IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 19, Issue 1 Ser.6 (January. 2020), PP 18-21
www.iosrjournals.org

"Supine mini PCNL: Our initial experience"

DrSunirmal Choudhury[1], Dr.Tapan Kr Mandal[2], Dr.TapasKr Majhi[3], Dr. ParagmaniTalukdar[4], Dr.Rohit Kumar[5]

[1]*MS, M.Ch (Urology) Associate Professor, Department of Urology*
Institute of Post Graduate Medical Education & Research, Kolkata-700020, India
Formerly, Assistant Professor, Department of Urology N R S Medical College, Kolkata-700014, India
[2]*Professor &HOD , Department of Urology N R S Medical College, Kolkata-700014, India*
[3]*Professor, Department of Urology N R S Medical College, Kolkata-700014, India*
[4]*Mch trainee Department of Urology N R S Medical College, Kolkata-700014, India*
[5]*Mch trainee Department of Urology N R S Medical College, Kolkata-700014, India*
Corresponding author: *Dr.ParagmaniTalukdar*

Work attributed to: Department of Urology, N R S Medical College, Kolkata-700014, India
Conflict of interest: None
Source of support: Nil
Acknowledgement: Nil

Abstract: *Renal calculus disease is an age old disease of human being. PCNL (Percutaneousnephrolithotomy) stands as a gold standard of treatment for large renal calculus which is traditionally being done in prone position.*

Objective:*To evaluate the safety and efficacy of supine miniPCNL in relation to intraoperative time, requirement of relook PCNL, post op hemoglobin drop,post operative hospital stay,post-operative complication,SFR (stone Free Rate).*

Methods and materials: *It is aretrospective study done inDept. of Urology, in a tertiary care hospital in eastern part of India between October 2017 and October 2018. A total of 11 patients of with lower calyceal renal stones of size < 1.5 cm who underwent supine mini PCNL were included in this study.Lower calyceal stone,size measuring >1.5cm , and any other calyceal stonewere excluded from the study*

Results: *The mean intra operative time was 71.62 min and the mean hemoglobin drop was 0.92 gm/dl. The mean post operative hospital stay was 3.1 days. One patient in require relook PCNL. Stone free rate at 1 month was 90.23% .*

Conclusion: *Mini supine PCNL is feasible, with potential benefit to high risk group of patients and added advantages of stone clearance*

Key words*: Mini supine PCNL, Lower calyceal stone.*

Date of Submission: 26-12-2019 Date of Acceptance: 10-01-2020

I. Introduction

Renal calculus disease is an age old disease of human being. Urinary stone disease is a global disease with a prevalence rate of about 12% In Indian population and out of which 50% may end up with loss of kidney functions [1]. In the modern era of minimally invasive surgery there are many ways of treatment for renal stone. However PCNL (Percutaneousnephrolithotomy) stands as a gold standard of treatment for large renal calculus. (PCNL) has almost completely replaced conventional open surgery for the removal of large and complex renal calculi. Since its first description by Fernstrom and Johansson in 1976 PCNL has traditionally been done with the patient prone, combining a high success rate and acceptable low morbidity [2]. The prone position has some advantages like easiness to puncture the posterior calyx, shorter track length, ease of tract dilation, ease to do multiple puncture. But prone position is not without difficulties. In prone circulatory and ventilatory compromise may be there because of compression on the chest especially in the obese patient;cervicalspine injuries, tracheal compression and ocular injury may occur on turning the patient prone; more fluid absorption may occur because of anti gravity drainage of fluid; concurrent RIRS (Retrograde intrarenal surgery)is difficult in prone position. So there was a hunt in search of a new position which can ameliorate the disadvantages of traditional prone position. Since its inception PCNL has evolved tremendously throughout the 8th decade of 20th century and 1n 1990 first original supine position was described by J G

Valdivia [3]. In this position the direction of the tract is downward and thus preserves a low pressure in the renal pelvis, and thereby reduces the risk of fluid absorption and allows even spontaneous clearance/washout of fragments by gravity directed flow of fluid

The main limitation of this position is that the flank is not fully exposed, which makes initial puncture more difficult. In 2007 The Galdakao-modified Valdivia position was described by Ibarluzea et al[4] for supine PCNL. Many authors confirmed that the PCNL in this position is a safe and versatile with high success rates and has advantages over the prone position [5],[6].

