

Day care percutaneous nephrolithotomy in COVID era

Javed Altaf Jat, Waqar Ahmed Memon, Pooran Mal, Taimoor, Abdul Qayoom Ghangro, Ahsan Ali Arain, Khadijah Abid

Submitted

October 18, 2022

Accepted

February 20, 2023

Author Information

From: Department of Urology, Liaquat University of Medical & Health Sciences, Jamshoro, Sindh, Pakistan

Dr. Javed Altaf Jat
Chairman & Associate Professor

Dr. Waqar Ahmed Memon
Assistant Professor

Dr. Pooran Mal
Associate Professor

Dr. Taimoor
Senior Registrar

Dr. Abdul Qayoom Ghangro
FCPS-II Trainee

Dr. Ahsan Ali Arain
Consultant Urologist

Dr. Khadijah Abid
Lecturer
(Corresponding Author)
Email:
khadijahabid@gmail.com

Citation: Jat JA, Memon WA, Mal P, Taimoor, Ghangro AQ, Arain AA, et al. Day care percutaneous nephrolithotomy in COVID era. J Rehman Med Inst. 2023 Apr-Jun;9(2):7-9.

ABSTRACT

Introduction: Like many other aspects of healthcare affected by the COVID-19 pandemic, patients with renal stones also had to face many unanticipated hurdles to the provision of necessary hospital care including surgeries, which could be undertaken essentially only on an emergency basis. To overcome this problem, the approach of Day Care Nephrolithotomy was undertaken that required only a 24-hours observation and much decreased use of surgical resources.

Objective: To assess the success rate of day care percutaneous nephrolithotomy during COVID-19 pandemic.

Materials & Methods: It was an observational study conducted at the Urology department of LUMHS Jamshoro, Sindh, Pakistan, from January 2021 to April 2022. Patients older than 18 years within 30 km of Jamshoro LUMHS with renal stones who presented for percutaneous nephrolithotomy were included in the study. Pre-operative data regarding patients' demographics and stone characteristics were obtained. Non-contrast CT was used to determine stone characteristics like size and site. All patients were undergoing surgery under general anesthesia. Fragmentation of stones was assessed using Holmium laser or Master lithocast. Flushing, irrigation, or grasper were utilized to extract small size stones. Clearance of stone was confirmed by fluoroscopy and endoscopy. Retaining Ureteric catheter or DJ stent was placed after surgery based on the preference of surgeon. After surgery patients were kept under observation for 24 hours to look for complications like bleeding and temperature. All data were recorded on pre-designed Performa and analyzed for descriptive and comparative statistics by SPSS 25.

Results: The mean age of the patients was 26.90 ± 10.83 years. Of 60 patients, 63.3% were males and 36.7% were females. The mean procedure time was 65.48 ± 14.03 minutes (range: 40 to 90 minutes). About 91.7% of the patients had complete stone clearance, while 3 patients had <10% stone burden remaining, and 2 patients had <25% stone burden remaining. All the patients were discharged within 24 hours of percutaneous nephrolithotomy without having any complication.

Conclusion: PCNL can be done as day care in selected patients, thereby reducing the hospital burden of patients and attendants during the COVID -19 pandemic.

Keywords: COVID-19; Coronavirus; Renal Calculi; Lithotripsy; Nephrolithotomy, Percutaneous.

The authors declared no conflict of interest. All authors contributed substantially to the planning of research, data collection, data analysis, and write-up of the article, and agreed to be accountable for all aspects of the work.

