



Outcome of Percutaneous Nephrolithotomy in Patients with History of Open Renal Stone Surgery

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Conflicts of interest: None

Abstract:

Background: Percutaneous nephrolithotomy (PCNL) in patients operated previously for renal stone are thought to pose some difficulties.

Objective: To see the outcome of PCNL in patients who had undergone open surgery for renal stone.

Method: This cross sectional study was conducted in the Department of Urology, Bangabandhu Sheikh Mujib Medical University, Dhaka from November 2015 to October 2016 over a period of one year. Thirty cases with recurrent stone having previous open renal stone surgery were enrolled as study subject. After PCNL all the patients were followed up at one week, one month and three months after procedure.

Result: Mean age of the patients was 40.90 ± 6.08 years and mean stone size was 2.98 ± 0.65 cm. Mean operation time of the patients was 1.50 ± 0.46 hours and mean postoperative hospital stay was 3.87 ± 1.13 days. Stone was cleared from 29 (96.7%) patients. Mean drop of Haemoglobin level was 0.85 ± 0.55 mg/dl.

Keywords: PCNL

Conclusion: Previous open stone surgery does not alter the outcome of subsequent PCNL.

Introduction:

Because of its prevalence and recurrence, the management of patients with urinary tract calculi is regarded as a health-care problem. The treatment of renal stones has progressed from open surgery to minimally invasive surgical procedures. Rupel and Brown published the first study of renal stone removal via nephrostomy in 1941, and since then, there have been major advancements in techniques, instruments, and experience. Percutaneous nephrolithotomy (PCNL) was first described by Fernstom and Johansson in 1976.¹ For stones larger than 1.5 cm or staghorn calculi,

percutaneous nephrolithotomy (PCNL) is now the treatment of choice. Nephrolithiasis is a common disease that affects the general population, peaking between the third and fourth decades of life.² A history of prior stone disease raises the chances of a second stone to around 50% within five to seven years.³ PCNL has almost entirely replaced open surgical procedures in advanced countries for the removal of large or complex renal calculi. In Bangladesh many surgeons are practicing open stone surgery in different centers where facilities and expertise for PCNL are not available;

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as a result, recurrent stones after open surgery are not uncommon. When conducting surgery in a previously operated anatomical area, the surgeon may encounter technical difficulties, which may result in a longer operating period, more complications, and probably a lower success rate. This may be true for PCNL also.

The PCNL's key components are access to the collecting system and stone removal. Because of the retroperitoneal scar and the distorted anatomy of the pelvicaliceal system, previous open stone surgery can pose challenges for subsequent PCNL, such as a longer operating period, higher complication rate, and lower success rate.

Renal surgery in the past has left retroperitoneal scars around the kidney. However, even if scarification exists, it is expected that by holding one's breath, needle access and placement of a guide wire into the collecting system will not be difficult. However, scarring can restrict the kidney's mobility during breathing and instrument manipulation (e.g., tract dilatation, looking for stones in the collecting system) and cause injury. As a result, the challenges and potential complications associated with PCNL in patients who have had prior renal surgery necessitate research that has never been performed in Bangladesh before. If found to have minimal complications and difficulties, this study may help endourologists gain confidence in managing patients with recurrent stone disease.

Method:

This cross sectional study was conducted in the Department of Urology, Bangabandhu Sheikh Mujib Medical University, Dhaka from November 2015 to October 2016 over a period of one year. Thirty cases with recurrent stone having previous open renal stone surgery were enrolled as study subject (age between 18-65, any sex, stone larger than 1.5cm, staghorn/ multiple calculi).

Stone size, shape, position, anatomy of the collecting system and renal function were evaluated by using ultrasonogram, IVU and CT scan before PCNL and recorded. Single tract access was used with an additional tract when needed to facilitate complete stone clearance. The percutaneous access was created with the patient in the prone position under fluoroscopic guidance.

Stones were fragmented by pneumatic lithotripter. Fragmented stones were removed by forceps and small fragments by flushing with normal saline. At the end of the procedure, the collecting system was examined by direct nephroscopy and fluoroscopy for any retained stone fragments and any procedural complication. Post-operative stone clearance was documented by X-Ray KUB at the time of discharge. Patients were discharged

on the 3rd postoperative day if there was no complication. Follow up was done 1 week after the procedure, then after 1 month and 3 months. In each follow up, clinical examination, urine RME and C/S and plain X- ray of KUB were performed. Failure defined as a retained stone >4 mm.

