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Research Article

EFFICACY OF PERCUTANEOUS NEPHROLITHOTOMY (PCNL) IN PREVIOUSLY OPERATED (PYLO / NEPHROLITHOTOMY) PATIENTS WITH RECURRENT RENAL STONES

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Abstract:

Background: Urolithiasis is a significant source of morbidity for our population which affects national health cost in billions annually and can be treated by Shockwave lithotripsy (SWL), retrograde intrarenal surgery (RIRS), percutaneous Nephrolithotomy (PCNL), open surgery and/ or combination.

Objective: To determine the efficacy of percutaneous nephrolithotomy (PCNL) in previously operated (pylo/nephrolithotomy) patients with recurrent renal stones.

Patients and Methods: The cross sectional study comprises twenty nine patients seen at urology clinic with signs and symptoms of renal calculi and diagnosed on ultrasonography and CT-KUB/IVU and have past history of open renal surgery (pyelo/nephrolithotomy) were enrolled for the study and underwent PCNL during July 2018 to March 2019. Percutaneous nephrolithotomy was performed under general anesthesia by experienced and qualified Urologist team, the clearance of stones was documented as complete, i.e. (no visible stone or <4mm stone fragment and incomplete (residual fragmentation > 4mm visible stone fragment on flourosocopy and 1st postoperative X-ray KUB). The operative time, intraoperative and postoperative blood transfusion and complications were also recorded. On 1st postoperative day the patient haemoglobin, serum creatine and X-ray KUB were advised. The patients were discharged on 2nd to 3rd postoperative day after nephrostomy removal. DJ stent were removed after 2 weeks. The collected data was analyzed in SPSS version 23. Mean \pm SD was calculated for numerical variables like age, stone size, time of procedure, pre and post operative haemoglobin. Frequency and percentages were calculated for categorical variables like gender of patients, co-morbid, nephrostomy placement, stone clearance and complications.

Results: During nine months study period total twenty nine previously operated patients were underwent for percutaneous nephrolithotomy. The mean age \pm SD of the patients was 41.79 \pm 8.86 years while the mean size of the renal stones was 2.06 \pm 1.21 cm with a range of 2–3 cm. Females population was predominant as 15 patients (51.7%) while the male patients observed as 14 (48.3%). Regarding comorbid, the HCV positive was 17.2%, hypertension 10.3%, diabetes mellitus 3.4% while the mean \pm SD for preoperative hemoglobin was 13.3 \pm 1.83 g/dl and post operative was 11.1 \pm 2.85 g/dl. Intraoperative blood transfusion was done in 13.8% and post operative blood transfusion was done in 6.9% of patients. The mean \pm SD time of PCNL was 1.25 \pm 0.32 hrs while the two punctures were done in 1 (3.4%) patient. Nephrostomy was done at the end of procedure in 75.9% of patients whereas the complete clearance of stone fragments was achieved in 93.1% and auxiliary procedure (DJ stenting) was accomplished in 3 patients (10.73%).

Conclusion: In patients having past history of renal stone surgery the PCNL can be performed with low blood transfusion rate (intra-operative and post operative), acceptable procedure time, less complication and high success rates if safety rules are followed strictly.

Key Words: Percutaneous nephrolithotomy, Kidney stones and Renal calculi

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INTRODUCTION:

Urolithiasis is a significant source of morbidity which affects national health cost in billions annually and the kidney stone can be treated by shockwave lithotripsy (SWL), retrograde intrarenal surgery (RIRS), percutaneous nephrolithotomy (PCNL), open surgery and/ or combination of above [1, 2]. Percutaneous nephrolithotomy was first introduced in 1976 as less invasive procedure for large and complex renal calculi of 2 cm and larger in size [3]. In developing countries, though PCNL has established itself well in major cities but in the peripheral regions and remote areas it is still not easily accessible. As a result, many patients with renal stones are still being treated conventionally with open surgery. Estimated lifetime risk of developing a kidney stone is about 12% and recurrence rate is up to 50% within 5 to 7 years, thus increasing the need for re-intervention [4]. Re-procedure in patients with history of open stone surgery is usually challenging due to the alteration in the retroperitoneal anatomy [4]. Percutaneous nephrolithotomy is a safe and effective treatment modality for patients with renal stones regardless history of previous PCNL or open renal surgery [5]. This study was designed to explore the effectiveness and safety of PCNL in patients with a history of open renal surgery so that the patients can be saved timely from various life threatening complications.

MATERIAL AND METHODS:

The cross sectional study comprises twenty nine patients seen at urology clinic with signs and symptoms of renal calculi and diagnosed on ultrasonography and CT, KUB, IVU and have past history of open renal surgery (pyelo/nephrolithotomy) were enrolled for the study and underwent PCNL during July 2018 to March 2019. Patient characteristics, including age, gender, associated comorbidities and past renal surgical history were recorded. Also, size, number, and location of stones were listed. Patient's safety was ensured before intervention. Informed consent was taken and patients were evaluated for coagulation profile and hemoglobin level.

Percutaneous Nephrolithotomy was performed under general anesthesia by experienced Urologists team, first cystoscopic guided ureteral catheter 5 Fr was placed under lithotomy position then patient's position was changed to prone position. Under fluoroscopy

guidance, percutaneous puncture was made in renal pelvic calyces system and dilatation of the tract was done, followed by insertion of an amplatz sheath 30 Fr through which Storz rigid nephroscope 26 Fr was passed and stone was visualized and fragmented with pneumatic lithoclast and retrieved with forceps. Once stone was cleared completely, nephrostomy catheter 16 Fr was used in PCNL tract in 19 patients. The clearance of stones was documented as complete, i.e. (no visible stone or <4mm stone fragment and incomplete (residual fragment > 4mm visible stone fragment on fluoroscopy and 1st postoperative X-ray KUB). The operative time, intraoperative and postoperative blood transfusion and complications were also recorded. On 1st postoperative day the patient haemoglobin, serum creatine and X-ray KUB were advised. The patients were discharged on 2nd to 3rd postoperative day after nephrostomy removal. DJ stent were removed after 2 weeks. The collected data was analyzed in SPSS version 23. Mean \pm SD was calculated for numerical variables like age, stone size, time of procedure, pre and post operative haemoglobin. Frequency and percentages were calculated for categorical variables like gender of patients, co-morbidities, nephrostomy placement, stone clearance and complications.

