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Original Article

A Prospective Study of Success Rate of Percutaneous Nephrolithotomy for the Management of Renal Pelvic Calculi

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Abstract
Background: *Renal stones are one of the common problems affecting large number of population all over the world. Percutaneous Nephrolithotomy (PCNL) is a promising technique for reducing hospital stay in patients with renal stone surgery.*
Aims and Objective: *To study the stone size and success rate of PCNL in patients with renal calculi.*
Materials and Methods: *Ninety renal calculi patients were studied at SVBP Hospital attached to LLRM Medical College Meerut from June 2016 to Sept 2017. After a thorough history taking, detail of demographic and clinical findings including age, sex, stone size, hospital stay and success rate were recorded for each patient. All the statistical analysis was done using IBM SPSS ver.20 software.*
Results: *Maximum patients belong to age group of 21-60 years with mean age of 36.24±13.81 years. Male preponderance was reported (70%). Majority of the patients had right sided stone (60%), single (72%) and upper calyx was the most common PCN puncture site (54.44%). Maximum (91%) underwent drainage by DJ stent, had duration of hospital stay of 4-6 days (62.2%). Most of the patients had operative time within 60 mins (54.4%). Maximum patients (90%) achieved total clearance.*
Conclusion: *PCNL should be the first-line treatment modality for the management of the renal calculi. In addition to advantage of minimally invasive therapy, it also offers shorter hospital stay and higher stone-free rates.*
Keywords: *Upper calyx, renal stone, percutaneous nephrolithotomy.*

Introduction

Minimally invasive treatment options for treatment of renal stones have evolved over the last several decades. Once the patient has history of urolithiasis, the risk of recurrence is 50% in next 5 years.

The main objective of stone clearance is to relieve obstruction, prevent further stone growth, any associated infection, and preserve kidney function.[1, 2] Previously, the surgical options to the urologist for treatment of larger renal calculi were limited to open surgical techniques, with their

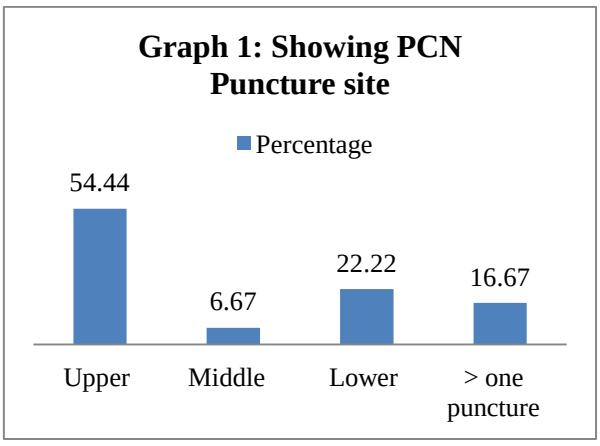
inherent disadvantages of prolonged morbidity.[2]
Percutaneous nephrolithotomy (PCNL) has become a standard, well-established procedure for the treatment of renal stones.[3] The most important indication for treating renal stone disease is the largest one burden.[4] The placement of a nephrostomy tube after completion of PCNL was initially considered a standard procedure.
PCNL provides stone free rates between 76 and 84% if properly performed.[5] If not performed well, it can be associated with significant complications.[6] In present study we tried to evaluate the stone size and the success rates of PCNL in patients with renal stone.

Materials and Methods

Present prospective study was performed on 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 was recorded as stated in the working proforma.
Patients with stones of 1-4cms in size, renal calculi, 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 and liver function tests, blood sugar, serum electrolytes, blood grouping with Rh compatibility, ultra sound whole abdomen and IVP / CT KUB done for preoperative purpose. Patients with radiologically confirmed renal calculus had undergone PCNL.
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±4.7mm.



Out of 90 patients, 82(91%) patients underwent drainage by DJ stent, 3(3.33%) patients by ureteric catheter and 05(5.55%) patients through nephrostomy tube. Most of the patients had duration of hospital stay of4-6 days [56 (62.2%)]. Mean operative time in present study was 83.65±34.42 min. Most of the patients had operative time less than 60 mins [49 (54.4%)].

