



Clearance of Renal Stone in PCNL Under Spinal Anaesthesia

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Abstract

Objective: To evaluate the Outcome of PCNL under spinal Anaesthesia.

Material and Method: A total of 74 patients with renal stone disease were treated by PCNL under spinal anaesthesia. Total study period was from January 2013 to October 2019. Pre operative and post operative variables and complications were recorded.

Result: Age range from 25 years to 65 years, mean 41.37 ± 33 yrs. Male female ratio was 6.4:1 stone size ranges from 15mm to 40mm, majority was 21.33mm. Mean operative time was 69 ± 4.2 min. Total stone clearance was 15.60%. Only 10.82% patients were suffering from grade I complications and mean hospital stay was 3.1 ± 0.6 days.

Conclusion: Percutaneous nephrolithotomy is effective and safe under spinal anaesthesia with shorter hospital stay and minimal complication.

Introduction

Stone disease is one of the common urological disorder in our Country. There are different modalities of treatment for stone disease according to size, shape and location of the stone in kidney. Among them stone size ≥ 2 cm within kidney and pelvis PCNL is considered one of the popular method of treatment because of less trauma, early mobilization and short hospital stay.¹ Early time when PCNL was started it was done under General Anaesthesia.² Different modalities of anaesthesia was tried to do PCNL to minimize the hazards of GA. Control of tidal volume and patency of air way are the main two challenges for the patient of PCNL under GA in prone position² Use of Spinal anaesthesia in gynecological surgeries¹ encourage to apply this modalities of anaesthesia in

PCNL operation. Spinal anaesthesia has several advantages such as shorter recovery time, avoidance of multiple drugs use and less costly.¹ Spinal anaesthesia has several other advantages like pain control, control of tidal volume and air way can be secured in prone position easily.¹ Under spinal anaesthesia stone clearance is also studied in our series.

Method and Procedure:

This randomized study is done in a private specialized hospital from January 2013 to October 2019. Total 74 cases was under went PCNL under spinal anaesthesia. We excluded patient with any anatomical anomalies in kidney and body mass index more than 30. All the routine investigations such as S. Creatinine, S. Electrolyte, USG and X-ray of KUB region and IVU were done. Patient were included whose age between

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18 to 70 years, ASA I and II, stone size up to 4cm with normal renal function. Patient who are on anticoagulation therapy, this medicine was stopped 7 days before operation and BT, CT, APTT, Prothombin time were done.

Patient consent was taken before all operation. They explained indetails about anaesthesia and surgical procedure. Patient was also explained that operation will be done in several steps and deferent position. During Spinal Anaesthesia patient was in position with head down and bowing forward, spinal anaesthesia was administered to patient with 0.5% 4ml of Bapivacaine at the level of L2-L3 vertebral space with all standard and aseptic procedure by 18g spinal needle . Patient was in supine position for 10 minutes. Sensory block upto T6 dermatome was confirmed by needle prick then cystoscopywas done in lithotomy position. Ureteric orifices were identified. Guide wire was passed throughureteric orifices and ureteric catheterpassed intorespective ureter, over guide wire up to pelvis of the kidney under fluoroscopic guidance. Guide wire was removed and again position of ureteric catheter was confirmed by fluoroscope.

Patient was then informed and position changed into prone position. Breathing comfort was ensured. After prone position scrubing and drapping was done. Under fluoroscopy dye was given through ureteric catheter. Target calyx was located at 0° and 30° of fluoroscopy guidance. Puncture needle proceed up to target calyx at 30° fluoroscopyguidance then it is confirmed at 0°. If alignment was same puncture needle was pushed up to calyx. After removing of trocher free flow of water confirmed correct position of needle. Upper outer portion of needle was glide upto tip of puncture needle. Then inner portion of puncture needle was withdrawn. Guide wire was passed through the puncture needle. It was passedup to the bladder orcoiled within kidney. Then puncture needle was withdrawn. Serial dilation was done up to30^{fr} andamplazsheeth was passed over metallic dilator. Metalic Dilator was withdrawn and wash given through amplazsheeth to remove clot if any. Then 24Fr nephroscope was passed and stone was identified. Stone fragmented by pneumatic lithotripter. Fragmented stone was extracted by stone holding forcep and water was flashed to clean stone dust and after clearance of stone D-J Stent was given antegradely. At the end of the operation Nephrostomy tubewas given in situ for 24hours. Then it was removed and pressure bandage was given. After 7 daysstitch

was removed. Foleys catheter was removed afterremoval of nephrostomytube. Patient advice to remove D-J Stent after 4 weeks after his operation. Check x-ray was done it see the D-J stent and residual stone if any. Complication were classified according to the modified clavian system. Data were taken regarding stone size, stone clearance, distributes of stone, operation time, complication & hospital stay.

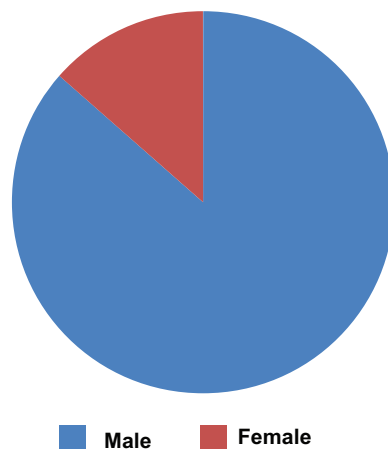
Result:

1. Distribution of the study patient by age (N=74) 5(6.7%) patient was ≤25 years old, 51(68.92%) patient was between 25 to 55 years and 18(24.32%) patient was more than 55 years old.

