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Comparison between mini PCNL and standard PCNL: A single-centre prospective study

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Objectives

PCNL has been the gold standard in management of renal stones larger than 2cm. The idea of using smaller PCNL tract size to reduce the risks of complications has been raised. This study aims to compare the efficacy and safety profiles of standard PCNL with mini PCNL.

Patients & Methods

A total of 92 patients with 105 PCNL procedures from 1st August 2016 to 30th August 2021 in Queen Mary Hospital and Tung Wah Hospital were included, 36 with tract sizes of Fr<22 (Group 1) and 69 with Fr≥22 (Group 2). Patient demographics, stone count, size, number of tract(s), tract size, operative outcomes and complications were analysed.

	Fr <22	Fr ≥22	P value
N	36 (34.3%)	69 (65.7%)	
First-time PCNL	34 (94.4%)	60 (87.0%)	0.745
Age	55.71± 9.79	55.75±9.85	0.235
Gender	M 19 (52.8%) F 17 (47.2%)	M 29 (42.0%) F 40 (58.0%)	0.310
Number of stones*	3.06±2.76	2.29±2.38	0.162
Pre-op stone max diameter (mm)	24.19±6.15	38.70±19.72	**<0.001**
Pre-op stone size (mm^2)	320.80±143.81	882.24±833.70	**<0.001**

Table 1 Background characteristics of patients

	Fr <22	Fr ≥22	P value
Any complications	8 (22.2%)	20 (29.0%)	0.255
Post-op fever	4 (11.1%)	7 (10.1%)	0.745
Maximum post-op white cell count (10^9/L)	13.02±4.50	13.77±3.70	0.391
Haemoglobin drop (g/dL)	0.94±0.64	1.21±0.89	0.127
Creatinine Change (mmol/L)	6.67±13.03	6.56±13.27	0.969
Post-op antibiotic duration (days)	4.36±4.36	8.00±13.07	0.108
Length of stay (days)	4.43±2.00	5.49±2.14	0.052
Need of Post-op JJ stent	22 (59.5%)	27 (40.3%)	0.068
Post-op JJ stent duration (days)	56.23±20.55	50.19±25.90	0.367
Need of Post-op PCN	36 (100%)	60 (96.8%)	0.53
Post-op PCN duration (days)	3.6±2.6	7.4±9.5	**0.02**
Any Residual stone	10 (27.8%)	32 (46.4%)	0.093
Number of residual stone	0.33±0.63	0.74±0.95	0.09
Additional stone treatment required	23 (63.9%)	34 (50%)	0.409
Number of additional treatment performed	0.64±0.96	0.93±1.26	0.41

Table 2 Perioperative outcomes and safety profiles

Results

There was no significant difference in patient demographics, percentage of first-time PCNL and stone count. However, the pre-operative stone maximum diameter and size were smaller in Group 1 (24.2±6.2mm vs. 38.7±19.7mm, p<0.001; 320.8±143.8mm^2 vs. 882.2±833.7mm^2, p<0.001).

There was no significant difference in terms of stone-free rate, hospitalization time, operation time, and complications including haemoglobin drop, rates of transfusion, postoperative fever, sepsis, prolonged antibiotic use, and renal impairment. The presence of residual stone ≥4mm and the number of additional treatments required were comparable (0.33±0.63 vs.0.74±0.95, p=0.09; 0.64±0.96 vs. 0.93±1.26, p=0.41). The postoperative PCN duration was shorter in Group 1 (3.6±2.6 vs. 7.4±9.5 days, p=0.02) while the JJ stent duration was comparable (56.2±20.6vs. 50.2±25.9 days, p=0.37).

Conclusion

Mini PCNL is an effective and safe alternative to standard PCNL.