SCIENTIFIC ARTICLE

Percutaneous renal stone surgery: redefining the better technique and lessons learnt in a developing country

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The increasing global prevalence in nephrolithiasis continues to burden the health care delivery system of industrialized nations and takes a disproportionately high humanitarian toll on populations of the developing world. WHO has identified kidney stones to be one of the major neglected non-communicable disease (NCDs) accounting for a significant proportion of kidney failures in long term [1]. Life time incidence of kidney stones is 13% for men and 7% in women2. Once an individual has formed a stone, the likelihood of a recurrence is 50% or greater at five years [2].

Hippocrates, the famous Greek physician, removed an infected stone from a perinephric abscess [3]. In the past open renal stone surgery has been the method of choice, namely pyelolithotomy, nephrolithotomy, which required large flank incisions. Such extensive surgery resulted in considerable pain requiring high analgesic dosing, delayed ambulation, prolonged hospital stay and eventually delayed return to normalcy. Recurrence of renal stone disease is fairly common in the tropics. There-fore performing repeated open renal surgery is difficult in the presence of peri-renal scar tissue which can result in complications such as haemorrhage, chronic scar pain, anterolateral abdominal wall weakness resulting in incisional hernia. There can also be poor cosmesis. Therefore open renal stone surgery is now becoming almost a unheard type of surgery even in low income countries.

Due to above mentioned draw backs, PCNL is widely used and has almost completely replaced open surgery for removal of large renal stones worldwide. It is performed through a skin incision 1 cm or less has revolutionized renal stone management.

It was in 1941 when Rupel and Brown first reported the use of a nephrostomy tract to remove residual stone from open surgery using the rigid cystoscope. The first successful removal of a renal stone by percutaneous method was performed in 1976 by Fernstrom and Johansson under radiological guidance [4]. In the 1980's PCNL underwent a rapid evolution following advancement in technology with an overall paradigm shift towards minimally invasive stone surgery. Since then PCNL has become the preferred method of treating large and complex renal stones.

The two other major treatment modalities to treat renal stones are shockwave-lithotripsy (SWL) and flexible ureterorenoscopy. SWL being non-invasive, but often requires multiple sessions since stones formed in the tropics are relatively hard. On the other hand flexible ureterorenoscopy is also a minimally invasive technique where with the aid of endoscopy stones are fragmented using laser technology. It is a relatively non-invasive procedure, more often two staged and costly when treating large stones.

Meta-analysis comparing the three techniques to treat renal stones clearly have demonstrated that best stone free rates are achieved by PCNL , having a higher success rate for clearing stones in one setting compared with other techniques such as SWL and ureteroscopy [5,6]. According to the European Association of Urology (EAU) and American guidelines, management of renal stones through percutaneous techniques is the first line treatment for renal pelvic stones greater than 20 mm. The other indications being calyceal stones larger than 15 mm or sizeable lower polar stones with unfavorable anatomy which includes steep infundibulopelvic angle, and stone proximal to a long or stenosed infundibulum. In addition for stones that are too difficult to disintegrate by SWL or ureteroscopy, PCNL is beneficial [7].

A perfect percutaneous access is “key” to success in PCNL. Optimal positioning of the patients is one of the most crucial steps to gain the correct access to the stone while ensuring patient safety. PCNL has been traditionally performed in the prone position. The widely accepted conventional prone position was chosen because it was believed that this would be the safest and shortest way to approach the kidney. The technique was developed as a three-step procedure. First the patient is positioned supine, to give general anesthesia and gain retrograde access to the upper urinary tract. Then the

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patient is turned prone for the main part of the procedure as prone position provides a posterior access to the collecting system through the lumbar region. Finally, the patient is turned back to supine position to recover from anesthesia.

Unfortunately, this commonly used prone position has a number of draw backs. It is known to be an anesthetist unfriendly position. Safe positioning back and forth from supine to prone and again to supine requires minimum of six trained individuals, (one for the head, two on either side and one controlling the legs and the feet). Finding such trained personnel twice for a single surgery can be difficult in the local theater setup. It is unfavorable in patients with cardiopulmonary disease, severe obesity as it compresses the abdomen causing a rise in abdominal pressure inspite of specially designed cushions placed under the hemiabdomen.

