

# Outcome of Tubeless Percutaneous Nephrolithotomy: A Retrospective Study

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## ABSTRACT

**INTRODUCTION:** Percutaneous nephrolithotomy (PCNL) is used to treat the urological condition nephrolithiasis. For large (>2cm) and complicated renal calculi, percutaneous nephrolithotomy (PCNL) is the treatment of choice. At the end of standard PCNL, a double j stent and nephrostomy are placed. The double j stent is inserted only at the very end of the surgical procedure in tubeless PCNL. This study was carried out in order to analyze the outcome and safety of tubeless PCNL.

**MATERIALS AND METHODS:** After IRC approval (ref # f-nmc/649/079-080), this study was carried out in the urology unit of the department of surgery at the National Medical College in Birgunj, Nepal, from June 2021 to May 2023. During this period, 75 patients underwent tubeless PCNL.

**RESULTS:** Seventy-five patients underwent planned tubeless PCNL in this study. The overall mean age was 37.33±16.86 years, with 29 men (38.6%) and 46 females (70.95%). Mean stone size 3.86±0.56mm, stone presentation 47 (62.6%), left side 25 (33.33%), and bilateral 3 (4.0%). The average operative time (min) was 55.8±18.6, and the average drop haemoglobin (mg/dl) was 0.864±0.98. The average hospital stay was 3.2±0.51 days. 67 (89.3%) of the patients had complete stone clearance.

**CONCLUSION:** Since tubeless PCNL is safer, more cost-effective, has fewer complications, requires fewer hospital stays, and is more convenient for patients, it is currently gaining preference.

**KEY WORDS:** Kidney calculi, Tubeless Percutaneous nephrostomy, Treatment outcomes

## INTRODUCTION

A urological condition called nephrolithiasis is treated with Percutaneous nephrolithotomy (PCNL). (1) Percutaneous nephrolithotomy (PCNL) is the treatment of choice for large (>2cm) and complex renal calculi [2]. Traditionally, PCNL has been performed in the prone position, due to surgeon's familiarity, posterior calyceal puncture, larger surface area for puncture, avoidance of bowel injuries and potentially less complications [3]. Fernstorm and Johanson performed PCNL for the first time

in 1976. (4) Several distinct PCNL techniques have now been identified. Following standard PCNL, a double j stent and nephrostomy are placed. The double j stent is placed at the very end of the procedure in tubeless PCNL. (5) A nephrostomy tube or a double j stent is inserted to keep the tract unobstructed and to limit additional bleeding. However, the patient is in discomfort with nephrostomy and ureteral stenting. A nephrostomy tube can also cause a renal fistula. (6) Bellman and colleagues were questioned about

routine postoperative standard PCNL nephrostomy, and tubeless PCNL became a research topic. (7) At the end of a tubeless PCNL, a double j stent is placed. This improves minimally invasive PCNL and minimizes the discomfort associated with a nephrostomy tube.

## METHODOLOGY

A retrospective study was conducted at the urology unit, department of surgery, National Medical College, Birgunj, Nepal, from June 2021 to May 2023 after IRC approval (ref # f-nmc/649/079-080). During this period, 75 patients underwent tubeless PCNL. Every patient was received broad spectrum parenteral antibiotics prior to surgery. Under general anaesthesia, the patient was held in a lithotomy position, and a cystoscope was used to insert a ureteral catheter that passed beyond the stone. After ureteric catheterization, the pelvicalyceal system was opaqued with urograffin dye via the ureteric catheter 6 french. In the prone position, a calyceal puncture was performed under fluoroscopic guidance. A guide wire was inserted into the puncture tract, and consecutive tract dilatation was performed with alken metal dilators. A nephroscope 18 French was put into an amplatz sheath 24

French. The stone was fragmented using a pneumolithotripter, and the fragments were removed using forceps. At the end of the procedure, a double j stent was inserted. After removing the amplatz sheath, the incision site was stitched.

Patients over the age of 16 with renal calculus were eligible for study, whereas pregnancy and an abnormal bleeding profile were not. The data was recorded using a proforma, and the findings were calculated through statistical analysis. The version spss23 was used.