Result:

In our study, males (80.0%) were predominant than females (20.0%). Mean age was 40.90 ± 6.08 years (Table I). Among the respondents, location of stone in Pelvis + Upper calyx + Middle calyx + Lower calyx was 08 (26.7%), Pelvis+Upper calyx was 07 (23.3%), Pelvis+Middle calyx was 09 (30.0%) and Pelvis+Lower calyx was 06 (20.0%). Single stone was in 8 (26.7%) patients and multiple stones were in 22 (73.3%) patients. Mean stone size was 2.98±0.65 cm (Table II). Blood transfusion required in 12 (40.0%) patients. Mean operation time needed 1.50 ± 0.46 hours. Mean post-operative hospital stay was 3.87 ± 1.13 days. Mean time of nephrostomy tube removal was 1.11 ± 0.35 days. Mean drop of Hb level was 0.85 ± 0.55 mg/dl (Table 3). Stone was not cleared only in 1 (03.3%) patient (Table IV).

Table I: Demographic profile of the patients

	Frequency (n)	Percentage (%)
Gender		
• Male	24	80.0
• Female	6	20.0
Age (Mean ± SD)	40.90 ± 6.08	

Table II : Comparison of location, number and size of stone in groups

Location of stone	Frequency (n)	Percentage (%)
Pelvis + Upper calyx + Middle calyx + Lower calyx	8	26.7
Pelvis + Upper calyx	7	23.3
Pelvis + Middle calyx	9	30.0
Pelvis + Lower calyx	6	20.0
Number of stone		
• Single	8	26.7
• Multiple	22	73.3
Stone size (cm) (measured by X-ray)	2.98 ± 0.65	

Table III: Per operative and post-operative information of both groups

	Mean±SD	n (%)
Per operative blood transfusion		12 (40.0)
Operation time (hour)	1.50 ± 0.46	
Post-operative hospital stay (day)	3.87 ± 1.13	
Nephrostomy tube remove (day)	1.11 ± 0.35	
Drop of Hb level (gm/dl)	0.85 ± 0.55	

Table IV: Distribution of patients by stone clearance in groups

Stone clearance	Frequency (n)	Percentage (%)
Stone cleared	29	96.7
Not cleared	1	3.3
Total	30 (100.0)	30 (100.0)

Discussion:

The indications for open renal surgery to treat renal calculi are limited to special situations; it is needed in only 0.47% to 5.4% of the time. Over time, renal stone management has undergone a dramatic change, from the era of open pyelolithotomy to the first percutaneous lithotomy (PCNL) in 1976.^{4,5}

Mean stone size among the patients was 2.98 ± 0.65 cm in this study. Study of Khan et al. showed the mean stone size was 2.7 cm with a range of 1.5 to 3.5 cm.⁶ Gupta et al.⁴ in their study reported that blood transfusion rate was 40.0% which was similar to our study. In our study, blood transfusion required in 12 (40.0%) patients. Mean operative time of the patients was 1.50 ± 0.46 hours. Falahatkar et al.⁷ in a study showed that the mean operating time was 75.41±17.2 minutes in the group of previous surgery. Gupta et al.⁸ in a study reported that the mean operative time was 88.4 min. Kurtulus et al.⁹ in a similar study found mean operative time 2.3 hours.

In this study, mean drop of Hb level was 0.85 ± 0.55 mg/dl. Average drop in hemoglobin level was 0.85 g/dl.⁸ In the present study, mean post-operative hospital stay was 3.87 ± 1.13 days. Falahatkar et al.⁷ in a study showed that the mean postoperative hospital stay was 85.88±17.25 hours in the group of previous surgery that result was similar to our result.⁷ Kurtulus et al.⁹ in a similar study found that post-operative hospitalization

time was 4.4 days. Complete stone clearance was achieved in 96.7% of patients in this study patients. Similar result was seen in studies of Shah et al.¹⁰ and Falahatkar et al.⁷

Khan et al.⁶, Falahatkar et al.⁷, Gupta et al.⁸ and Resorlu et al.¹¹ in their studies reported that previous open stone surgery does not alter the outcome of subsequent PCNL significantly.

Conclusion:

The results of PCNL in patients who had previously undergone open renal surgery were found to be satisfactory in this study.

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