INTRODUCTION

The COVID-19 pandemic has altered medical practice all over the world including Pakistan.¹ According to recent data, total 1.56 million cases and more than 30 thousand deaths are reported from Pakistan.² Many countries including Pakistan have implemented lockdown strategy to curb the spread of COVID-19, which included complete shutdown of educational institutes and religious, political, and social gatherings.³ Many hospitals have changed their daily activities, which leads to cancellation of outpatient clinics and elective surgeries, in order to ensure adequate number of beds and hospital facilities for COVID-19 patients.^{1,4}

Many urology practices have also delayed operations in order to accommodate patients with COVID-19.³ This has significant impact on the delay of many urological time-sensitive procedures.³ For urinary stones, procedures were limited to urological emergencies and all hospitals have postponed non-emergent procedures like extracorporeal shock wave lithotripsy (ESWL), percutaneous nephrolithotripsy (PCNL), transurethral lithotripsy (TUL) and retrograde intrarenal surgery (RIRS).⁵

On the other side, if ureteric or renal stones are left untreated for longer period of time, then renal function can be significantly influenced. That is why appropriate and timely management is important. It is recommended to treat obstructing kidney stones related with infection within 24 hours and simple or with uncontrolled pain and renal impairment within 72 hours.⁶ For these cases, the preferred treatment option is PCNL under local anesthesia during COVID-19 crisis.³ This procedure is safe, cost-effective, and less invasive; moreover, the health worker has less exposure to the patients than DJ stent insertion that requires general anesthesia. It is also associated with lesser emergency visits or readmission.⁵

In light of the overwhelming burden of renal stone disease in conjunction with the recent isolation era of pandemic crises, an approach modification and implementation were made to transform the hospitalized admitted patient to an overnight transient stay for PCNL procedure in the Urology department of tertiary care hospital. This was necessitated due to over burden of COVID patients in the hospital thereby resulting in decreased availability of beds.

MATERIALS & METHODS

It was an observational study conducted at the Urology department of LUMHS Jamshoro, Sindh, Pakistan, from January 2021 to April 2022. Sample size of 60 was calculated using Open Epi sample size calculator by taking statistics of complete stone clearance as 91.4%, bond on error as 7.5%, and 95% level of confidence.(7) Patients older than 18 years within 30 km of Jamshoro with renal stones who presented for percutaneous nephrolithotomy were included in the study. Those patients who require multiple punctures were also excluded. Patients with urine infection, pelvic kidney, multiple comorbidities and haematuria were excluded from the study. Non-random consecutive sampling method was employed.

The study was approved by the ethical review board of the institute. All patients who underwent PCNL in the specified time period were included in the study according to selection criteria, after describing the study and getting written informed consent data was obtained from the patients.

Pre-operatively, data regarding patient's demographics and stone characteristics were obtained. Non-contrast CT was used to determine stone characteristics like size and site. All patients underwent surgery under general anesthesia. Fragmentation of stones was done by using Holmium laser or Master lithocast. Flushing, irrigation, or grasper were utilized to extract small size stones. 16 – 22 Amplatz Sheath was used in PCNL. Clearance of stone was confirmed by fluoroscopy, endoscopy, and post-operative X-ray KUB on the next day morning. Ureteric catheter or DJ stent was placed after surgery based on the preference of surgeon. After surgery patients were kept under observation for at least 24 hours to look for hematuria & fever. The catheter was removed on next day and patient discharged after confirming no hematuria and no fever. All data were recorded on pre-designed proforma.

SPSS version 25 was used to analyze data. Mean and SD were reported for numeric variables, while frequency and percentage were reported for categorical variables. Fisher exact test was applied for the comparison of stone characteristics with stone clearance. One-way ANOVA was applied for the comparison of procedure time with remaining stone burden. A p-value ≤ 0.05 was considered statistically significant.

RESULTS

Of 60 patients, 63.3% were males and 36.7% were females. The mean age of the patients was 26.90 ± 10.83 years. Stones requiring stenting were equally distributed between the left and right sides (46.7% each), and only 6.7% had bilateral stenting done. The most common location of obstruction was renal pelvis (71.7%), followed by staghorn (23.3%). All the stones were radio opaque (100%). Details regarding the number of stones, site of punctures, and the requirement of any form of ancillary treatments are displayed in Table 1.