Table 1: Showing success rate among study cohort

Sr. No	Clearance	Frequency	Percentage
1	Total clearance	81	90.0
2	Clearance in second sitting	2	2.2
3	Residual stone	6	6.7
4	Failure	1	1.1

Discussion

Past two decades have witnessed a lot of improvement in the surgical management of renal tract stone disease with the advancement in the techniques like ESWL and PCNL.[7] PCNL has become a common procedure performed in patients with renal calculi. [8] Since the recurrence rate for renal stones is high.

Reddy et al[9] studied 367 patients who underwent PCNL, reported the mean age of 45.67±13.21 which is in agreement to the findings of present study where the mean of study cohort was 36.24±13.81 years. Raut et al studied 107 cases of renal calculi who underwent PCNL and reported that mean age of cases was 43.64 years which is slightly higher as compared to present study.[10]

In present study maximum patients were male (70%) followed by 27 (30%) female. Khawaja et al[11] did a similar study in 2014 and found that males predominated, with male/female ratio of 2.6:1(86:33). Study done by Raut et al also reported male preponderance (60.7%) as compared to present study. [10]

In present study 60% had right sided and 33.3% patients had left side stone and rest 6.67% had bilateral stones. This is similar to the study done by Khan et al where out of 200 patients, 110 (55%) had right-sided stone and 90 (45%) had left- sided stone.[7]

Lingeman and colleagues[12] in 1987 showed that for stones less than or equal to10 mm, the stone-free rate is 77% and this decreases to a mere 29% for stones greater than 30 mm. In early 1990s sandwich therapy became an attractive option for large calculi that were typically treated percutaneously followed by lithotripsy and a second percutaneous procedure to clear any significant residual fragments following lithotripsy.[13, 14] However, a more recent study by Denstedt and colleagues[15] showed that primary PCNL resulted in better stone free rates than sandwich therapy (84% versus 63%) with shorter hospital stay (6 days versus 12.2 days) and decreased need for blood transfusion (1.6% versus 14%) when compared with the sandwich approach advocated by Streem and colleagues.[14] In agreement to that in present study mean stone size was 18.75±4.7 mm which may be the reason for the higher rates of stone free rates in present study. Maximum patients had hospital stay between 4-6 days in present study which is in agreement to the previous study done by Denstedt and colleagues.[15]

Raut et al studied 107 renal calculi patients and has found that multiple calculi were seen in 43.9%, while a staghorn calculus was seen in 16.8%. [10] In agreement to that in present study 28% of the patients had multiple stone.

In present study we found that mean operative time was 83.65±34.42 min. However most of the patients had operative time within 60 mins (54.4%). Raut et al found that average operative time required for PCNL was 34 to 102 minutes with a mean of 57.67 minutes, while the nephroscopy time on an average was 27 minutes.[10] Hayder et al noted the average procedure time of 57.40 ± 21.05 minutes.[16]

In present study out of 90 patients, 91% patients have undergone drainage by DJ stent, 3.33% patients by ureteric catheter and 5.55% patients through nephrostomy tube. Reports of Raut et al showed that stone clearance was done through a single tract in 78.5% out of 107 patients and additional tracts were made in 21.5%.[10] Hegarty and Desaiin their study concluded that monotherapy with PCNL utilizing multiple percutaneous tracts is highly effective in the treatment of staghorn calculus and other large volume renal calculi.[17]

In present study out of 90 patients, total clearance was reported in 90% of the patients. In agreement to present study Raut et al who studied 107 renal calculi patients who underwent PCNL reported

that urinary leak was noted in 4.6%; 70% of the cases were left stone free, with an overall success rate of 85.98%.[10]

However the study is small and of cross sectional in nature, large randomized clinical trial is needed to strengthen the present study findings.

Conclusion

The findings of the present study revealed that PCNL is the first-line treatment modality for the management of the renal calculi, which offers the advantage of minimally invasive therapy with shorter hospital stay, and higher stone-free rates without compromising patient safety. Advancements in technology, proper training, learning, experience of the urologist and availability of good, well-maintained instruments play a very important role in improving the success rate of PCNL.

