

Determine the Outcome of Multiple Tract Percutaneous Nephrolithotomy for Renal Staghorn Calculus

Nephrolithotomy
for Renal
Staghorn
Calculus

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ABSTRACT

Objective: To determine the outcomes of PCNL (multitract percutaneous nephrolithotomy) in patients presented with renal staghorn calculus.

Study Design: Descriptive case series study.

Place and Duration of Study: This study was conducted at the Department of Urology Saidu Teaching Hospital Swat and PIMS Islamabad, during from the period December 2018 to December 2019.

Materials and Methods: Two hundred and ten patients of both genders with renal staghorn calculi of >20 mm in size were included. Patients detailed demographics were recorded after taking written consent. Multiple tract PCNL was done after completion of all investigations. All patients were given prophylactic antibiotics. Stone clearance post-operatively was assessed by CT-KUB. Follow-up was taken at 1 month postoperatively. Data was analyzed by SPSS 24.0.

Results: There were 100 (47.62%) males while 110 (52.38%) were females. Mean age of 42.26±12.68 years. Mean BMI was 24.68±2.13 kg/m². Mean size of the stone was 24.88±4.73 mm. Postoperative complications found in 40 (19.05%) patients, in which 20 (9.52%) patients had fever, blood transfusion in 8 (3.81%) patients, wound infection in 6 (2.86%), hydrothorax in 4 (1.90%) patients and 2 (0.95%) patient had septic shock. Overall stone clearance rate with multiple tract PCNL was 87.92%.

Conclusion: It is concluded that multitract PCNL is safe and very effective treatment modality for staghorn caculi with higher stone clearance rate and fewer postoperative complications.

Key Words: Multiple tract percutaneous nephrolithotomy (PCNL), Renal staghorn calculus, Stone clearance

Citation of article: Din N, Ahmed I, Shah MA, Elahi F, Akbar F, Rashidullah. Determine the Outcome of Multiple Tract Percutaneous Nephrolithotomy for Renal Staghorn Calculus. Med Forum 2020;31(12):26-29.

INTRODUCTION

The stone-polluted stonic calculus is known as the renal calculus which has a branch structure with a large portion of the collector system^[1]. This procedure also incorporates open operation, percutaneous nephrolytomy, extracorporeal shock lithotripsy and a combination Staghorn calculus therapy option. The emphasis of staghorn computer management is to clear stones entirely, so that blockages are removed and the further formation of stones prevented, as well as causative organisms eradicated^[2].

Despite this excellence in stone clearance, many international studies with suitable amounts of surgical complications and which have particular relevance to blood transfusion are documented^[3]. Percutaneous nephrolithotomy is also controversial with numerous tracts which may lead to additional complications such as serious bleeding from multitract renal parenchyma trauma^[4].

The effect of percutaneous nephrolithotomy on the transient deterioration of renal function is similar, however, either with a single or multi-access tract. Thus the clearance of stone with a considerably complicated rates in percutaneous staghorn nephrolithotomy with many accesses can be seen as an efficacious and competitive approach^[6].

Therefore, many complex staghorn stones require many access in different sizes to reach and remove all parts of the stone^[6],^[4]. The discussion continues to see whether a single PCNL-loop procedure or sandwich treatment is to be carried out in which the initial PCNL is paired with the lithotripsy extracorporeal shock wave (SWL) and then another 2nd PCNL look or rather a PCNL-loop multitract to make the patient stone free in one session. In addition, the discussion continues. Later, the rate can be 84–95% without stone^[7]. In addition, multitracting one-session PCNL would considerably

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Received: May, 2020

Accepted: September, 2020

Printed: December, 2020

lower costs if multiple procedures of all forms were avoided [8]. Compared to combination therapies, multitract PCNL has a comparable complication rate [9], although studies indicate that multiple tracts cause perioperative bleeding [10].

MATERIALS AND METHODS

This descriptive study was conducted at Department of Urology Saidu Teaching Hospital Swat and PIMS Islamabad, during from the period December 2018 to December 2019. Total 210 patients of both genders with renal staghorn calculi of >20 mm in size were included. Patients detailed demographics including age, sex, body mass index and size of stone were recorded after taking written consent. Patients ages were ranging between 18 to 70 years. Patients with uncontrolled bleeding disorders INR>1.5, ectopic pelvic kidney and urinary tract infection diagnosed on urine culture and sensitivity were excluded. Detailed medical history and examination, renal function tests (serum urea and creatinine), urine complete examination and urine culture, X ray KUB, ultrasonography and computed tomography (KUB) were done.

All the patients were received Multiple tract PCNL was. All patients were given prophylactic antibiotics. All procedures were performed under general anesthesia. Postoperative complications such as fever, blood transfusion, hydrothorax, septic shock and wound infection were examined. Stone clearance post-operatively was assessed by CT-KUB. Follow-up was taken at 1 month postoperatively. Data was analyzed by SPSS 24.0.