Table 2 shows data about stone clearance. The mean procedure time was 65.48 ± 14.03 minutes (range: 40 to 90 minutes); 91.7% patients had stone clearance, while 3 patients had <10% stone burden remaining, and 2 patients had <25% stone burden remaining.

Table 1: Baseline characteristics of patients (n=60).

Variables	f (%)
Mean Age (years)	26.90 \pm 10.83
Gender	
Male	38 (63.3)
Female	22 (36.7)
Laterality	
Right	28 (46.7)
Left	28 (46.7)
Bilateral	04 (6.7)
Stone location	
Renal pelvis	43 (71.7)
Staghorn	14 (23.3)
Lower calyceal	03 (6)
Number of stones	
Single	43 (71.7)
Multiple	17 (28.3)
Sites of puncture	
Upper calyceal	17 (28.3)
Mid calyceal	01 (1.7)
Lower calyceal	42 (70)
Ancillary treatment	
URS	2 (3.3)
DJ stent	1 (1.7)
ESWL	1 (1.7)

The proportion of stone clearance was same in right and left sided laterality (p=0.337). The success rate was higher in single stone whereas 27.3% cases showed stone clearance in multiple stones. The highest stone clearance rate was reported at renal pelvis followed by staghorn. While, lower-calyceal puncture sites showed greater stone clearance than other puncture sites. (Table 2).

Table 2: Comparison of stone clearance with stone characteristics (n=60).

Stone Characteristics	Stone Clearance		p-value
	Yes	No	
Laterality			
Right	26 (47.3)	02 (40)	0.337
Left	26 (47.3)	02 (40)	
Bilateral	03 (5.5)	01 (20)	
Number of stones			
Single	40 (72.7)	03 (60)	0.616
Multiple	15 (27.3)	02 (40)	
Location of stone			
Lower calyceal	03 (5.5)	0	0.684
Renal pelvis	40 (72.7)	03 (60)	
Staghorn	12 (21.8)	02 (40)	
Site of puncture			
Upper calyceal	16 (29.1)	01 (20)	0.103
Mid calyceal	0	01 (20)	
Lower calyceal	39 (70.9)	03 (60)	

The procedure time was reported least in <25% stone burden whereas highest in <10% stone burden with p-value=0.716. (Table 3).

Table 3: Comparison of the remaining stone burden with procedure time (n=60).

The remaining stone burden	Mean	SD	p-value
<10%	71.67	7.64	0.716
<25%	62.50	24.75	
Complete clearance	65.25	14.12	

None of the patients reported any complication after daycare PCNL during COVID-19 pandemic.

DISCUSSION

The COVID-19 pandemic has caused a great deal of anxiety and dread among people about getting the virus.⁹ This is particularly true when it comes to concerns regarding COVID-19 infections in hospitals.^{6,10} According to reports, as the virus spread over the world, the number of patients with common and usual complaints who visited the emergency room significantly decreased. Additionally, it was noted that some patients were delaying their emergency department visit until they had developed severe disease and unacceptably dangerous symptoms.¹⁰ Madanelo et al.,¹¹ reported an almost 50% reduction in number of patients visiting the urological emergency department during the COVID-19 pandemic. They further reported a greater proportion of emergency hospitalization during COVID-19 pandemic revealing that patients were indeed presenting later with more unwell condition. Motterle G et al.,¹² also reported more than 50% decrease in emergency urological emergency department visits.

Stone clearance was determined to be 91.7% complete after daycare PCNL in the current investigation; the puncture site had

an impact on stone clearance. Additionally, after daycare PCNL, we identified no severe or minor complications in patients within 24 hours. Tarek et al.,¹³ reported that 78% of patients showed complete stone clearance after PCNL. A meta-analysis also revealed that daycare PCNL is an effective approach in achieving stone clearance and it was related with less bleeding, complications, or hospital readmission.⁷ Sekar et al.,¹⁴ reported that 93% of patients cleared their stones after PCNL, with 6 patients needing ancillary treatment. In our study also, only 4 patients needed ancillary treatment. This ostensibly high stone clearance may however be partially attributable to the presence of kidney stones between 1 and 2 centimeters in size, particularly in the lower calyx, renal pelvis, or upper ureter, all of which were mostly eliminated without the need for extensive fragmentation. The other causes could be a greater number of radio-opaque stones, utilization of multiple punctures required to attain a complete clearance of stone.¹⁵

CONCLUSION

PCNL can be done as day care in selective patients, that reduces the hospital burden of patients and attendants during pandemic of COVID-19.