Prone position increases the functional residual capacity while decreasing the expiratory lung volume and total lung capacity, all of which will contribute towards ventilation perfusion mismatch. Endotracheal tube must be secured carefully as accidental extubation and loss of airway will be disastrous in the prone position. Also, unrecognized neck flexion during prone position leads to ET tube movement far in to the right main bronchus. This can lead to one lung ventilation, increased airway pressure, lung collapse and hypoxia. Prone position has predictable effects on the cardiovascular system. Abdominal compression results in compression of the inferior vena cava resulting in reduced cardiac output, venous stasis and may lead to thrombotic complications. It is very difficult or almost impossible for the anaesthetist to manage a cardio-respiratory emergency in the prone position. This will obviously involve some delay in turning the patient back to a supine position. Although prone defibrillation and CPR has been described, it is not something that most clinicians, even anaesthetists are familiar with. Also in prone position one must take great care of the pressure points since it has a high possibility of pressure injury especially the globe of the eye causing visual impairment and peripheral nerve injuries due traction on the limbs [8-10].

While PCNL gained more popularity, it became evident that prone position was not optimal to all patients, especially those with other comorbidities, which led to introduction of alternative positions.

The supine PCNL method was first introduced by Valdivia-Uria in 1998. He approached the kidney more laterally away from the lumbar region. This was achieved by placing the patient supine with a cushion under the flank. It was not until 2007 when Ibarluzea introduced the Galdakao-Valdivia position when supine positions regain its popularity among the urological community once again. In this position, the patient is slightly tilted from the supine position with the ipsilateral leg extended and contralaeral leg flexed to achieve a modified lithotomy position [11-12]. In 2008 Barts and in 2012 Kumar further modified this position to perform supine PCNL [13].

In supine PCNL induction of anaethesia, access to the renal tract in a retrograde fashion percutanously, performing the PCNL and recovery from anaesthesia are all done in the same position.

Supine position has numerous advantages. The position has a low impact on the patient's cardio respiratory system. Position facilitates friendlier endotracheal tube placement and monitoring. The position also facilitates simultaneous ureteroscopy access to deal with complex stones rather than having to turn back the patient to supine position when done in the traditional prone position. Also, the position gives the accessibility to puncture the anterior and the posterior calyx separately to enter the collecting system [13].

The traditional nephrostomy tract of PCNL was dilated to 24-30F, which is referred to as "Standard-PCNL". Standard PCNL has a high stone free rate, however, at the cost of severe morbidity. To decrease the disadvantages related to standard PCNL, "mini-perc" or "mini-PCNL", with 20F or smaller tracts created, was first introduced as a pediatric procedure in 1997, and subsequently implemented in adults with the expectation of similar SFR and low morbidity [15]. Although numerous efforts have been carried out, whether mini-perc outweighs standard-PCNL for the treatment of large calculi terms of efficiency and safety remains controversial. The purpose of the present study was to share the first ever experience of supine PCNL series performed in Sri Lanka and to highlight the advantages of each technique and to compare the outcomes of prone, supine PCNL and supine mini PCNL.

Patients and method

All patients with large renal and upper ureteric calculi who were admitted from November 2013 to January 2017 to the urological unit at Sri Jayawardenapura Teaching hospital were included. During the thirty nine month period a total of 240 patients were enrolled. Patients with prior pig tail catheters inserted (DJ stenting) to the upper renal tracts and or percutaneous nephrostomy inserted due to obstruction or infection in the kidney who underwent PCNL later, multi tract PCNL done for complete staghorn calculi or complex stones, bilateral simultaneously performed PCNL, PCNL in solitary kidney and in ectopic kidneys were excluded to have a cohort of patients with similar characteristics to facilitate the study. The study population consisted of 214 patients. Local institutional review board had approved the data collection procedures.

