stone size was 1.9 cm (1.5-2.6cm) see table no. 3. Location of stone and anatomy of urinary tract including pelvicalyceal system was confirmed with Intravenous Urogram. Patients who had radiolucent stones, CT scan KUB were performed to see the size and site of stones. Out of 101 patients 8 (8%) presented with urosepsis and had grossly hydronephrotic kidney and therefore PCNL done to drain the infected urine. Fifteen (15%) patients had prior urinary tract infections which were treated with appropriate antibiotics. Mean serum creatinine was 1.2±0.9 mg/dl. Patients were given general anesthesia before procedure. In lithotomy position retrograde pyelography was performed to see the level of obstruction, location of stone and pelvicalyceal anatomy. Stones were pushed back into the kidney with help of ureteroscope or 5 Fr ureteric catheter which left in place for opacification and filling of pelvicalyceal system during the procedure. Patients

placed in prone position. Out of 101 cases, lower calyx was accessed in 60 patients, middle calyx was used in 11 patients and upper calyceal puncture was done in 30 patients (See Table no. 4). Track dilated up to 30 Fr and 28 Fr Amplatz dilator left in place, while 26 Fr nephroscope was used for identification of stones. Stones were fragmented with pneumatic lithotripter and fragments were removed with stone grasper. Mean operative time was 55 min. At the end of the procedure complete clearance was confirmed on fluoroscope followed by placement of 18 Fr Nephrostomy tube for drainage purpose. In 3 patients Double J stent was placed due to severe edema or minor residual fragments. Stent was removed after 2 weeks. X-ray KUB for radio-opaque and Ultrasound KUB for radiolucent stones were performed on 1st post-operative day to see the clearance of stones. Complete clearance was found in 99 (98.7%) patients (See Graph no. 1). Nephrostomy was removed on 2nd post-operative day and ureteric catheter was removed on 3rd post-operative day. Mean post-op hospital stay was 4 days. Complications observed were, post-PCNL Urosepsis in 2 patients and hemorrhage requiring blood transfusion in 4 patients (See Table no. 5).

TABLE I: AGE DISTRIBUTION IN GROUPS (n = 101)

Age Group	n(%)
20-30 Yrs	10 (9.9%)
31-40 yrs	55 (54.3%)
41-50 yrs	30 (29.6%)
Above 50 yrs	6 (5.9%)

TABLE II: STONE SIZE IN GROUPS (n = 101)

Size of stone	n(%)
1.5-2.0 cm	51(50.4%)
2.1-2.6 cm	50(49.5%)

TABLE III: DURATION OF SYMPTOMS (n = 101)

Duration of symptoms	n(%)
1-6 months	11(10.8%)
7-12 months	25(24.7%)
13-18 months	37(36.6%)
19-24 months	19(18.8%)
25-30 months	9(8.9%)

TABLE IV: TYPE OF CALYX USED FOR ACCESS

Type	n(%)
Upper	30(29.7%)
Middle	11(10.8%)
Lower	60(59.4%)

GRAPH I: CLEARANCE RATE OF PCNL

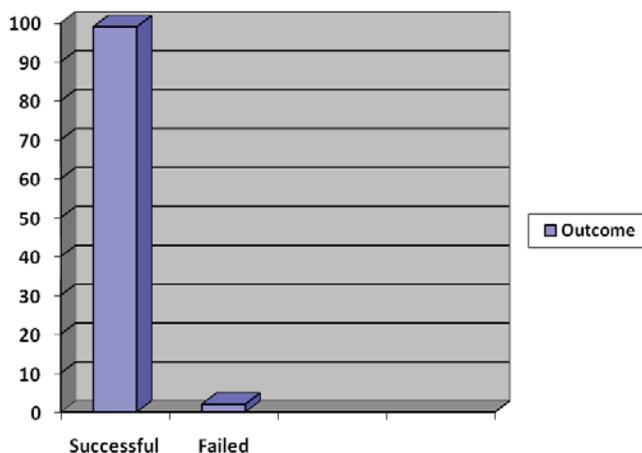


TABLE V: COMPLICATIONS

Urosepsis	2 (2%)
Bleeding required blood transfusions	4 (4%)

