

OUTCOMES OF PERCUTANEOUS NEPHROLITHOTOMY IN A TERTIARY CARE HOSPITAL

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**ABSTRACT**

Introduction: Percutaneous nephrolithotomy (PCNL) is the gold standard first-line treatment for renal stones. It is a successful, less invasive surgery (> 90%) but with high complication rate (> 10%). The study aims to see the outcome of PCNL in patients with renal stone who were treated.

Materials and Methods: A retrospective study which included all the cases that presented with renal stone and who underwent PCNL for the treatment. The data included in this study was from April 2019 to December 2021. Ethical clearance was obtained from the institutional Review Committee (F-NMC/578/078-079). The data were collected from the records available in the record section. We evaluated the distribution of presentation, puncture site, stone clearance, blood loss, postoperative stenting and complications of the surgery.

Result: The total of 63 cases underwent PCNL in our institute. The mean age of the patients was 34.68±14.108 years and mean size of the stone was 5.7531±18.07804 cm³. Among the total cases, 52% cases presented with renal stone on the left kidney, 54% presents in the pelvic ureteric junction. In 71% cases puncture was made in the lower pole and in 63.5% single puncture was made to proceed. Complete clearance of stone was seen in 94% cases, 4.8% developed urosepsis and 6.3% required blood transfusion. Stenting was done postoperatively in 95% cases.

Conclusion: The total stone clearance rate in our study was 94% which is higher when compared to other study. With the increase in case flow the efficacy of the procedure will increase and along with this the outcome of the procedure will increase.

Keywords: Outcome; PCNL; Renal stone.

INTRODUCTION

Percutaneous nephrolithotomy (PCNL) is a minimally invasive surgical technique used to remove stone from the kidney or upper pole of ureter. It is a widely accepted procedure to remove renal stone that are large, firm and resistant to other mode of treatment.¹ Percutaneous stone removal was suggested as the first line treatment option for the management of staghorn calculi by the American Urological Association Nephrolithiasis Clinical Guidelines panel.² PCNL is a successful, less invasive surgery (> 90%) but with high complication rate (> 10%).^{3,4} There are some complications that may be predictable

or unpredictable, such as hemorrhage, collecting system injuries, contiguous organ injuries, intra-operative technical complications, hypothermia, fluid overload, sepsis, stricture formation, nephron-cutaneous fistula, renal loss, and death.^{3,5}

PCNL is the gold standard first-line treatment for renal stones larger than 2 cm; the use of ultrasonographic access is recommended for PCNL.⁶ Numerous characteristics of the patient, such as number of comorbidities,⁷ body mass index (BMI),⁶ renal anatomy (e.g., renal features and congenital renal anomalies)⁸ and features of the

renal stones (e.g., size, location and number)⁹ have been reported as predictive of treatment success.

The study aims to see the outcome of PCNL in patients with renal stone who were treated in the Urology department of National Medical College.

MATERIALS AND METHODS

This was a descriptive retrospective study which included all the cases that presented with renal stone and who underwent PCNL for the treatment in Urology Department of National Medical College (NMC), Birgunj during the last three years. The data included in this study was from April 2019 to December 2021. Ethical clearance was obtained from the institutional Review Committee of NMC (Reference No: F-NMC/578/078-079). All the patients that underwent PCNL were included in the study. A total of 63 cases were included in our study. All the data were collected from the records available in the record section of the hospital. We evaluated the distribution of presentation, puncture site, stone clearance, blood loss, postoperative stenting and complications of the surgery. The outcome included in the study were complications faced post-surgery. The data were collected in data collection sheet and was entered in Microsoft Excel 2016. Data analysis was done using the Statistical Package for the Social Sciences (SPSS) version 16.