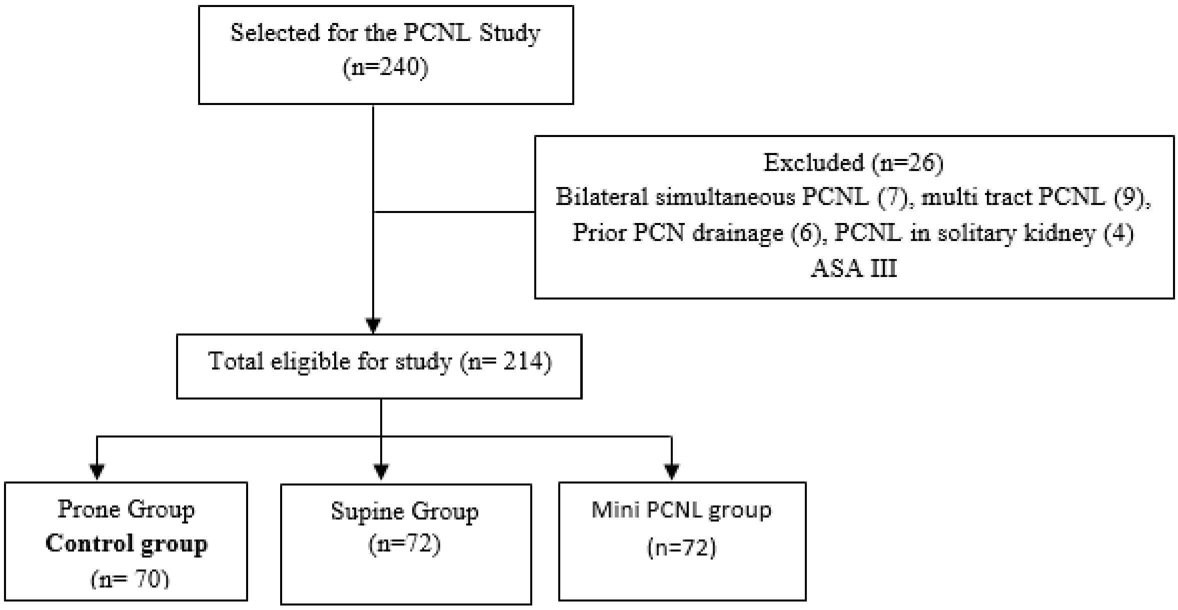

Figure 1. Study population groups

All patients underwent urine analysis and culture, renal function test, clotting profile and pre-anesthetic assessment. As imaging, a CT- KUB or when relevant a CT -Urogram especially in patients with previous open renal surgery was performed as a definitive investigation for analysis of the stone burden, location, density and pelvicalyceal anatomy. The first group, 70 patients underwent PCNL in the traditional prone position (pPCNL) while the second group (72 patients) underwent supine PCNL (sPCNL). The last group of 72 patients underwent supine mini PCNL(mPCNL) (Figure 1).

PCNL procedure

Under fluoroscopic guidance, 5 Fr ureteric catheter was inserted which allowed for injection of contrast material to obtain a pyelogram. Using 18G coaxial needle the desired calyx was punctured. Then a 0.035mm hydrophilic guide wire was passed percutaneously through the needle in to the pelvis.

Using a plastic or Alken metal dilators, fascial dilatation was done using the seldinger technique. 26-30 Fr Amplatz sheath was inserted to allow a 24fr nephroscope to enter the collecting system. Pneumatic lithotripter for less dense stones, and laser in the case of high density stones were used for fragmentation.

Once the stones burden was treated, a 22/24 Fr foley catheter was placed as the nephrostomy tube. Then the patient was stented using 6/26 double pigtail stent in an antegrade manner prior to nephrostomy insertion.

