



Research Article

SAFETY AND EFFICACY OF MINI-PCNL AS COMPARED TO RIRS IN LOWER POLE CALCULUS 1-1.5cm

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ABSTRACT

Aim: To compare the efficacy and safety of Mini-PCNL and RIRS in the management of lower pole renal stones of 1- 1.5 cm.

Materials and methods: Prospective Study was conducted in institute of urology, Madras Medical College, Chennai between the period of January 2016 to September 2016. 50 patients were included in this study, 25 in RIRS group & 25 in Mini-PCNL group study group. All patients with single lower pole stone of size 1-1.5 cm with hounsfield unit of >1000 were included. Patient with anatomical abnormality, bleeding diathesis, multiple renal calculus, diverticular stones were excluded. All the eligible patients were enrolled in the study and assigned either to the RIRS group or Mini-PCNL group after getting the informed consent

Results: Six patients (24%) of the RIRS group had sepsis and 2 patients (8%) of the Mini-PCNL group had sepsis. There was significantly higher sepsis rate in the RIRS group, p-value 0.0416. 8 patients (32%) of the RIRS group had significant stone fragment, One patient (04%) of the Mini-PCNL group had significant stone fragment. There was statistically significant higher residual calculi rate in the RIRS group. The mean duration of the RIRS procedure was 67.6 minutes. The mean duration of the Mini-PCNL procedure was 57.32 minutes. The procedure duration in the RIRS group was higher than the Mini-PCNL group and the difference was statistically significant, p-value 0.0001.

Conclusion: Complete clearance of lower pole renal calculus of size 1- 1.5 cm, with the lowest morbidity is the goal of the treatment. Mini-PCNL would be the better option for complete clearance of lower pole stone with minimal morbidity and cost effective rather than RIRS. Advantages of Mini-PCNL group includes less operative time, less chances of significant residual stone fragments and low rate of sepsis. More over Mini-PCNL group does not require preoperative stenting. Hence Mini-PCNL would be the better option for lower pole renal calculus of size 1-1.5 cm.

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INTRODUCTION

Kidney stone disease is increasing with its most common location being in the lower calyx. Lower pole stones make up an estimated 25–35% of all kidney stones [1]. Stones in the lower calyx arguably are the most difficult to manage successfully due to difficulty with anatomical configuration. The various treatment modalities to treatment lower pole stones (LPS) vary from shock wave lithotripsy (SWL), ureteroscopy (RIRS) and percutaneous nephrolithotomy (Mini-PCNL), thereby increasing in their invasiveness. While treatment focus is on complete stone clearance, this has to be balanced against the morbidity of the procedure involved. A clear strategy for effective management of these stones is essential

MATERIALS AND METHODS

Prospective Study was conducted in institute of urology, madras medical college Chennai between the period of January 2016 to September 2016. 50 patients were included in this study, 25 in RIRS group 25 in Mini-PCNL group study group. Includes patients with single lower pole stone of size 1-1.5 cm, hounsfield unit of >1000. Excludes patient anatomical abnormality, bleeding diathesis, multiple renal calculus, diverticular stones. All the eligible patients were enrolled in the study and assigned either to the RIRS group or Mini-PCNL group after getting the informed consent.

The diagnosis of lower pole renal calculi was confirmed by CECT and then the patients were evaluated. The patients were explained about the procedure of RIRS and Mini-PCNL. Under regional anaesthesia, pre-operative stenting with 5F Double J stent was done and left in situ for 2 weeks. After

two weeks patients werereadmitted for RIRS.RIRS was done under general anaesthesia with endotracheal intubation Operative time was calculated from the time of passing the cystoscope to the Double 'J' stent placement. RIRS was done using Olympus P.5scope Single deflection scope, 5.3 F at tip 8.4F – Rest of the scope, Upward deflection of scope – 180, Downward deflection of scope – 270.Mini-PCNL was done under general anaesthesia with endotracheal intubation Operative time was calculated from the time of calyceal puncture to the time of nephrostomy tube placement mini Mini-PCNL was done using 14 F Olympus nephroscope using standard technique. Stone fragmentation was done using 30 watts holmium laser in both RIRS and Mini-PCNL group. In Mini-PCNL Nephrostomy tube was kept and the ureteric catheter was retained for 12 hours and removed, nephrostomy tubewas removed after 24hrs.

PARAMETERS	RIRS	MINI-PCNL	P-VALUE
AGE	47.4 SD 9.87	47.04 SD 13.28	0.913
GENDER	M 13	M 16	0.39
	F 12	F 9	
BMI	27.72 SD 3.54	25.84 SD 3.89	0.0804
SIDE	RT 13	RT 17	0.2482
	LT 12	LT 8	
DURATION OF PROCEDURE	67.6 SD 5.4 MINS	57.32 SD 6.5 MINS	0.0001
POST OPERATIVE PAIN	5	9	0.2077
HEMATURIA	2	5	0.2044
SEPSIS	6	2	0.0416
SSF	8	1	0.0099
HOSPITAL STAY	59.7 SD 26.7 HRS	53.7 SD 15.53	0.1684
BLOOD TRANSFUSION	1	4	0.1573

RESULTS

Majority of the study population in RIRS were in the age group of 41-50 years. Mean age group in RIRS was 47.4+/-9.87. Majority of the study population in Mini-PCNL were in the age group of 41-50 years. Mean age group in Mini-PCNL was 47.04+/-13.28, P-value (0.913) is insignificant. In RIRS group 13(52%) patients were male, 12(48%) were female. Mini-PCNL group 16 (64%) patients were male, 9(36%) patients were female. The difference in the gender distribution among the RIRS and Mini-PCNL group was not statically significant, p-value 0.39.