References

1. Koga S, Arakaki Y, Matsuoka M, Ohyama C. Staghorn calculi – long-term results of management. Br J Urol 1991 Aug; 68(2):122-124.
2. Preminger GM, Assimos DG, Lingeman JE, Nakada SY, Pearle MS, Wolf JS Jr; AUA Nephrolithiasis Guideline Panel. Chapter 1: AUA guideline on management of staghorn calculi: diagnosis and treatment recommendations. J Urol 2005 Jun;173(6):1991-2000.
3. Wickham JE, Kellett MJ. Percutaneous nephrolithotomy. Br J Urol 1981 Aug; 53(4):297-299.
4. Liatsikos EN, Kapoor R, Lee B, Jabbour M, Barbalias G, Smith AD. "Angular percutaneous renal access." Multiple tracts through a single incision for staghorncal- culous treat- ment in a single session. EurUrol 2005 Nov;48(5):832-837.
5. de la Rosette J, Assimos D, Desai M, Gutierrez J, Lingeman J, Scarpa R, Tefekli A; CROES PCNL study group. The clinical research office of the endourological society percutaneous nephrolithotomy global study: indications, complications, and outcomes in 5803 patients. J Endourol 2011 Jan;25(1):11-17.
6. Turna B, Nazli O, Demiryoguran S, Mammadov R, Cal C. Percutaneous nephrolithotomy: variables that influence hemorrhage. Urology 2007 Apr;69(4):603-607.
7. Khan S, Toori LA, Anwer K. The efficacy of percutaneous nephrolithotomy in renal and upper ureteric calculi. Pakistan J Med Res 2005;44(2):89-91
8. Srivastava A, Singh KJ, Suri A, Dubey D, Kumar A, KapoorR, et al. Vascular complications after percutaneous nephrolithotomy: are there any predictive factors? Urology.2005;66:38-40
9. Reddy SVK, Shaik AB. Outcome and complications of percutaneous nephrolithotomy as primary versus secondary procedure for renal calculi. Vol. 42 (2): 262-269, March - April, 2016
10. Raut N, Singhania P, Joshi N, Shringarpure S, Sathe S, Tiwari N. Prospective Study of Percutaneous Nephrolithotomy in the Management of Renal Calculi. MGM Journal of Medical Sciences, January-March 2017;4(1):1-5
11. Khawaja AR, Dar TI, Sharma AK, Bashir F, Tyagi VK, Bazaz MS. Post percutaneous nephrolithotomy nephrosto- gram: is it mandatory? A single center experience. AdvUrol 2014;2014:423730.
12. Lingeman JE, Coury TA, Newman DM, et al. Comparison of results and morbidity of percutaneous nephrostolithotomy and extracorporeal shock wave lithotripsy. J Urol 1987;138(3):485–90.
13. Segura JW, Preminger GM, Assimos DG, et al. Nephrolithiasis clinical guidelines panel summaryreport on the management of staghorn calculi. The American urological association nephrolithiasis clinical guidelines panel. J Urol 1994;151

(6): 1648–51.
14. Streem SB, Yost A, Dolmatch B. Combination ‘‘sandwich’’ therapy for extensive renal calculi in 100consecutive patients: immediate, long-term and stratified results from a 10-year experience. J Urol1997;158(2):342–5.
15. Denstedt JD, Razvi HA, Dushinski J, et al. Percutaneous treatment of large and staghorn renalcalculi. J Endourol 1996;10 (Supp 1):S140, P11–328 (Abstract).
16. Hayder MA. Percutaneous nephrolitho-tomy for renal calculi: a single surgeon experience. Iraqi Postgraduate Med J 2013; 12(4):573-80.
17. Hegarty NJ, Desai MM. Percutaneous nephrolithotomy requiring multiple tracts: comparison of morbidity with single-tract procedures. J Endourol 2006 Oct;20 (10):753-60.