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**TITLE**

USING AORTA–LESION–ATTENUATION–DIFFERENCE (ALAD) ON PREOPERATIVE CONTRAST–ENHANCED CT SCAN TO DIFFERENTIATE BETWEEN MALIGNANT AND BENIGN RENAL TUMORS

**BACKGROUND/AIMS:** To evaluate the ability of Aorta–Lesion–Attenuation–Difference (ALAD) to differentiate malignant renal tumors from renal oncocytomas.

**METHODS:** A retrospective review of preoperative CT scans and surgical pathology from robotic assisted partial nephrectomy specimens obtained by a single surgeon was performed. ALAD was calculated by measuring the difference in Hounsfield units (HU) between the aorta and the lesion of interest on the same image slice in the nephrographic phase on preoperative CT scan. The discriminative ability of ALAD to differentiate malignant pathology from oncocytoma was evaluated by sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and area under curve (AUC) using ROC analysis.

**RESULTS & CONCLUSIONS:** A total of 218 preoperative CT scans and corresponding pathology reports were reviewed. Pathology review revealed 22 oncocytomas (10.1%), 11 chromophobe RCC (5%), 37 papillary RCC (17%), and 148 clear cell RCC (67.9%). ALAD was able to differentiate malignant pathology from oncocytoma using a HU threshold of 24 with a sensitivity of 84%, specificity of 86%, PPV of 98%, and NPV of 33%. The AUC for malignant pathology versus oncocytoma was 0.86 (95% CI 0.77–0.96).

Subgroup analysis showed that ALAD was able to differentiate chromophobe RCC from oncocytoma using a HU threshold of 24 with a sensitivity of 100%, specificity of 86%, PPV of 75%, and a NPV of 100%. The AUC for chromophobe RCC versus oncocytoma was 0.98 (95% CI 0.91–1.00).

ALAD measurements based upon preoperative CT scans provide good discrimination between malignant renal tumors and oncocytomas, potentially decreasing the need for biopsy in certain patients. ALAD also discriminates well between chromophobe RCC and oncocytoma, which may aid in the management of patients with indeterminate diagnoses of oncocytic neoplasm on biopsy. Further validation of ALAD will be necessary prior to routine use in clinical practice.