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Introduction & Objectives: Several nephrometry scores have been developed to quantify the anatomical features of renal masses in a standardized, reproducible way as to predict complications following partial nephrectomy (PN). The percutaneous PERC-score has been developed to predict the risk of postoperative complications in patients treated with percutaneous local tumour ablation (LTA). This study aimed to propose and validate the PERC-score in a multicentric external cohort.

Materials & Methods: Overall, 496 patients with cT1a renal mass treated with LTA in 4 tertiary centers were retrospectively evaluated: 203 (41%) patients treated with cyoablation (Cryo), 122 (25%) patients treated with Microwave ablation (Microwave) and 171 (34%) patients treated with Radiofrequency ablation (RFA). The outcome of interest was postoperative complications. Points of the PERC-score were assigned to each of the following parameters from univariate logistic regressions analyses results to predict postoperative complications: tumor size <2cm (1), 2-3cm (2) and 3.1-4cm (3); posterior (1) or anterior (2) lesion location; lateral (1) or medial (2) renal rim; ≥50% exophytic lesion (1), <50% exophytic lesion (2), endophytic lesion (3); Cryo (1), Microwave (2) and RFA (3). Linear regression analysis was performed to evaluate the correlation between the PERC-score and overall complications. Multivariate logistic regression analysis was performed to identify the predictors of postoperative complications. Receiver operating characteristic (ROC) curves were generated to test the accuracy (Area Under the Curve [AUC]) of different scoring systems (PERC, RENAL, mRENAL, PADUA and SPARE score) in predicting overall complications. The intercepts obtained with the development cohort were used to validate the PERC-score on an external cohort of 116 patients.

Results: Overall, 120 (24%) postoperative complications were recorded. At linear regression analysis, PERC-score shown a statistically significant correlation with postoperative complications (OR 1.48, 95% CI 1.32-1.66, p<0.001). At multivariate logistic regression, tumor size >2cm, anterior lesion location, RFA and endophytic masses were independent predictors of postoperative complications (all p<0.04). PERC-score showed higher accuracy (AUC 72.2%) in predicting overall complications compared to PADUA (AUC 66.6%), RENAL/mRENAL (both AUC 59.9%) and SPARE

(AUC 68.4%) scores. In the external cohort, the PERC-score showed a statistically significant correlation with postoperative complications (OR 2.01, 95% CI 1.49-2.88, $p < 0.001$) and has a good accuracy (AUC 78.7%).

Conclusions: The PERC-score is correlated to an increased risk of postoperative complications after LTA and could help physicians during counseling of patients suitable for LTA for an improved risk stratification, compared to other nephrometry scores developed for a surgical approach.