

**PP30****What determines stone durability during PCNL: a qualitative and quantitative analysis**

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**Objective:** It has been purported that the fragility of stones during lithotripsy may be predicted by radiologic characteristics on CT scan and is dependent on their biochemical composition. We sought to determine pre-operative, intra-operative and post-operative factors that influence stone durability during percutaneous nephrolithotomy (PCNL).

**Methods:** We prospectively reviewed data of the patients that were undergoing PCNL at our Institute by a single surgeon. The characteristics of the stone on CT scan were analyzed for mean attenuation value (MAV-in Hounsfield units), skin to stone distance (SSD), and stone measurements, and the stone volume was computed using ellipsoid formula. During the surgery, the surgeon used 10-point scale to qualitatively assess the hardness of the stone. The number of impulses with the same pneumatic lithotripter device to fragment the stone was counted and documented by a research associate, as was the time it took to fragment the stone and to clear the fragments. Post-operative factors such as perioperative complications and biochemical stone composition were documented.

**Results:** A total of 21 patients were included in the study. There were 9 males and 12 females with the mean age of 56.8 (range 39-81). Mean stone volume and MAV were 263 mm<sup>3</sup> (range 4.53-964) and 1001.3 HU (range 288.4-1850) respectively. There were 17.8% of patients with uric acid stones, 75.06% mostly mixed with calcium stones (47.56% calcium oxalate monohydrate and calcium oxalate dihydrate, and 27.5% calcium phosphate) and 7.14% matrix stones as well as magnesium ammonium phosphate stones. Mean surgeon score of overall stone hardness was 6.47 (range 2-10). Mean stone score for uric acid stones was 6.3, calcium oxalate and calcium phosphate were 6.75 and 7.46 respectively. Mean impulses per volume and time per volume was 9.66 (range 0.0031-11.08) and 1.08 (range 0.00321-1.008) respectively. The correlation between hounsfield units and durability (measured by impulses/volume) were significant, as well as the differences between stone compositions ( $p < 0.05$ ).

**Conclusions:** We conclude that stone composition and density on CT do correlate with stone durability as measured by impulses per volume to fragment stones.