RESULTS

The total of 63 cases underwent PCNL in our institute among which 36 (57%) were female and 27 (43%) were male patients. The mean age of the patients who underwent PCNL was 34.68 ± 14.108 years. Similarly, the mean size of the stone was 5.7531 ± 18.07804 cm³. (Table 1)

Table 1: Presentation of patients

Parameters	Minimum	Maximum	Mean	SD
Age in years	16	70	34.68	14.108
Size of stone (cm ³)	0.34	144.65	5.75	18.0780
HU	749	1823	1350.48	187.528

Among the total cases, 33 (52%) cases presented with renal stone on the left kidney with 34 (54%) presents in the pelvic ureteric junction (PUJ). In 45 (71%) cases puncture was made in the lower pole and in 40 (63.5%) single puncture was made to proceed. Among the total cases 3 (4.8%) developed urosepsis and 4 (6.3%) required

blood transfusion. Stenting was done postoperatively in 59 (94%) cases and in 1 case antegrade stenting was done. Complete clearance of stone was seen in 59 (94%) cases. (Table 2)

Table 2: Operative parameters

Parameters	Frequency	Percentage (%)
Presentation of stone		
Right kidney	30	48
Left kidney	33	52
Site of stone		
Lower pole	13	20.6
Mid pole	15	23.8
PUJ	34	54.0
Upper pole	1	1.6
Puncture site		
Mid pole	18	29
Lower pole	45	71
Number of punctures		
1	40	63.5
2	10	15.9
More than 2	13	20.6
Urosepsis	3	4.8
Blood loss parameter		
Hematuria	1	1.6
Blood transfusion	4	6.3
Postoperative stenting		
No stenting	3	5
Stenting	59	94
Antegrade stenting	1	1
Stone clearance		
Complete	59	94
Partial	4	6

DISCUSSION

PCNL was done three years ago for the first time in our institution. Till date total of 63 cases have undergone PCNL among which 36 (57%) were female and 27 (43%) were male patients.

In our study the mean age of the patients was 34.68 ± 14.108 years and the size of renal stone was 5.75 ± 18.078 cm³.

Among the total cases, 33 (52%) cases presented with renal stone on the left kidney with 34 (54%) presents in the PUJ. In a study done by Karki et al where 36% stone presented in pelvicalyx.¹⁰ In a study done by Mousavi-Bahar et al 74.4% cases presented with stone in PUJ.¹¹ In

45 (71%) cases puncture was made in the lower pole and in 40 (63.5%) single puncture was made to proceed where as 20.6% required multiple punctures. Which was similar to study done by Opondo et al where in 70.3% cases puncture was made in lower pole but only 4.5% cases required multiple punctures.¹² in a study done by Karki et al 69.77% cases were approached through subcostal approach and 4.8% required multiple punctures.¹⁰

Among the total cases, 3 (4.8%) developed urosepsis and 4 (6.3%) required blood transfusion. Where as in a study done by Karki et al 12.44% developed fever and 2.2% required blood transfusion.¹⁰ Where as in a study done by Mousavi-Bahar et al only 1% developed fever and 0.6% cases required blood transfusion.¹¹

Stenting was done postoperatively in 59 (94%) cases and in 1 case antegrade stenting was done in our study. In a study done by Opondo et al 40.1% postoperative stent placement was done.¹² In another study done by Armitage et al 33% cases stent placement was done.¹³ As we started doing PCNL from last three years, we are just gaining experience in the technique. As a precaution we place stent in maximum cases to avoid traumatic stricture in our patients. Hence the number of stents is higher in our study when compared with other study.

In our study complete clearance of stone was seen in 59 (94%) cases. Study done by Armitage et al showed that the complete clearance of staghorn was 34% and that of >2cm stone was 80%.¹³ In an audit done by Bayles et al in the United Kingdom showed total stone clearance rate was seen in 67% cases.¹⁴

The outcome in our study was similar to other studies but the total case load is less in our center when compared. As the procedure was started recently the case flow has consistently increased. Still, we require prospective study and feedback from our patients to do better in the future.

CONCLUSION

The total stone clearance rate in our study was 94% which higher when compared to other study. With the increase in case flow the efficacy of the procedure will increase and along with this the outcome of the procedure will increase. Studies have shown that outcome of PCNL is

better in high volume centers than low volume centers.

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Conflict of interest

None

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