In this position the ipsilateral leg is extended and the contra lateral leg is abducted and flexed. The patient is placed in an intermediate supine-lateral position with a 3-L bag placed to raise the flank.

This position combines the surgical and anaesthesiological advantages of the original Valdivia position with the additional advantage of RIRS.

Mini PCNL is being regularly done since its inception in less than 1.5 cm . It is thought to have less intraoperative blood loss, less nephron loss. Literature of supine mini PCNL is less.

We have studied retrospectively 11 patients of supine mini PCNL. This study is our initial experience with supine mini PCNL.

II. Methods And Materials

It is a prospective study done inDept. of Urology, NilratanSircar Medical College, Kolkata between October 2017 and October 2018.A total of 11 patients with lower calyceal renal stones underwent supine mini PCNL.

Preoperative evaluation was done either with computed tomography urography or intravenous urography along with other routine investigation. Tract dilatation to 16 F was followed by nephroscopy, stone disintegration using pneumatic lithotripsy, and retrieval using a stone forceps.Lower calyceal stone ,size measuring less than 1.5cm included in the study where as **a**ny other calyceal stone ,Stone size more than 15 mm were excluded from the study

Intraoperative time duration is taken from the time of intubation to placement of PCN tube.

A p value of <0.05 was taken to be significant .Statistical analysis was done SPSS version 16

Operative steps:

In supine position after ureteral catheterization patient's ipsilateral leg is extended and the contralateral leg is abducted and flexed. A bolster is placed to raise the flank in stead of 3 L saline bag (fig :1). Initial puncture is done with 18 cm long 18 G needle in triangulation technique.A terumo guide wire of size 0.035" is passed and serial dilatation is done over metallic guide rod upto 16 Fr to allow Amplatz sheath of same size. Stone fragmentation is done pneumatic lithoclast and retrieved with alligator forceps. A double J stent of size 6 Fr was placed in each case

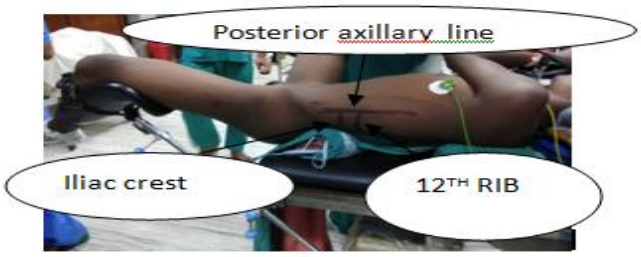

Figure 1: Galdakao modified supine Valdivia position .The area behind the posterior axillary line and in between the iliac crest and 12th rib is considered to be the safe area.