RESULTS

There were 100 (47.62%) males while 110 (52.38%) were females. Mean age of 42.26±12.68 years. Mean BMI was 24.68±2.13 kg/m². Mean size of the stone was 24.88±4.73 mm. (Table 1).

Table No 1: Baseline details of all the patients

Variables	Frequency No.	% age
Mean Age (Years)	42.26±12.68	-
Mean BMI	24.68±2.13	-
Mean Stone Size (mm)	24.88±4.73	-
Gender		
Male	100	47.62
Female	110	52.38

Table No 2: Postoperative complications

Po complications	Frequency No.	% age
Fever	20	9.52
Transfusion	8	3.81
Wound Infection	6	2.86
Hydrothorax	4	1.9
Septic Shock	2	0.95

Postoperative complications found in 40 (19.05%) patients, in which 20 (9.52%) patients had fever, blood transfusion in 8 (3.81%) patients, wound infection in 6 (2.86%), hydrothorax in 4 (1.90%) patients and 2 (0.95%) patient had septic shock. (Table 2).

184 (87.92%) patients had successful treatment and found complete stone clearance while 26 (12.08%) had not complete stone clearance. (Figure 1).

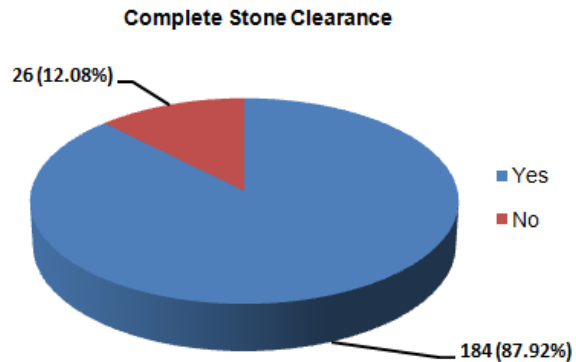


Figure No.1: Frequency of Stone Clearance

DISCUSSION

Complex stones are very detrimental to the kidney as they cause inflammation, atrophy, renal failure and cancer. To obtain maximum clearance and to prevent second vision procedures such as ESWL or retrospective inner arrest surgery, multiple tracts are often required for treatment (RIRS). Nevertheless, some tracts frequently have a higher risk of bleeding [11]. Moreover, multitract PCNL is very difficult to learn and needs a lot of expertise, even though device and technology have been developed over the recent decades [12]. Some studies have shown that open or laparoscopic stone surgery is an effective way to treat complex renal stones and is related to a higher one-session stone-free rate [13]. We conducted present study to determine the outcomes of renal staghorn calculi treated with multiple tract PCNL. In this regard 210 patients with staghorn calculi were enrolled. Majority 52.38% patients were females while males were 47.62%. Mean age of patients was 42.26±12.68 years. These results showed similarity to some previous studies in which females were high in numbers 55% to 60% and average age of patients was 45 years [14-15].

In present study stone clearance rate associated with PCNL was 87.92%. These results were comparable to many of previous studies in which multiple tract PCNL had high successful rate with stone clearance rate 85% to 92% [7, 16]. A study conducted by Rashid AO et al [17] reported that out 65 patients received multitract PCNL and among them stone clearance rate was 85%.

A study conducted by Liang T et al ^[18] regarding multiple tract PCNL for complex renal stone and they reported that complete stone clearance rate was 88.9%.

Chan J et al ^[19] used multiple tract PCNL for the treatment of renal staghorn calculi and in their study out of 117 patients 54.2% patients got complete stone clearance while 45.8% patients had partial stone clearance.

A study by Gadelmoula M et al ^[20] regarding outcomes of PCNL for renal stone, in their study the stone clearance rate was 87.7% patients.

In our study postoperative complications found in 40 (19.05%) patients, in which 20 (9.52%) patients had fever, blood transfusion in 8 (3.81%) patients, wound infection in 6 (2.86%), hydrothorax in 4 (1.90%) patients and 2 (0.95%) patient had septic shock. Many of previous studies showed similarity to our study findings in which bleeding, fever, hydrothorax and septic shock were associated with PCNL ^[21-22].

CONCLUSION

The multiple tract PCNL is gold standard technique for staghorn calculi with reasonable operative duration, low morbidity and good success rate.

