15

Safety and efficacy of superior calyceal access versus inferior calyceal access for pelvic and lower calyceal stones – prospective observational comparative study

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Chawla A.K. , Mohan A.

Kasturba Medical College, Manipal University, Dept. of Urology and Renal Transplant, Manipal, India

Introduction & Objectives: Superior calyceal access allows for greater stone clearance rates due to its easy and direct access to collecting system with minimal torque on the renal parenchyma. This prospective study was carried out to evaluate the safety and efficacy of superior calyceal versus inferior calyceal puncture for pelvic and lower calyceal stones with primary objective of complete stone clearance along with other parameters like operative duration, drop in haemoglobin, need for second puncture, Clavien Dindo complications and auxiliary procedures needed.

Materials & Methods: A total of 126 patients underwent PCNL for stones in pelvis and/or lower calyx were studied. Staghorn stones, calyceal diverticular stones and renal units with previous PCNL were excluded. Sixty three of them underwent Superior calyceal (Group 1), while 63 underwent inferior calyceal puncture (Group 2). Data was collected to include demographic profile, stone characteristics, procedural details, intra-operative and post operative l complications and Stone clearance. Standard Pcnl, Mini PCNL were used in both groups. Statistical analysis was performed with unpaired t-test for continuous variables, Chi square test and fisher exact test for categorical variables with significance of less than 5%.

Results: In our study, primary supracostal puncture was required in 53.9% in group 1 and 3% in group2. PCNL guidewire entered the ureter in 92% in group1 and 74.6% in group 2 -p-value of 0.034. Stone fragments migrated to middle calyx in 3.17% in group1 and 10.5% in group 2 -p-value of 0.033. Second puncture was required in one patient in group 1 and 6 patients in group 2 with p-value of 0.04. The operative duration for stone removal was 13.46 +/- 1.09 in the group 1 while 16.58 +/- 1.44 in the group 2 with p-value of 0.002. Calyceal injuries (Mucosal to pericalyceal fat) were noted in 3 patients (4.76%) in group 1 and 12 patients (19.04%) in group 2 with p-value of 0.002. Thoracic complications (hydro/pneumothorax) occurred to 2 patient in superior calyceal access group managed with intercostal tube drainage for 12 hours with p-value of 0.243.Post operatively blood transfusion three patients in group 2 with p-value of 0.11. Angioembolisation was done in one patient among the inferior calyceal access approach (p-0.683).Complete stone clearance assessed at 1 month was 98.4% in group 1 and 85.71% in group 2. Auxillary procedure was needed in 2 patients of Group 2.

Conclusions: We conclude that superior calyceal puncture is a safe and efficacious in terms of achieving complete stone clearance rate as compared to lower calyceal access for pelvic and lower calyceal stones. It is associated with reduced operative time, minimal blood loss, less incidence of calyceal injury, less need for a second puncture and auxiliary procedures with minimal complications.