## RESULTS

In this study seventy-five patients in total underwent scheduled tubeless PCNL. The overall mean age was  $37.33 \pm 16.86$  years with 29 (38.6%) males and 46 (70.95%) females. Mean stone size  $3.86 \pm 0.56$ mm, presentation of stone right side 47 (62.6%) left side 25 (33.33%) and bilateral 3 (4.0%). Mean operative time (min) was  $55.8 \pm 18.6$  and mean drop haemoglobin (mg/dl)  $0.864 \pm 0.98$ . Mean hospital stays  $3.2 \pm 0.51$  days. Complete stone clearance was in 67(89.3%) patients.

Patients' characteristics and operative outcome

Parameter	
Mean Age (year)	$37.33 \pm 16.86$
Sex	
Male	29 (38.6%)
Female	46( 61.3%)
Presentation of stone	
Right side	47 (62.6%)
Left side	25(33.3%)
Bilateral	3(4.0%)
Stone burden $\text{cm}^2$	$3.86 \pm 0.56$
Mean operative time ,min	$55.8 \pm 18.6$
Mean drop hemoglobin ,mg/dl	$0.864 \pm 0.98$
Mean hospital stay, days	$3.2 \pm 0.51$
Stone clearance	
Yes	67 (89.3%)
No	8 (10.6%)

## DISCUSSION

Nephrolithiasis is a common urological condition in our region. Treatment options include ESWL, PCNL, retrograde intra

renal surgery (RIRS), and open surgery. Because of its excellent success rate, PCNL has become the standard of treatment for renal stones greater than 2 cm in size [8].

Tubeless PCNL has mostly replaced traditional conventional PCNL due to lower costs, faster recovery, less need for blood transfusions, and the possibility to allow patients to resume their regular daily activities sooner. (9)

In our study, 75 patients with renal stones underwent tubeless PCNL, with male 29 (38.6%) and female 46 (61.3%) patients, with a mean age of  $37.33 \pm 16.86$  years, whereas Manzoor et al found a mean age of  $43.05 \pm 14.3$  years. (10)

The distribution of the submitted complaints was analyzed, and the majority of patients (89%) experienced flank pain, with other symptoms including burning micturition (29%) and frequent urination (9%), hematuria (16%), vomiting (9%), fever (13%), and dysuria (10%). These findings are comparable to those of a study conducted by Sohagaura et al. (11)

Regarding the clinical finding, we evaluated the stone burden based on CT scan and found that the majority of patients (65%) had a single stone, while the remainder had multiple stones. Sengamuthu et al found a single stone in 60% of cases and multiple stones in 40%. (12)

In this study, we observed that 62.6% of patients had stones in the right kidney, 33.3% had stones in the left kidney, and 4% had bilateral stones, whereas Homayounich et al reported that 28% of patients had left renal calculi, 22% had right renal calculi, and 50% had bilateral calculi (13).

In our study, 89.3% of patients got complete stone clearance, which is an important outcome for PCNL patients. It is comparable to Khadgi et al's study, which reported 87.6% stone clearance. (14) In our study, only 9% of patients required blood transfusion, which is comparable to earlier studies that indicated 7% of patients required blood transfusion. (15) Our study's mean hospital stay was  $3.2 \pm 0.51$  days, whereas Bhangu et al reported a mean hospital stay of 1.5 days (16).

The most common postoperative consequence was hematuria (10.7%), which was comparable to Lai et al, who found that

8% of patients had bleeding, while the second most common postoperative problem was fever (5.2% in our study, but 10.4% in another study (17).

Because our study is not comparable, we are unable to establish the difference between tubeless and other PCNL.

## CONCLUSION

Since tubeless PCNL is safer, more cost-effective, has fewer complications, requires fewer hospital stays, and is more convenient for patients, it is currently gaining preference.

## Declaration by Authors

**Ethical Approval:** Approved

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**Conflict of Interest:** The authors declare no conflict of interest.

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