In RIRS group 48% of the patients were overweight followed by 28% in the obese category and 24% in the normal BMI group. In Mini-PCNL 48% of the patients were with the normal BMI followed by 32% in the overweight category and 20% in the obese group. The mean BMI of the population studied in the RIRS group was 27.72. The mean BMI of the population studied in the Mini-PCNL group was 25.84. The difference in the BMI values among the RIRS group and Mini-PCNL group was not statically significant. The side of the lower pole calculi distribution was not statically significant among the RIRS and Mini-PCNL group, p-value 0.2482. The mean duration of the RIRS procedure was 67.6 minutes. The mean duration of the Mini-PCNL procedure was 57.32 minutes. The procedure duration in the RIRS group was higher than the mini -PCNL group and the difference was statistically significant, p-value 0.0001. 5 patients (20%) of the patient in the RIRS group were having pain in the postoperative period, whereas 9 patients (36%) of the Mini-PCNL group had pain in the postoperative period. The difference among both the groups were not statistically significant, p-value 0.2077. Hematuria was present in 2

patients (8%) of the RIRS group, and 5 patients (20%) of the patients in the Mini-PCNL group. The difference in the values were not statistically significant, p-value 0.2044. 24% of the RIRS group had sepsis and 8% of the Mini-PCNL group had sepsis. There was significantly higher sepsis rate in the RIRS group, p-value 0.0416. 8 patients (32%) of the RIRS group had significant stone fragment One patient (04%) of the Mini-PCNL group had significant stone fragment There was statistically significant higher residual calculi rate in the RIRS group. one patient (04%) of the RIRS group had blood transfusion. 4 patients (16%) of the Mini-PCNL group had blood transfusion. The difference in the results were not statistically significant, p-value 0.1573. The mean duration of hospital stay for the RIRS procedure was 59.7 hrs. The mean duration of hospital stay for the Mini-PCNL procedure was 53.7 hours. The hospital stay duration in the Mini-PCNL and RIRS group and the difference was not statistically significant.

DISCUSSION

RIRS provides better clearance of lower pole stones <15 mm [2]. As a minimally invasive intervention, RIRS can be used both to fragment the stone (s) and/or to displace the stone(s) to a more accessible location for basket removal [3]. Mini-PCNL offers decreased blood loss, hospital stay, analgesic requirements, and overall complication rates whilst maintaining similar SFR [4,5]. Kirac et al. compared RIRS with Mini-PCNL in 73 patients with LPS <15 mm where SFR were comparable (91.9% for Mini-PCNL versus 91.6% for RIRS) at 24 hours. The mean theatre time was significantly lower for Mini-PCNL (53.7 minutes versus 66.4 minutes for RIRS)

PCNL would be a better option in management in new era in lower pole renal stone. The decreasing size of the tracts, scopes, energy sources, and retrieval devices over the past two decades have led to the development of new methods of PNL and a subsequent decrease in complication rates. This has resulted in standard PNL (tract size 26-30Fr) being replaced by Midi (20–22F), Mini- (16–18Fr), Ultramini (11–14Fr), and Micro-PNL (<10Fr) techniques in appropriate patients [4]

The advent of miniaturized technology expanded the role of PCNL. These techniques offer a particular advantage for difficult to access calculi, impacted lower pole calculi with an acute infundibular angle or stones in a calyceal diverticulum [Weizer et al. 2005; Kirac et al. 2013]. In the paediatric population, mini PCNL has been found to be a safe and effective alternative to standard techniques [Jackman et al. 1998a]. Length of stay is reduced with a faster recovery compared with standard techniques, [Akman et al. 2011; Hatipoglu et al. 2014].

The advent of refined PNL techniques undoubtedly spells a new era in LPS management,. Similarly, there is a critical need to add to the evidence base with more long term data and randomised-controlled trials comparing a host of qualitative and quantitative outcomes for all available treatment methods in the context of lower pole stone.

CONCLUSION

Complete clearance of lower pole renal calculus of size 1- 1.5 cm, with the lowest morbidity is the goal of the treatment. Mini-PCNL would be the better option for complete clearance

of lower pole stone with minimal morbidity and cost effective rather than RIRS .Advantages of Mini-PCNL group includes less operative time, less chances of significant residual stone fragments and low rate of sepsis.More over Mini-PCNL group does not require preoperative stenting. Hence Mini-PCNL would be the better option for lower pole renal calculus of size 1-1.5 cm.

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