DISCUSSION

Surgical management of proximal ureteric stones remains challenging (5). Extra corporeal shock wave lithotripsy is 1st line treatment in stones smaller than 1.5 cm in size but when size of stone is larger, or associated with edema and gross hydronephrosis then optimal results are usually not achieved with Extra corporeal shock wave lithotripsy(7). Ureteroscopic lithotripsy is another mode of treatment which is being used at many centers with success rate of nearly 80% (12). In these cases because of proximal dilatation stones are easily pushed back with first stroke of pneumatic lithotripter probe. Then these patients require number of ancillary procedures like placement of double J Stent followed by extra-corporeal shockwave lithotripsy and removal of stent once patient becomes stone free (13). In recent past flexible ureteroscope and laser lithotripsy is being used with reasonably good results. These different procedures in one patient multiply burden on health recourses for developing and under-developed countries. For larger stone impacted in proximal ureteric stone, open ureterolithotomy is an

other option, where identification and retrieval of stone wouldn't be a problem in experienced hands. But again morbidity related to open surgery is high including hospital stay, use of injectable antibiotics, drains, catheters for relatively longer period of time, and therefore late recovery (8). Presently PCNL appears ideal mode of surgical treatment as it can offer almost 100% clearance as in our study. Associated hydronephrosis in such cases offer easy access to the calyceal system that might be promising factor for young surgeons who are in the initial phase of their practice. Time taken by the procedure is low as in most cases stone is solitary. Sometimes if stone is impacted and it is not possible to push it back or it is inaccessible retrogradely, we can use ureteroscope antegradely to reach the stone as mentioned by Sun X et al in their study (14). In our study male to female ratio is 3:1 which is also true for stone disease prevalence. Mean age of our patients is 26 years which indicates that younger population is affected with stone disease which is like an endemic problem resulting into significant morbidity leading to less productivity. Another finding in our study was relatively longer duration of symptoms averaging 2 years. It seems that either people find access to tertiary health care centers difficult or negligence on their part, as people preferred to use some unani, herbal or other ways to treat these stones until disease affect their kidneys to significant extent. Probably this account for higher rate of renal failure secondary to stone disease in this part of the world as observed by same author in another study. Size of the stone is another important factor which influences the decision making regarding treatment options. We have selected patients who had stone size of more than 1.5 cm. This size is being taken as cutt-off level in most of the cases of ureteroscopic lithotripsy because in larger stones chances of bigger fragments to be pushed back in to the kidney are high which require number of other procedures which is also cumbersome for the patients as they would be stone free after many weeks in comparison to PCNL which can make them stone free within minutes, as in our study total procedure time was 55 minutes. Another finding which was evident in our study was that all patients had moderate to severe hydronephrosis because of longstanding obstruction which would have developed infections. In our study 8 patients presented with high grade fever, raised

creatinine and severe pain. These were hospitalized, Percutaneous Nephrostomy tube passed, intravenous hydration & antibiotics prescribed until settled. For these cases we used Nephrostomy tract for PCNL which significant reduced operative time. In our study all patients had urine culture and sensitivity done which is pre-requisite for any surgery. Out of 101 patients, 15 patients had documented urinary tract infections. Regarding function of the affected kidney, all patients had contrast studies to see the uptake by parenchyma and opacification of pelvicalyceal system. Those patients who had doubt of non-functioning kidneys underwent radionuclide studies. The kidneys which turned out to be non-functioning were excluded from study.

Regarding access of Calyceal system during PCNL, lower calyx seemed to be preferred route because once stone was pushed back into the kidney, it lodged in lower calyx. This is also considered safe route to avoid pleural injury. Good thing in these cases was easy puncturing of the kidneys due to gross hydronephrosis which reduced the time of procedure.

Clearance of stone disease is dramatic in our study as this is 98.7% on 1st post-op day. The matter of the fact is stones are solitary and mean size nearly 2 cm which enhanced the clearance rate while Nguyen HD et al mentioned 88.2% at the time of discharge but they did PCNL on complex urinary stone disease⁽¹¹⁾. Regarding complications only 2 patients developed urosepsis mainly because majority of patients already received appropriate antibiotics. Blood transfusion was required in 4 patients which is also directly related to difficult access and duration of surgery.

CONCLUSION

This study concludes that PCNL is very much safe, viable, feasible and economical option in proximal ureteric stones of relatively bigger size.

We recommend that a comparative study between ESWL, URS and PCNL should be conducted to see the clearance rate and number of complications.

Conflict of interest: None

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