The patients in the Supine group were positioned supine after endotracheal intubation. PCNL procedure was similar to the prone position except for the following differences:

1. There was no need to change the position of the patient after general anesthesia. Without the need for changing the patients position for three times, the patient was cleaned and draped only once.
2. Fluoroscopy tube was placed away from the working space; therefore, accidental radiation exposure directly to the surgeon's hand was prevented.
3. PCNL tract was placed in a dependent position; therefore, the irrigation fluid related intra renal pressure rise was minimal. Therefore, pyelorenal reflux is minimized. Gravity was used to ease out stone fragments with the whirlpool effect created.
4. Simultaneously access of the upper ureter, renal pelvis and the calyceal systems were performed using ureteroscopy or flexibleureteroscope to facilitate greater stone clearance
5. The PCNL procedure was performed in seated position by the surgeon. Therefore, it was more ergonomically friendly.
6. The nephrostomy tube was placed on the lateral aspect rather than on the back, which is far more comfortable for the patient postoperatively lying on the back, in bed.

In the supine Mini PCNL group the entire procedure was similar to the supine PCNL group except in two aspects. The tract created in the kidney in supine group was 26-30 FR which was around 10mm in diameter. In contrast in the mini PCNL group the tract diameter was halved to 5mm to 15Fr to accommodate the 13.5 Fr Nephroscope. Therefore, the nephrostomy tube placed, was 12 Fr.

Post operative care

The clamped nephrostomy tube was removed postoperatively after 24-48hrs depending on the stone burden treated. The urinary catheter was removed 24 hrs after nephrostomy removal and patient was discharged on postoperative day three or four.

Follow-up procedure

All patients were followed up at two weeks with urine culture and one month with X-ray KUB or CT-KUB in the case of radiolucent stone to determine the presence of residual stones. Patients with residual stones were managed with medical expulsive therapy, flexible ureterorenoscopy at the time of stent removal or extracorporeal shockwave lithotripsy. The double pigtail stent was removed at 4-6 weeks post-operatively using flexible cystoscopy under local anesthesia as a day-case procedure.

All patients were followed up for a minimum of three months and maximum of 3 years. Postoperative complications were classified according to the modified Clavien Dindo classification system 2004.

Data analysis

Apart from demographic data, stone characteristics and complexity were recorded. GUYS stone score was used to grade the complexity of stone [16].

It comprises of 4 grades:

I. Solitary stone in mid/lower pole or solitary stone in renal pelvis with normal anatomy
II. Solitary stone in the upper pole or solitary stone with abnormal anatomy or multiple stones with normal anatomy
III. Multiple stones in abnormal anatomy or partial staghorn
IV. Complete staghorn or stone in patient with spinal deformity/injury

The outcome of PCNL was interpreted in terms of success and complications. Success was defined as the absence of residual stones or clinically insignificant residual fragments (less than 4 mm) during follow up. Complications were categorized according to Modified clavien Dindo classification; 2004. Data analysis was done using SPSS V 20 using chi-square and t-test. A p value less than 0.05 was considered as significant.

Results

A total of 214 patients were eligible for the study. There was a male preponderance with male: female ratio nearly 2:1 in all 3 groups. [Table 1] Youngest was 24 years while the oldest operated was 75 years. A fair number of patients had diabetes, hypertension and dyslipidemia and were on treatment, signifying that stone disease had a favourable relationship towards metabolic syndrome. Chronic Kidney disease co-existed in more than 10% of patients. The mean BMI was 25.74 with the majority of patients being overweight. Obesity was seen in over 10% of the population. Twenty-seven patients (12.6%) had undergone previous open renal surgery for stone disease.

Stone laterality was more or less equal in both groups [Table 2]. According to the GUYS score majority of stones were Grade 1 and II which were more equally distributed. Mean stone size of the index stone was 26 mm. Mean stone density was 1073 HU indicating that the stones were hard and not amenable for shock wave lithotripsy. Stone analysis later found that the majority of stones were hard composed of calcium oxalate monohydrate. There was no significant difference between the stone demographics between the three study groups.

