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A prospective study of complications and recovery time in patients undergoing percutaneous nephrolithotomy for renal stone

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Abstract
Background: European Association has considered percutaneous nephrolithotomy (PCNL) as first option for large, multiple or inferior calyx stones. Open surgery has been replaced by PCNL because of its cost effectiveness, lower morbidity, shorter operative time and lower postoperative complications.
Aims and Objectives: To study the post PCNL complications among the patients with renal stone.
Materials and Methods: A total ninety patients with renal stone were studied at SVBP Hospital attached to LLRM Medical College Meerut from June 2016 to Sept 2017. Postoperative complications were studied along with the recovery time for all the patients. Statistical analysis was done using IBM SPSS ver. 20 software.
Results: Mean age of study cohort was 36.24±13.81 years with male preponderance (70%). Majority of the patients developed hematuria (n=28) followed by fever (n=3), leakage (n=1), urinary tract infection (n=5) and respiratory complications (n=2). Maximum patients returned to normal activity within 1-2 days after PCNL.
Conclusion: PCNL has become a preferred treatment modality because of minimally invasive procedure and lower rate of complications.

Keywords: PCNL, minimally invasive therapy, bleeding, renal stone

Introduction
The use of percutaneous nephrolithotomy (PCNL) in developed countries was started in early 1980's [1, 2]. Since than it has gained the popularity as a routine procedure and become now standard choice for the treatment of renal stones [2].

Remarkable shift has been seen in the treatment of renal stone since 25 years. Shift from open procedure including nephrolithotomy and ureter lithotomy to end urological approaches including shock wave lithotripsy (SWL), ureteroscopy (URS), and PCNL [3].

PCNL is the preferred treatment modality for the removal of large and complex renal stones. Even after the introduction of ESWL it is still the method of choice in patients with large, dense or staghorn stones, frequently as monotherapy [4, 5]. In present study we tried to evaluate the post PCNL complications arising in the patients.

Materials and methods
In present prospective study we included 90 patients with renal calculi at SVBP Hospital attached to LLRM Medical College Meerut from June 2016 to Sept 2017.

A written informed consent from each patient and Institutional Ethics Committee approval was obtained before starting the study.

A thorough history was obtained from each patient. Documentation of patients was done in respect of clinical findings, USG KUB region, X Ray KUB at the presentation in the hospital and was recorded as stated in the working proforma.

Patients with renal calculi of 1-4 cms in size, upper 1/3rd ureteric calculi, PUJ calculi and stones that are difficult to disintegrate by ESWL were included.

Patients with calyceal calculi staghorn calculi, solitary kidney, lower 2/3rd ureteric calculi, vesicle calculi, congenital anomalies, patients unfit for surgery and anesthesia, stones above 4cms, body habitus that excludes prone position (Kyphosis) and patient with bleeding diathesis were excluded from the present study.

All the patients were investigated for complete blood count, urine routine, microscopy and culture/ sensitivity, prothrombin time, renal function tests, liver function tests, blood sugar, serum electrolytes, blood grouping with Rh compatibility, ultrasound whole abdomen and IVP / CT KUB done for preoperative purpose. Patients with radiologically confirmed renal calculus underwent PCNL. Post operatively, the efficacy of the operative procedure was analyzed based on the outcome of the procedure and post-operative complications were studied.

All the data analysis was performed using IBM SPSS ver. 20 software. Quantitative data was expressed as mean ± standard deviation (SD) whereas categorical data was expressed as percentage. Cross tabulation and frequency distribution was used to prepare the table and Microsoft excel 2010 was used to prepare the required graph. Level of significance was assessed at 5% level.

Results

Majority of patients who had undergone PCNL were in age group of 21 to 60 years. Mean age of this group was 36.24±13.81 years. Maximum patients were male [63(70%)] followed by 27(30%) female.

Out of 90 patients, 54(60%) had right sided and 30 (33.3) patients had left side stone and rest 6 (6.67%) had bilateral stones. Out of 90 patients, 65 (72%) patients had single stone and 25 (28%) patients had multiple stone. Mean stone size was 18.75±4.7 mm.

Out of 90 patients, 68 patients required analgesia (injection diclofenac) in the range of 100-150 mg. A total 77.8% patients have pain score in the range of 1-2 (VAS score), followed by 22.2% patients who had VAS score in the range of 3-4.