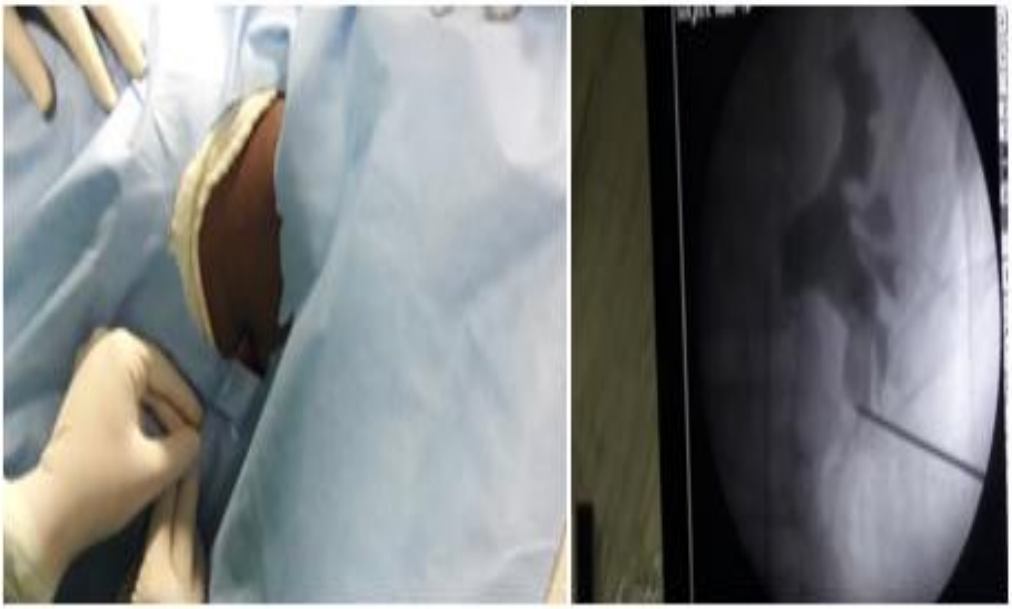

Figure 2: Initial puncture with simultaneous C arm view.

III. Results:

In our study 6(54.55. %) patients were female and 5 (45.45%) were male. In 8 patients stone was located to right side and in3 patients stone was located to left side.

The mean age was 38.4 years and the mean BMI was 28.2 kg/ m^2 .10 patients fulfil the criteria ASA (American Society of Anaesthesiologist's) category Ihealth status . The mean stone size was 13.6 mm..

Table 1: Generalcharacteristics

Characterstics		**Supine**
Mean Age (Yrs)		38.4
Mean BMI(Kg/m^2)		28.2
ASA	I	10
	II	1
Mean Stone Size (mm)		13.6

The mean intra operative time was 71.62 min and the mean haemoglobin drop was 0.92 gm/dl . The mean post operative hospital stay was 3.1 days. One patient require relook PCNL. Stone free rate at 1 month was 96.23% .

Table 2: Surgical outcome

Parameters	**Supine group**
Time for initial puncture	12.34min SD=5.21
Mean Intraoperative period (In minutes)	71.62 SD=10.48
Mean Haemoglobin drop (gm/dl)	0.92 SD=0.51
Mean Duration of hospital stay (Post operative in days)	3.1 SD=1.7
Requirement of relook PCNL (In numbers)	1
Requirement of blood transfusion (In numbers)	Nil
SFR at 1 month	90.23%

IV. Discussion

The technique of PCNL has been rapidly evolving since its inception. Various new position has been tried and there has been miniaturization of nephroscopes, improvement in the lithotripsy devices, and new retrieval tools have resulted in growth of mini PCNL to reduce the morbidity and to reduce intraoperative blood loss. Many studies of supine mini PCNL has been carried out specially in paediatric patient and showed stone free rate to be in between 90%-98% [7,8]. We have also seen in our study that the SFR to be of 90.23%

In one study the average operative time (from the beginning of the puncture trial to nephrostomy tube insertion) was 41 ± 15 min which lower than our study (71.62±10.48 min) [9]. This may be due to time taken during initial puncure.
In our study there was hemoglobin drop (difference between pre op hemoglobin and post op hemoglobin) 0.92 gm (SD 0.51), without any requirement of blood transfusion which is similar to findings of other studies [10].
In our study we have seen that mean post operative hospital stay was 3.1which is consistent with other studies. [11]
We have seen that 1 patient further require second relook PCNL.

V. Conclusion

Supine PCNL is cumbersome because of limited pelvicalyceal fullness as irrigating fluid drains off quickly making manipulation of nephroscope more difficult. However it has many potential advantages for the patients. Supine mini PCNLhas advantages of being less morbid procedure than standard supine PCNL . Moreover mini supine PCNL reduces blood loss. We do believe that supine mini PCNL is feasible, with potential benefit to high risk group of patients and added advantages of stone clearance and simultaneous use of RIRS

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Dr.ParagmaniTalukdar.et.al. "Supine mini PCNL: Our initial experience."*IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 19(1), 2020, pp. 18-21.