P087 Computed tomography parameters for discrimination of pure and mixed calcium oxalate mono- and di- hydrate stones

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Introduction & Objectives: Computed Tomography (CT) represents the gold standard for urolithiasis diagnosis. To date, the CT discrimination of stone composition, particularly between calcium oxalate mono- (CaOxMH) and di- hydrate (CaOxDH) stones, is yet to be explored. The aim of this study is to evaluate the predictive value of Hounsfield (HU) parameters on CT for the discrimination between CaOxMH and CaOxDH.

Materials & Methods: A total of 233 patients submitted to percutaneous or endoscopic lithotripsy were retrospectively analyzed from November 2010 to April 2017 and then prospectively until December 2018. Inclusion criteria were: I-II) the availability of a pre-operative CT-scan and the stone biochemical analysis, III) a maximum stone diameter >4 mm, IV) a calcium oxalate stone component > 50%. Group A (CaOxMH) and B (CaOxDH) included 164 and 69 patients, respectively. Pure stones were considered for calcium oxalate stone component >75% (Group A: 136 vs Group B: 51). All images were reviewed by a single urologist, blinded to the composition of the calculi. Stone volume, HU mean value (HUM), core (HUC), periphery (HUP) HU and their absolute difference (ΔHU) were evaluated. HU density (HUD) was defined as the ratio between mean HU and the stone's largest diameter. Descriptive statistics were used for demographics and clinical data. Receiver Operating Characteristic (ROC) curves were calculated to test the predictive power of HU parameters to differentiate the two groups. Statistical significance was set at $p < 0,05$.

Results: Mean age was 55 years. Seventy-two patients were female, 161 were male. The patients were submitted to PCNL (n=73), RIRS or ureteroscopy (160). CaOxMH stones resulted significantly hyperdense than CaOxDH for HUD (mean ± SD 89,5 ± 41,8 vs 66,33 ± 25,23; p<0,0001), HUC (1194 ± 299,3 vs 1063 ± 308,5; p=0,003), HUM (836,2 ± 257 vs 759,2 ± 225,8; p=0,03) and ΔHU (1022 ± 301,3 vs 882,4 ± 313,5; p=0.002). HUD best differentiated the two groups (cut-off 70 HU/mm; specificity 65%, sensitivity 64%). The AUC of HUD was 0,67. In case of HUD > 70 HU/mm probability of CaOxDH was three folds higher. Comparing the pure stones of the two groups, the accuracy of HUD slightly improves (89,4 ± 42,5 vs 64,7 ± 24,7, p=0,001; AUC= 0,69; specificity 65%, sensitivity 65%) at the same cut-off.

Conclusions: At present, calcium stones cannot be differentiated prior with CT. We found that HUD is the best variable to distinguish the composition of either mixed or pure calcium oxalate stones. These findings can help the clinician to select the best candidates for SWL and could potentially drive the patient life style.