The subcostal approach was selected to puncture the targeted calyx; a supracostals puncture was performed when it was not possible to reach the upper calyx [Table 3]. Lower calyceal puncture access was achieved in majority (90.6%) which was the most frequent site of the targeted puncture

All procedures were successful except in two patients, which were converted to open nephrolithotomy as result of difficulty in stone localization of a radiolucent stone (Uric acid stone) [Table 4]. This was at the initial stages of the learning curve of PCNL. Simultaneous use of the ureteroscopy was indicated in a few as a result of stones impacted in the upper ureter. In the prone group this had to be done after changing the position from prone to supine while in the supine group (including mini PCNL group) it was done in the same position. The mean operative time was significantly lower in the supine group compared to prone group. However the operative times were longer in the mini-PCNL group than supine-PCNL group because the smaller sheath took considerable time to break the stones into smaller fragments to be extracted through the smaller tract. Stone free rate was highest in the supine group, but this was not statistically significant when compared with other groups. Overall stone free rate was 84%. Stone free rate was defined as absence or <4mm stone fragments on CT KUB or X Ray KUB when indicated. Mean hospital stay was 4 days while the mean time for stent removal was 33 days overall for the study group. There was no difference between the two groups.

Fever more than 38°C was observed in 21 patients of whom 18 patients had high fever continued for more than 24 hours [Table 5]. Patients with transient fever were managed with continued IV antibiotics. Those eighteen patients with prolonged fevers had the nephrostomy tube unclamped and

Table 1. Patient characteristics

	Prone PCNL	Supine PCNL	Mini PCNL	Total	P value
Patient number	70	72	72	214	
Males	48(68.5%)	46(63.8%)	52(72.2%)	146(58.2%)	
Females	22(31.5%)	26(26.2%)	20(27.8%)	68 (31.8%)	
Mean Age	48.1±11.8	49.7±12.3	47.8±12.4	49±12.5	0.4
Age range	24-74	25-75	26-70	24-75	
ASA status					
I	29(41.5%)	32(44.5%)	34(47.2%)	95(44.3%)	
II	41(58.5%)	40(55.5%)	38(52.8%)	119(55.7%)	**1**
Co-Morbidity status					0.2
Diabetes mellitus(DM)	18(25%)	23(31%)	26(36%)	67(31.3%)	
Hypertension	11(15%)	21(27%)	14(18%)	46(21.4%)	
Ischemic Heart Disease	5(7%)	4(5%)	3(4%)	12(5.6%)	
Dyslipidemia	10(14%)	9(12%)	14(18%)	33(15.4%)	
Chronic Kidney Disease II	10(14%)	9(12%)	7(9%)	26(7.4%)	
Chronic Kidney Disease III	4(5%)	4(5%)	2(3%)	10(4.6%)	
Body Mass Index kg/m2					
Overall mean BMI	26.27±3.9	25.72±3.5	25.74±3.86	25.74±3.86	0.33
BMI range	17.09-36.08	17.7-33.0	16.8-39.07	16.8-39.07	
<18.5(underweight)	3(4%)	1(1.5%)	1(1.5%)	5(2.3%)	
!8.5-24.9(normal weight)	30(42%)	32(44%)	38(52%)	100(46.7%)	
25 - 29.9(over weight)	28(38%)	31(43%)	27(37%)	86(40.1%)	
30-34.9(Obesity II)	9(12%)	8(11%)	5 (8%)	22(10.2%)	
>35-39.9(Obesity II)	1(1.5%)	0	1(1.5%)	2(0.9%)	

left insitu with continued IV antibiotics until the fever settled. Transient perinephrostomy leak was observed in 21 patients who required unclamping of the nephrostomy tube for 24 hours. Eighteen patients especially in the CKD group had transient rise in their serum creatinine >0.5mg/dl or greater immediate postoperatively which normalized by six weeks. Blood transfusion were required in 7 patients.

Two patients in the prone group developed pneumonia and three patients developed urosepsis all of which was managed with IV antibiotics and supportive therapy. Two patients had superficial surgical site wound infections where the sutures had to be released. Two patients developed secondary hemorrhage and clot retention which was managed conservatively. Collecting system perforation was noted in five patients at the time of surgery, required slightly longer indwelling time of the double J stents and the open nephrostomy tubes.

