MP50-06: Utilization of Radiomic Markers In Localized Renal Cell Carcinoma To Predict Stage

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INTRODUCTION

• Incidental detection of pathologic T3a disease at the time of partial nephrectomy (PN) is associated with inferior oncologic outcomes and local recurrence rates
• The ability to preoperatively identify characteristics associated with pathologic upstaging using current imaging and biopsy modalities is limited
• Purpose: To evaluate whether any radiomic features were associated with pT3a upstaging following PN for cT1 renal masses

METHODS

• Pre-operative CT imaging from a total of 130 patients with cT1 renal masses and final pathology demonstrating either pT1 (n=93) or pT3a (n=46) RCC were retrospectively reviewed
• pT1 lesions were individually matched by age and tumor size with pT3a lesions in a 2:1 ratio
• An Auto-Initialized Cascaded Level Set (AI-CALS) system was used to segment all lesions
• A total of 49 radiomic descriptors including morphological features (i.e.; volume and shape) and gray level features (i.e; image intensity) were extracted
• A predictive model using automatic feature selection and linear discriminant analysis classifier was developed and leave-one-lesion out cross validation method was used for model training and performance testing
• The area under the receiver operating characteristic curve (AUC) was calculated for the predictor model

RESULTS

• A total of 2 gray level and 3 morphological features of significance were identified in our predictive model
• Features related to surface irregularity of the renal mass appeared to be highly predictive in distinguishing between pT1a and pT3a cancers
• The training AUC was 0.72 and the test AUC was 0.70

CONCLUSIONS

• Machine-learning techniques using radiomic features may improve the detection of adverse pathologic features using pre-operative imaging
• This may allow for improved patient counseling and treatment selection