RESULTS:

During nine months study period total twenty nine previously operated patients were underwent for percutaneous nephrolithotomy. The mean age \pm SD of the patients was 41.79 ± 8.86 years while the mean size of the renal stones was 2.06 ± 1.21 cm with a range of 2–3 cm. Females population was predominant as 15 patients (51.7%) while the male patients observed as 14 (48.3%). Regarding co-morbidities, the HCV positive was 17.2%, hypertension 10.3%, diabetes mellitus 3.4% while the mean \pm SD for preoperative hemoglobin was 13.3 ± 1.83 g/dl and post operative was 11.1 ± 2.85 g/dl. Intraoperative blood transfusion was done in 13.8% and post operative blood transfusion was done in 6.9% of patients. The mean \pm SD time of PCNL was 1.25 ± 0.32 hrs while the two punctures were done in 1 (3.4%) patient. Nephrostomy was done at the end of procedure in 75.9% of patients whereas the complete clearance of stone fragments was achieved in 93.1% and auxiliary procedure (DJ stenting) was accomplished in 3 patients (10.73%). The clinical profile of study population is mentioned in Table 01.

TABLE 01: CLINICAL PROFILE OF STUDY POPULATION

	Minimum	Maximum	Mean	SD
TOTAL TIME FOR PCNL	1	1.5	1.2555	0.12403
BLOOD TRANSFUSION DURING PCNL	Frequency	Percentage		
Intra operative blood transfusion	4	13.8		
Post operative transfusion	2	6.9		
AUXILLARY PROCEDURES				
DG Stenting				
Yes	03	10.3		
No	26	89.7		

DISCUSSION:

Percutaneous Nephrolithotomy is less invasive procedure for large and complex renal calculi of 2 cm and larger in size and with the recurrence rate for renal stones being high (up to 50% in 5-7 years, these patients often need re-intervention. Previous study reported that the operating time (177 ± 52 minutes) and percentage of secondary procedures (29% v 12%) were significantly higher in patients who had previously undergone open stone surgery [5]. Former study had previously compared the outcomes of primary PNL patients with patients who have undergone Open Renal Surgery and PNL, and have demonstrated that history of undergone Open Renal Surgery reduces the success rates of PNL [6]. However, former literature did not find any significant difference in PCNL success, with or without previous open renal surgeries [7, 8] while the present study did not show any difference in the outcome of PCNL in such patients. PCNL in the previously operated patients may be hampered at various stages. At outset (at the time of puncture and dilation) perirenal fibrosis and retroperitoneal scarring, may cause troublesome. This was also depicted in our study too, but at the end was done successfully with single puncture in 96.6% of patients and double puncture was done only in a single case. A similar observation was made by another study [5] who required 2.3 ± 1.9 vs. 1.2 ± 1.1 attempts in secondary v/s primary cases, thus stressing the fact that retroperitoneal scarring does hamper access to the kidney. Also, retroperitoneal and perinephric scarring make the dilation of the tract difficult. This may be attributed to the marginally longer operating time in case of previously operated cases despite patients having similar stone burden compared to primary cases. To avoid this problem some authors have even used Collings knife or optic urethrotome for tract dilation. However, this increased morbidity, so it is not very common [9]. Difficulty in tract dilation has been observed by former study [7] where successful tract formation with balloon

dilation in one step could be obtained in 83% of primary cases while in patients with history of open surgery it was possible only in 50%. Moreover in their study one patient has required open surgery due to a failure to create tract despite using Amplatz and balloon dilators in tandem. In present series we did not convert any case to open in case of failure. The disadvantage of telescopic metal dilation is the high incidence of pelvic perforation but this is rare with experienced skills [8]. In our series we had one patient who had small pelvic perforations that responded well to conservative treatment. We feel that excessive force used for dilation should always be avoided (this can be facilitated by the incision of the fascia) and also the dilators should always be advanced gently under fluoroscopy to prevent this complication.

We prefer a preoperative CT scan/ to study the relationship between the adjoining viscera to the kidney following open surgery. Although IVU was performed as the initial imaging study in some cases while none in our series developed injury to adjoining organs (bowel).

Previous study recommends choosing upper pole caliceal puncture to avoid the scar tissue coming in the way of the puncture needle. However, we agreed with the fact that the previous incision site should be avoided if possible to facilitate puncture and ease dilation.

Retroperitoneal and caliceal scarring may fix the kidney thus reducing its mobility. In these cases intraoperative manipulation of nephroscope may torque the kidney and cause laceration with bleeding. Also, this hampers access to the intrarenal calyces affecting the overall clearance [9]. Though we observed difficulty in the intrarenal manipulation, but didn't have effect on the overall clearance rate (93.1% respectively) or the overall intra operative and postoperative transfusion rate in the (13.08% vs. 6.9% respectively). The clearance rate and transfusion rate are also consistent with the former literature [9, 10].

CONCLUSION:

In patients having past history of renal stone surgery the PCNL can be performed with low blood transfusion rate (intra-operative and post operative), acceptable procedure time, less complication and high success rates if safety rules are followed strictly.

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