There were no arterioveous fistula formation nor termination of the procedure due to bleeding. There were no damaged adjacent viscera including colonic injury or diaphragmatic injury resulting in pneumothorax, all of which have being reported in the literature. There was no renal loss or mortality reported.

Discussion

Transforming from open renal surgery to PCNL clearly has shown many advantages. A traditional open nephrolithotomy or a pyelolithotomy is performed commonly through an extra peritoneal flank incision. This requires a muscle cutting long incision, which leaves behind a formidable wound. There is no doubt that this is one of the main disincentives where patients may express concerns about wound pain predominantly due to muscle damage, increased use of analgesics, poor cosmetic results and the need for a prolonged

Table 2. Stone characteristics					
	Prone PCNL	**Supine PCNL**	**Mini PCNL**	**Total**	**P value**
Laterality of stones					
Right Kidney	30(42%)	35(48%)	34(46%)	99	0.3
Left Kidney	40(58%)	37(52%)	38(54%)	115	
Guys Score for renal stones					
I - solitary stone mid/lower pole	12	9	12		0.2
I - solitary pelvic	16	23	19	91(42.5%)	
II -solitary stone upper pole	2	1	3		0.2
II- multiple stones	24	22	32	90(42.1%)	
III - partial staghorn	12	8	3		
III - Stone in abnormal anatomy	0	1	1	25(11.6%)	
IV - complete staghorn	0	0	0	0	
Ureteric stones	4	2	2	8(3.7%)	
Stone density in HU units	1071(476-1582)	1130(451-1529)	1042(505-1485)	1073(451-1582)	0.21
Index stone size				26.93(13-51mm)	
10- 20 mm	18	15	16	47(21.9%)	0.88
21-30mm	44	41	54	139(64.9%)	
31-40mm	6	11	2	19(8.8%)	
>40mm	2	5	0	7(3.2%)	
Stone Composition					
Calcium oxalate	46	47	50	153(71.4%)	
Uric Acid	6	9	11	26	
Calcium oxalate + uric acid	0	2	2	4	

Table 3. Puncture method					
	Prone PCNL	**Supine PCNL**	**Mini PCNL**	**Total**	**P value**
Calyx puncture					
upper pole	3(4.2%)	1(1.3%)	2(2.6%)	4	
mid pole	7(10%)	5(8.4%)	7(13.8%)	16	
lower pole	60(94.8%)	63(83.6%)	63(83.6%)	194(90.6%)	0.8
Rib puncture – relationship to the 12th rib					
supracostal	2(2.8%)	0	0	2	
subcostal	68(97%)	70(100%)	70(100%)	212	1

recovery period in the hospital, at home and at work. When we transformed to PCNL, from open surgery we observed that most patients returned to normal activities such as driving, exercising, and sexual activity much more earlier. These were the observations made during the initial period of the study when PCNL was performed in the prone position (control group).

Once supine PCNL commenced there were many advantages experienced during the study, including benefits to the patient, anesthetist and the surgeon.

Firstly, there is was less patient handling. Rolling the patient from supine to prone and back to supine position safely in the classical prone PCNL need minimum of 5 people including the anesthetist in the OT room. Also, it is anesthetic concern of tracheal tube dislodgment, close monitoring in compromised cardio respiratory patients and the potential for pressure point damage, once a patient is positioned in prone. All this can be avoided in Supine PCNL.

Secondly the surgeon has the ability to perform antegrade and retrograde access to the kidney simultaneously giving the opportunity to achieve better stone clearance by dealing with upper ureteric and other calyceal stones.

Also, better drainage via the Amplatz sheath by using gravity enables the stone fragments to clear easily. This was an observation made where the stone free rate was much higher in the supine group when compared to the prone group. Lateral approach of the technique enables less radiation exposure to the surgeon's hand. Also, laterally place nephrostomy tube enables the patient to have comfortable seating and sound sleep while lying on the back immediately post op unlike in the prone position where the tube is place on the back. Moreover, it is greater comfort to the surgeon since the surgery can be performed in the sitting position.