LIMITATIONS

Our analysis was limited by the small patient sample and the fact that it was an institute-based study. Additionally, we did not examine how the BMI and surgical expertise of the surgeon affect PCNL success.

RECOMMENDATION

To improve the generalizability of the findings, we propose doing a bigger sample size and multicenter prospective investigation.

REFERENCES

- Lee MS, Assmus MA, Agarwal DK, Rivera ME, Large T, Krambeck AE. Ambulatory Percutaneous Nephrolithotomy may be cost-effective compared to standard Percutaneous Nephrolithotomy. *J Endourol.* 2022;36(2):176-82.
- GOP. Pakistan Cases Details: Government of Pakistan; 2022 [Available from: <https://covid.gov.pk/stats/pakistan>].
- Nowroozi A, Amini E. Urology practice in the time of COVID-19. *Urol J.* 2020;17(3):326.
- Somani BK. After COVID-19: planning postpandemic care of patients with kidney stones. *Nature Rev Urol.* 2021;18(9):511-2.
- Yasseri AF, Aghamir SMK. Urinary stone management during the COVID-19 pandemic: a suggested approach and review of literature. *Ther Adv Urol.* 2020;12:1756287220939513.
- Lee C, Whitehurst L, Masani A, Mackie S, Watson G. The impact of the COVID-19 pandemic on the primary definitive management of ureteric stones. *J Clin Urol.* 2021;0(0):20514158221090044.
- Aarthy P, Thangarasu M, Prakash JS, Raghavan D, Jain N, Balakrishnan A, et al. Safety and efficacy of mini-percutaneous nephrolithotomy as daycare procedure: a prospective observational study. *Afr J Urol.* 2021;27(1):9.
- Shafraan R, Rachman S, Whittal M, Radomsky A, Coughtrey A. Fear and anxiety in COVID-19: preexisting anxiety disorders. *Cogn Behav Pract.* 2021;28(4):459-67.
- Anderson S, McNicholas D, Murphy C, Cheema I, McLornan L, Davis N, et al. The impact of COVID-19 on acute urinary stone presentations: a single-centre experience. *Ir J Med Sci.* 2022;191(1):45-9.
- Romero J, Valencia S, Guerrero A. Acute appendicitis during coronavirus disease 2019 (COVID-19): changes in clinical presentation and CT findings. *J Amer Coll Radiol.* 2020;17(8):1011-3.
- Madanelo M, Ferreira C, Nunes-Carneiro D, Pinto A, Rocha MA, Correia J, et al. The impact of the coronavirus disease 2019 pandemic on the utilisation of emergency urological services. *BJU Int.* 2020;126(2):256-8.
- Motterle G, Morlacco A, Iafrate M, Bianco M, Federa G, Xhafka O, et al. The impact of COVID-19 pandemic on urological emergencies: a single-center experience. *World J Urol.* 2021;39(6):1985-9.
- El-Karamany T. A supracostal approach for percutaneous nephrolithotomy of staghorn calculi: a prospective study and review of previous reports. *Arab J Urol.* 2012;10(4):358-66.
- Sekar H, Krishnamoorthy S, Kumaresan N, Ramanan V. Supracostal punctures for PCNL: factors that predict safety, success and stone free rate in stag horn and non-stag horn stones: a single centre experience and review of literature. *J Clin Diagn Res.* 2016;10(9):Pc17-pc21.