



A PROSPECTIVE COMPARATIVE STUDY OF STANDARD PCNL AND TUBELESS PCNL

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ABSTRACT

Aims and Objectives: The purpose of this study is to prospectively to evaluate efficacy and safety of tubeless PCNL in comparison to standard PCNL

Material and method: Forty patients prospectively evaluated, study period from January 2017 to January 2018, randomised into two groups 20 patients underwent standard PCNL and 20 patients tubeless PCNL(nephrostomy not paced). Djstenting done in both groups Patient preoperative parameters including age, sex, laterality, BMI, stone size, location and maximum diameter of stones, number of calyces involved by the stones .Intra-operative parameters including the number of renal access used. Post-operative parameters including residual stones, visual analog pain score (0-10) as 1st recorded post-operateday, analgesic requirements, duration of hospitalisation operation time, major/minor complications and stone-free

Results: The mean operation time in the standard PCNL group (55±14min) was significantly higher than in the tubeless PCNL group (48±7.8min).The mean hospitalization time was significantly lower in the tubeless PCNL group (2.3+0.8days) than in the standard PCNL group (5.6+1.2days)Table 2. Postoperative pain assessed by VAS, pain score for tubeless PCNL is 2.5+0.4 and standard PCNL 4.5+0.5. Postoperative pain is less in tubeless PCNL compare to standard PCNL. In our study, inj.Tramadol 50mg administer for postoperative pain, analgesic dose need is lower in tubeless PCNL (4± 0.5days) compare to standard PCNL (1.8±0.5days).

Conclusion: Post-operative pain, analgesic requirements, duration of inpatient stay were all significantly reduced in the tubeless PCNL group. There was no significant difference between groups regarding stone-free status.

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INTRODUCTION

Renal stone management moved from open surgery to minimally invasive procedures with the aim of achieving maximum stone clearance with the least morbidity and mortality. The high risk of stone recurrence also favours minimally invasive treatment rather than repeated open surgery. The standard PCNL includes insertion of a nephrostomy tube and a Double J stent after the procedure. In recent days practice started towards Tubeless PCNL i.e. no nephrostomy tube or Double J stent following a PCNL in view of reduced morbidity and hospital stay (1). Tubeless” percutaneous procedure that omits the postoperative nephrostomy tube was initially proposed by Wickham and colleagues (2). Tubeless PCNL is mainly two types. Tubeless with ureteral stent - after completion of procedure only double J stent placed, no nephrostomy tube inserted. Totally tubeless PCNL -no nephrostomy tube or DJ stent placed after the procedure (3-5).

The purpose of this study is to prospectively to evaluate efficacy and safety of tubeless PCNL in comparison to standard PCNL. In our study nephrostomy was not placed and antegrade dj stenting done in both groups

MATERIALS AND METHODS

Forty patients prospectively evaluated ,study period from January 2017 to January 2018, randomised into two groups 20 patients underwent standard PCNL and 20 patients tubeless PCNL(nephrostomy not paced). Djstenting done in both groups. Patient preoperative parameters including age, sex, laterality, BMI, stone size, location and maximum diameter of stones, number of calyces involved by the stones .Intra-operative parameters including the number of renal access used. Post-operative parameters including residual stones visual analog pain score (0-10) as 1st recorded post-operative day, analgesic requirements, duration of hospitalisation operation time, major/minor complications and stone-free

Inclusion Criteria: Renal stone >1.5cm <3cm, PUJ calculus >1.5cm< 3cm

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Exclusion Criteria: Renal stone > 3cm, Complete staghorn calculus Associated with infection, Patient require more than one percutaneous tract, Solitary kidney, Intraoperative bleeding

Table no 1 & 2 Preoperative parameters

	PCNL	Tubeless
Age	50yrs	45yrs
Sex		
Male	13	14
Female	7	6
Bmi	34	32
Laterality		
Right	11	13
Left	09	7
Maximum size	3cm	2.8cm

	PCNL	Tubeless PCNL
Calyx middle	08	06
lower	07	08
Pelvic calculus	03	03
Puj calculus	02	03
Comorbities	05	03
Diabetes mellitus	03	02
Hypertension	03	03
Hemoglobin	13g/dl	12g/dl

Surgical Technique

All patients underwent a contrast computerized tomography to evaluate stone burden, location and adjacent organs.

- All patients underwent standard PCNL procedure by the subcostal approach. Categorized into two groups:
- Group-A - 20 patients ,nephrostomy tube (N) was placed (standard PCNL)

Group B - 20patients, no nephrostomy (NN) was placed (tubeless).

The patients were placed in the lithotomy position to insert a ureteral catheter (4F–5F) andpatient placed in the prone position. Access to the calyx was performed using a C-armed and 18-gauge needle. With the aid of the guidewire, dilatation was performed with Amplatz dilators, andan Amplatz sheath (28F–30F). Stone fragmentation wascarried out with a pneumatic lithotripter, and an X-ray wasperformed for residual stone fragments.