Table-I		
Age	Number of Patient	Percentage
≤25	5	6.75
25-55	51	68.92
>55	18	24.32
Mean±SD	41.37	±3.3

2. Distribution of the study patient by sex (N=74) Among the population group male was 64(86.48%) and female 10(13.52%).

Table-II		
Gender	Number of Patient	Percentage
Male	64	86.48
Female	10	13.52



Pie Chart showing distribution of the study patient by sex.

3. Distribution of BMI of study patient (N=74)

In our study 39(52.7%) patients BMI were ≥ 25.0 kg/m² which is over weight, Rest 35(47.3%) patient BMI were ≤ 24.9 kg/m² but less then 18.5 kg/m² which is normal.

Table III		
BMI (kg/m ²)	Number of Patient	Percentage
18.5-24.9 (Normal)	35	47.3
≥ 25.0 (Over Weight)	39	52.7
Mean \pm SD	23.6	± 4.8

4. Distribution of the study patient by ASA Score (N=74).

49(66.22) patient had ASA score I and 25(33.78) patient had ASA score II.

Table -IV		
ASA Score	Number of Patient	Percentage
Score-I	49	66.22
Score-II	25	33.78

5. Stone size Distribution

The stone size of 12(16.21%) patient was 15-20mm, 47(63.51%) stone size 21-35mm and 15(20.28%) stone size.

Table-V		
Stone size in mm	Number of Patient	Percentage
15-20	12	16.21
21-35	47	63.51
35-40	15	20.28

6. Stone clearance Distribution

56(75.60%) patient had Complete stone Clearance, lase then <4mm residual stone 11(14.86%) and >4mm residual stone was 7(5.04%).

Table-VI		
Stone size in mm	Number of Patient	Percentage
Complete Clearance	56	75.60
<4 mm Residual stone	11	14.86
≥ 4 mm Residual stone	7	5.04

7. Distribution of Operation Time

17(22.97%) patient needed operation tome between 45 to 60 minutes, 43(58.10%) patient between 61 to 90 minutes and 21(28.37%) patient 76 to 90 minutes.

Table-VII		
Operation time in minutes	Number of Patient	Percentage
45-60	17	22.97
61-75	43	58.10
76-90	21	28.37
Mean \pm SD	69	± 14.2

8. Complication Distribution

It was observed 58 (78.37%) patient did not suffer from any complication 16 (21.63%) patients developed different type of complication which is shown in the table.

Table VIII		
Complication	Number of Patient (N=16)	Percentage (21.63%)
Grade -1	8	10.82
Grade -2	6	8.11
Grade -3	2	2.70
Grade -3a	-	-
Grade -4a	-	-
Grade -4b	-	-
Grade -5	-	-

9. Distribution of hospital stay (N=74)

Hospital stays in our study group 45(60.81%) patient discharged on 3rd day POD, 16(21.62%) patient on 4th POD and 13(17.57%) on 5th POD when there was no macroscopic haematuria.

Table IX		
Hospital stay (in days)	Number of Patient	Percentage
3	45	60.81
4	16	21.62
5	13	17.57
Mean \pm SD	3.1	± 0.6

Discussion:

This prospective comparative study had been designed to observe the efficacy and safety of PCNL under spinal anaesthesia. Total 74 patients were included in the study according to inclusion and exclusion criteria.

Result of treatment were compiled and compared. Preoperative baseline variables like age, gender, BMI, ASA, risk group, size of stone were compared between groups. Outcome variables such as stone clearance, postoperative pain score, analgesics requirement, operation time, postoperative complication and hospital stay were done.

In this study, age of the patients ranged from 25 years to 60 years. The majority of patients were belonged to age 25-50 years mean was 41.37 ± 3.3 years. The mean age of this study was comparable with the study found that the mean age was similar to the present study by 3,4.

In this study it was observed that male was predominant which 86.48 due to male predominance of the disease. Similar studies done and showed male predominance of renal stone^{5,6}.

In this study, mean BMI was found 25.5 ± 2.5 kg/m² in group. The mean BMI of this study was comparable with the study done by Karacalar, S, Bilen, C.Y, (2009)

American Society of Anaesthesiologists (ASA) physical status was ASA physical status. ASA score III and IV were not included in this study. Our observation was similar with study done by Cicek³. In this study, mean stone size was found 21-35mm. Stone upto 4cm were included in this study, The mean stone size of this study was comparable with the study Mehabi, S and Karimzadeh, S.K (2010).

This study, Stone Clearance was 75.60%. The stone clearance ratio of PCNL under different methods of anaesthesia were reported to be between 53.8% and 97% in several studies done by Tangpaitoon, T, (2012) & Karacalar, S, (2009). It was demonstrated in these studies that SA does not affect the success of PCNL.

In this study, mean operating time was 69 ± 14.2 min. The mean operative time of this study was comparable with the study by Tangpaitoon, T, (2012). Among the complications most are grade I of modified Clavien complications Tae, S.S (2011).

In this study, mean hospital stay was 3.1 ± 0.6 stay depends on postoperative pain. fever, hematuria and

urinary leakage similar to the study done by Cicek, T (2014)

Conclusion:

Percutaneous nephrolithotomy done under spinal anaesthesia is effective and safe. The pain following the PCNL in spinal anaesthesia is significantly less and requires shorter hospital stay and more patient satisfaction.

Recommendation:

This is a study done in a single centre with small sample size. More centres and more sample are needed for making a comment about its outcome. But this study may act as a template for further study.

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