Author's Contribution:

Concept & Design of Study:	Nizamud Din
Drafting:	Irfan Ahmed, Mumtaz Ali Shah
Data Analysis:	Fazal Elahi, Fazal Akbar, Rashidullah
Revisiting Critically:	Nizamud Din, Irfan Ahmed
Final Approval of version:	Nizamud Din

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Healy KA, Ogan K. Pathophysiology and management of infectious staghorn calculi. *Urol Clin North Am* 2007;34:363–374.
2. Preminger GM, Assimos DG, Lingeman JE, et al. Chapter 1: AUA guideline on management of staghorn calculi: diagnosis and treatment recommendations. *J Urol* 2005;173:1991–2000.
3. Viprakasit, DP, Sawyer, MD, Herrell, SD. Changing composition of staghorn calculi. *J Urol* 2011; 186: 2285–2290.
4. Osman, M, Wendt-Nordahl, G, Heger, K. Percutaneous nephrolithotomy with ultrasonography-guided renal access: experience from over 300 cases. *BJU Int* 2005;96: 875–878.
5. Elawady H, Mostafa DE, Mahmoud MA, Abuelnaga M, Farouk A, Tawfick A, et al. Is multiple tracts percutaneous nephrolithotomy (PCNL) safe modality in the management of complex renal stones? A prospective study: a single-center experience. *Afr J Urol* 2018;24(4): 308–314.
6. Tan MAV, Lusaya DG. Multiple vs. single access PCNL. In *Endourol Progress*;2019.p.57–63.
7. Li JK, Teoh JY, Ng CF. Updates in the endourological management of urolithiasis. *Int J Urol* 2019;26(2):172–183.
8. Zhong W, Zeng G, Wu W, Chen W, Wu K. Minimally invasive percutaneous nephrolithotomy with multiple mini tracts in a single session in treating staghorn calculi. *Urol Res* 2011;39:117–122.
9. Manohar T, Ganpule AP, Shrivastav P, Desai M. Percutaneous nephrolithotomy for complex caliceal calculi and staghorn stones in children less than five years of age. *J Endourol* 2006;20:547–551.
10. Said SH, Hassan MA, Ali RH, Aghaways I, Kakamad FH, Mohammad KQ. Percutaneous nephrolithotomy; alarming variables for postoperative bleeding. *Arab J Urol* 2017; 15(1): 24–29.
11. Akman T, Binbay M, Sari E, et al. Factors affecting bleeding during percutaneous nephrolithotomy: single surgeon experience. *J Endourol* 2011;25(2):327–33.
12. Desai M, Jain P, Ganpule A, et al. Developments in technique and technology: the effect on the results of percutaneous nephrolithotomy for staghorn calculi. *BJU Int* 2009;104(4):542–8.
13. Basiri A, Tabibi A, Nouralizadeh A, et al. Comparison of safety and efficacy of laparoscopic pyelolithotomy versus percutaneous nephrolithotomy in patients with renal pelvic stones: a randomized clinical trial. *Urol J* 2014; 11(6):1932–7.
14. Haggag YM, Morsy G, Badr MM, et al. Comparative study of laparoscopic pyelolithotomy versus percutaneous nephrolithotomy in the management of large renal pelvic stones. *Can Urol Assoc J* 2013;7(3–4):E171–175.
15. Yin Z, Wei YB, Liang BL, et al. Initial experiences with laparoscopy and flexible ureteroscopy combination pyeloplasty in management of ectopic pelvic kidney with stone and ureter-pelvic junction obstruction. *Urolithiasis* 2015;43(3):255–60.
16. Abdelhafez MF, Wendt-Nordahl G, Bedke J, Amend B, Honeck P, Stenzl A, et al. Minimally invasive versus conventional large-bore percutaneous nephrolithotomy in the treatment of large-sized renal calculi: Surgeon's preference? *Scand J Urol* 2016;50:212–215.
17. Rashid AO, Mahmood SN, Amin AK, et al. Multittract percutaneous nephrolithotomy in the

- management of staghorn stones. *Afr J Urol* 2020; 26:74.
18. Liang T, Zhao C, Wu G. et al. Multi-tract percutaneous nephrolithotomy combined with EMS lithotripsy for bilateral complex renal stones: our experience. *BMC Urol* 2017;17:15.
 19. Chen J, Zhou X, Chen Z, et al. Multiple tracts percutaneous nephrolithotomy assisted by LithoClast master in one session for staghorn calculi: report of 117 cases. *Urolithiasis* 2014; 42(2):165–9.
 20. Gadelmoula M, Desouki EA, Abdellatif A, Shalaby M. Outcome of percutaneous nephrolithotomy for renal stones in Assiut Urology and Nephrology Hospital. *J Curr Med Res Pract* 2018;3:58-62
 21. Morgan TN, Shahait M, Maganty A. Conservative management of staghorn calculi: when is it safe? *J Endourol* 2018;32: 541–545.
 22. Wollin DA, Joyce AD, Gupta M. Antibiotic use and the prevention and management of infectious complications in stone disease. *World J Urol* 2017; 35:1369–1379.