Both groups antegrade double dj stent placed Both groups were compared about duration of hospital stay, post-operative pain, analgesic duration, complications, and estimated blood loss - haemoglobin (Hb) drop in g% (before and after PCNL)

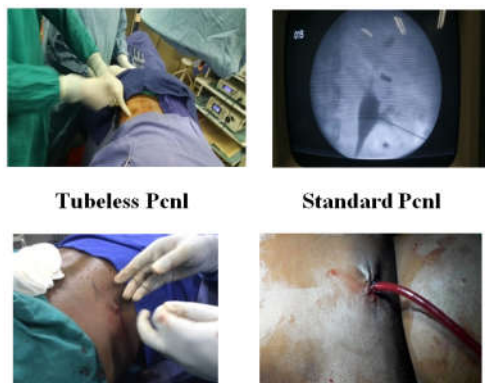


Figure no 1 a)standard PCNL triangular technique b)calyx punctured under C-ARM C) tubeless PCNL d) standard PCNL nephrostomy placed

Data acquisition and Statistical analysis

Continuous measures were described as means, standard deviations, and the two sample T-test was used to evaluate the differences between two groups. All tests were performed at a significance level of 0.05.

RESULTS

Forty patients were enrolled in this study. Patients ‘preliminary and demographic data, including age, gender, surgery side, and stone size, are shown in Table 1. No significant differences were observed in age, gender, surgery side, stone size, and stone location between these two groups. The mean operation time in the standard PCNL group (55±14min) was significantly higher than in the tubeless PCNL group (48±7.8min) (Table 2) The mean preoperative haemoglobin level was significantly higher in the standard PCNL group (13g/dL) than in the tubeless PCNL group (12g/dl). The mean postoperative haemoglobin level was 12.5g/dL and 11.5g/dL in the standard PCNL and totally tubeless PCNL groups, respectively, with no significant difference between the groups (Table 2). The mean hospitalization time was significantly lower in the tubeless PCNL group (2.3±0.8days) than in the standard PCNL group (5.6±1.2days)Table 2. Postoperative pain assessed by VAS, pain score for tubeless PCNL is 2.5±0.4 and standard PCNL 4.5±0.5. Postoperative pain is less in tubeless PCNL compare to standard PCNL. In our study, inj. Tramadol 50mg administer for postoperative pain, analgesic dose need is lower in tubeless PCNL (4± 0.5days) compare to standard PCNL (1.8±0.5days).

Table No 2 Postoperative parameters

	PCNL	Tubeless PCNL	P VALUE	P value
Operative time	55±14 min	48.5±7.8 min		<0.022
Analgesics duration (Tramadol)	4±0.5 days	1.8±0.5 days		<0.002
Hemoglobin	12.5gm	11.5gm		
Postoperative fever	6 ±0.5	2 ±0.6		<0.002
Hospital Stay	5.6±1.2days	2.3±0.8days		<0.002
Change in HB	<1gm	<1gm		
Pain Score (VAS)	4.5±0.5	2.3±0.		<0.002

Infection at site of puncture after nephrostomy removal about 4 case in standard PCNL patient. All patients follow up for 3weeks, dj stent removed after 2weeks in tubeless PCNL patient.No stent related complication in both groups

DISCUSSION

The placement of percutaneous nephrostomy tube after the completion of the procedure has been considered the standard practice to aid in haemostasis to ensure proper drainage of urine and to facilitate easy access in case repeat PCNL is required.

Despite these apparent advantages, nephrostomy tube has been implicated in post-operative discomfort and morbidity. To reduce discomfort and tube related morbidity, modifications have been made nephrostomy tube not placed in uncomplicated procedure using double-J stent/ureteral catheter as tubeless PCNL (6, 7, and 8)

Akam *et.al*(9) retrospectively reviewed 1669 patients ,The mean length of hospitalization was 2.89 ± 1.66 days , the presence of diabetes, a large stone burden, intercostal access,

multiple accesses, and impaired kidney function prolong the LOH after PCNL. The use of the tubeless procedure was able to diminish the LOH.

Bellman *et al.* (10) described 50 patients who had early removal of the nephrostomy tube after PCNL. The first 30 patients had a nephrostomy tube removed within 2-3 h after surgery, and the remaining 20 patients had the nephrostomy tube removed in the operating room. All patients had a double-J stent placed during PCNL, and a Foley catheter was left in place for 24 h. Patients with the significant residual stone burden, procedures longer than 2 h, and multiple accesses, perforation of the collecting system or significant bleeding were excluded. The authors reported no significant complications in this cohort, and hospitalization, analgesia requirements, and time to return to normal activity were significantly reduced in the group with double-J stent drainage compared with a control group in whom nephrostomy tubes were placed.

Desai *et al.* (11) (2004) also performed a prospective randomized study of patients undergoing PCNL with conventional large-bore nephrostomy drainage, small-bore nephrostomy drainage, or no nephrostomy drainage. The authors reported that tubeless PCNL was associated with the least pain.

Pande *et al.* (12) reviewed 305 patients, tubeless or totally tubeless PCNL is significantly superior to standard PCNL in terms of length of hospital stay, return to normal daily activities, postoperative pain, analgesia requirements, and total treatment costs. In uncomplicated cases, tubeless or totally tubeless PCNL may be considered a safe alternative.

In uncomplicated case such as no intraoperative bleeding, one access for calyx, stone size less than 3cm and no infection, tubeless PCNL have advantages over standard PCNL regarding post-operative discomfort, morbidity, hospital stay, and period of analgesia requirement (13,14,15,16,17)

CONCLUSION

- In our study, Tubeless PCNL shorten hospital stay 2-3 days, decrease postoperative pain VAS (2-3) and decreased analgesic.
- In properly selected patients, tubeless PCNL have advantages over standard PCNL regarding post-operative discomfort, morbidity, hospital stay, and period of analgesia requirement

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