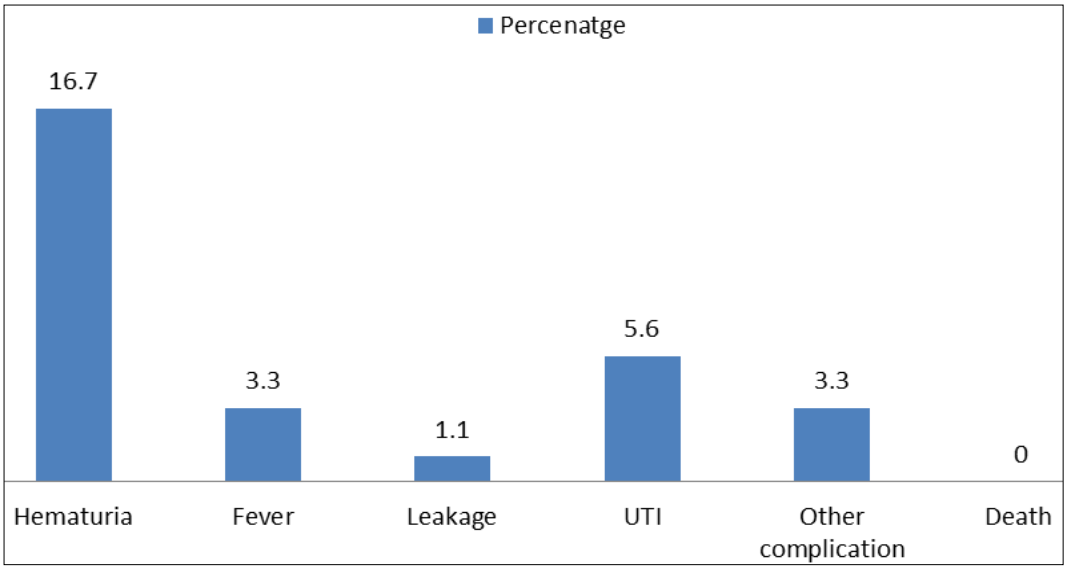

Fig 1: Post-operative complication

Out of 90 patients, time taken to revert to normal activities was in the range of 1-2 days in 82 patients, 3-4 day in 5 patients and only 3 patients had taken more than 4 days due to complication. Mean duration of returning to normal activities was 2.02 days.

Discussion

PCNL is one of the preferred modality for managing stone of more than 3 cm size. With the advancement in the minimally invasive methods, treatment modalities for renal stone diseases has changed over past few decades. In comparison to open surgery, PCNL is less invasive and have minimum complication [6, 7]. In addition to that, PCNL is cost effective treatment modality [8].

In present study out of 90 patients, 68 required analgesia (injection diclofenac) in the range of 100-150 mg. A total 77.8% patients have pain score in the range of 1-2 (VAS score) followed 22.2% patients who had VAS score in the range of 3-4.

Postoperative complications may induce life-threatening situations [9]. The overall complication rate after PCNL is 10–26% [10, 11]. Complications rates in present study were 44.4% which is higher than the previous reports. Higher rates in present study may be due to the small sample size [10, 11]. However in agreement to present study findings El-Karamany *et al.* reported an overall complication rate of 38% [12]. In a similar study by Gupta *et al.* [13] reported that out of 63 patients 22% had complications in post-operative period, out of which most common was chest complications. Study done by Munver *et al.* reported an overall complication rate of 16% (16/98 tracts) [14].

In present study out of 90 patients, 28 patients developed hematuria, 3 patients developed fever, 1 patient had leakage, UTI was found in 5 patients, 2 patients developed respiratory complication and 1 patient developed abdominal distension. In agreement to present study the complications of PCNL reported by Raut *et al.* were residual calculi, bleeding, and renal perforation. Infectious complications related to PCNL were reported in 32.7% patients. In most of the cases, it is limited to postoperative fever, despite antimicrobial prophylaxis, and usually resolves with continuing antibiotics for 48 hours [15]. Bleeding can be seen at any step of the procedure; it may be seen while creating the track or because of vascular injury after puncture or because of excess dilation. In routine practice, venous bleeding can be controlled by Amplatz sheath. In case of excessive bleeding procedure can be stopped and tamponading nephrostomy tube is inserted. [16] Study of El-Karamany *et al.* reported that blood transfusion was indicated if the haemoglobin and/or haematocrit decreased to <9 g/dL and <27%, respectively. In present study bleeding was seen in 28 patients. Dayal *et al.* studied 60 patients with mean age of 39.45 years reported that total complication rate was 6% with minor complications in the form of fever, PCNL leak, suture granuloma and major complication in 4 patients [5].

Time taken to revert to normal activities in present study was in the range of 1-2 days in 82 patients, 3-4 day in 5 patients and only 3 patients had taken more than 4 days due to compli cation. Mean time to return to normal activities was 2.02 days. We did not find any study reported the recovery time in

patient undergoing PCNL for renal stone. However based on our results we can conclude that PCNL has shown lesser recovery time and patients have gained the normal activity within 2.02 days.

Cross sectional nature was the main drawback of present study because of that present study findings cannot be applied to larger population. Small sample size was another one; a large randomized clinical trial is required to strengthen the present study findings.

Conclusion

PCNL has become a first line treatment modality for the removal of renal stones. PCNL offers two major advantage of being minimally invasive therapy and complete stone clearance. PCNL as a monotherapy is associated with lesser morbidity and the greatest cost efficiency compared with the other techniques.

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