Despite several advantages in performing supine PCNL, there are few draw backs experienced with the supine technique. The puncture route is slightly longer when compared to prone position. There is medial displacement of the kidney with the

Table 4. Outcome

	Prone PCNL	Supine PCNL	Mini PCNL	Total	P value
Procedure completed	68	70	72	210	
Conversion to open surgery	2	0	0	2	
Simultaneous use of URS	2	7	11	20	
Operative time(min)	119±40	97±42	104±38	107±42	0.04*(gp 1 and 2)
Mean nephrostomy time(days)	2	2.3	2	2.3	
Hospital stay(days)	4.1±0.7	4.3±0.8	4±0.8	4.2±0.7	
Stone free rate	55(78%)	66(91.6%)	59(82%)	180(84.1%)	0.1
Time for DJ stent removal(days)	32	36	30	33	
Post procedure fURS	3	4	2	9	

Table 5. Complications according to Modified Clavien Dindo classification

Grade	Complication	Prone PCNL	Supine PCNL	Mini PCNL	Total	Significance
I	Fever >38 °C lasting for more than 24hrs	10	3	5	18	p=0.3
	Perinephrostomy leak	10	7	4	21	p=0.7
	Transient rise of creatinine >0.5mg/dl	3	8	7	18	p=0.1
II	Blood transfusion	4	2	1	7	
	Urosepsis	2	3	4	9	
	Pneumonia	2	0	0	2	
III A	Acute Retention due to blood clots	1	1	2	4	
	Angio-embolization of AV fistula	0	0	0	0	
	DJ stent dislodgment requiring repositioning	0	2	0	2	
III B	Infundibular stricture	0	1	0	1	
	Collecting system perforation	3	1	3	7	
IV A	Visceral injury	0	0	0	0	
	Nephrectomy	0	0	0	0	
IV B	Multi organ dysfunction (MODS)	0	0	0	0	
V	Death	0	0	0	0	

puncture. But this can be used to advantage as guide to locate the surface of the kidney when the medial displacement is noticed when needle hits the surface of the kidney.

With these advantages, the study was extended where miniaturizing the technique where a smaller renal track was created to deal with renal stone (mini PCNL). The observations made during the mini PCNL group was that the procedure can achieve comparable stone-free rates to the conventional methods, even for large stones. It is a safe procedure, and no major complications are reported. Although less invasive it failed to demonstrate a clear advantage in terms of transfusion rates or shorter hospital stay than the standard method. However it was clear that mini PCN tract can be useful as a multi tract procedure in order to achieve complete stone clearance of a staghorn calculi or large renal stone burden situation.

The strength of the entire study is that it was a single center study with the same urological team with single surgeon performing all cases unlike in most of other large series where many surgeons are involved.

As an endourologist it is of paramount importance to change your practice according to the best available evidence and adhere to the technique which you are most conversant with . This will ensure patient safety, and better outcomes with ease and comfort not only to the practicing surgeon but to the entire surgical team which includes the anesthetist, nurses and minor staff members.

Present study clearly demonstrated that supine PCNL was statistically equally effective, showing slightly increased though statistically non-significant rate of stone clearance in comparison to the prone approach.

None of the patients in the study experienced major complications such as death, renal loss, major haemorrhages, arterioveous fistula requiring embolization, pleural and colonic injury which are reported in previous larger studies [17]. The minor complications the patients had completely resolved with time. This confirms that the supine PCNL as well as mini PCNL was equally or much safer when compared to the traditional technique.

More importantly the operating time was significantly lower in the supine group. This has had the greatest impact in changing our practice to shift from prone to supine PCNL.

In brief PCNL in supine position is as effective and safe as PCNL in the prone position and has proven to be a better alternative to the traditional prone PCNL in our setup. Mini PCNL will be useful when the stone burden is small or as a second tract or as multi-tracts when dealing with a large stone burden.

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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