P049 Renal pelvic pressure fluctuations during vacuum assisted mini-PCNL with the Clear Petra® system: Preliminary results

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Introduction & Objectives: Small caliber percutaneous nephrolithotomy (PCNL) has been reported to cause renal pelvic pressures (RPPs) rise due to reduced outflow through the miniaturized access sheath. RPPs over 30 mmHg (40,78 cmH2O) are associated to irrigation fluid backflow into renal tubules with potential systemic absorption of bacteria leading to infectious complications. The employ of a vacuum assisted mini-PCNL (vmPCNL) system may help keeping low RPPs by suctioning the irrigation fluid during lithotripsy. The aim of this study is to evaluate RPPs peaks and fluctuations during vmPCNL procedures in an in-vivo setting.

Materials & Methods: Data from consecutive vmPCNL procedures from March to May 2019 in a single center were prospectively collected. All patients underwent urine culture prior to the procedure and received antibiotic prophylaxis. All procedures were performed with the patient in the semi-supine position. The vmPCNL set is composed of a 16 Fr nephrostomic sheath (Clear Petra®) equipped with a lateral arm connected to the aspiration. A 12 Fr Storz nephroscope was used and Holmium:YAG laser lithotripsy performed through a 550 um fiber. Irrigation was provided by a gravity bag allocated 1.5 m over the patient level. After zero adjustment, the RPP was measured during the whole procedure (50 measurements per second), through an open-end ureteric catheter connected to a pressure transducer of the urodynamic machine. The procedure was split in different surgical steps to analyze RPP fluctuations along surgery. Post-operative complications were recorded and graded according to the CROES PCNL Clavien score.

Results: Eleven procedures were included. Median stone volume was 1,13 cm^3 (IQR 0,68-1,88). Mean operative time was 51 ± 22 min and median lithotripsy and lapaxy time was 17 min (IQR 10-27). Mean RPP during the procedures was 17 ± 5,7 cmH2O. In all procedures but one, peaks over the threshold of 40,78 cmH2O were registered. Mean maximum RPP peak was 81,6 ± 21,5 cmH2O. Median accumulative time with RPP > 40,78 cmH2O was 47,6 sec (IQR 8,9-60). During lithotripsy and suction-mediated lapaxy, mean RPP was 15,6 ± 6,8 cmH2O and maximum peaks never reached 40,78 cmH2O in any of the procedures. Maximum peaks were reached during final pyelography in 6 (54,5%) procedures, during nephroscopy with closed aspiration in 3 (27,3%) and during puncture in 2 (18,2%). No patients experienced post-operative complications (Clavien 0).

Conclusions: Our preliminary results suggest that vmPCNL is a procedure characterized by low overall mean RPPs. Interestingly, maximal pressure peaks are registered during the surgical steps when aspiration is closed. During lithotripsy and vacuum-mediated lapaxy, RPP never raised over the tubular reflux threshold of 40,78 cmH2O. In this first series, no infectious complications were recorded but the study sample is still too small to draw clinical conclusions.