AB032. P002. Radiomics based classification of pancreatic cystic neoplasms

Linda Chu, Seyoun Park, Elliott Fishman

Johns Hopkins Hospital, Baltimore, Maryland, USA

Background: Pancreatic cystic masses are detected in greater than 2% of abdominal CTs, and they vary in malignant potential based on underlying pathologic diagnosis. Many of these cystic masses share overlapping imaging features and are difficult to confidently diagnose based on visual assessment of these imaging features. These imaging features, including intensity, shape, size or volume, and textural features can be extracted and quantified through radiomics. The purpose of this study is to use radiomics features to classify different types of pancreatic cystic masses.

Methods: This was an Institutional Review Board (IRB)-approved retrospective study. A total of 103 patients (age: 60.0±15.9 years, 42 males, 61 females) with pathologically proven pancreatic cystic masses with preoperative dual-phase pancreatic protocol CT were identified from the radiology and pathology database from 2003 to 2016. This included 60 intraductal papillary mucinous neoplasms (IPMNs), 8 mucinous cystic neoplasms (MCNs), 20 serous cystadenomas (SCNs), 10 solid pseudopapillary epithelial neoplasms (SPNs), and 5 pancreatic neuroendocrine tumors (PNETs). Primary cystic masses and whole pancreas were manually segmented using Medical Imaging Interaction Toolkit (MITK). The phenotype of each cyst was expressed by 478 radiomics features, including the first order statistics, shape, texture, and textures from wavelet and Laplacian of Gaussian. Additional ten statistics from the whole pancreas and two demographic features of age and gender were also used for the analysis of the types of cyst.

Results: Among the whole 490 features, 30 features were found for the binary classification of IPMN. Radiomics features were significantly different among different types of pancreatic cystic neoplasms. The model was 77.7% accurate in the classification of five types of pancreatic cystic neoplasms. The model achieved 80.6% accuracy in differentiating IPMN vs. non-IPMN pancreatic cystic neoplasms.

Conclusions: Radiomics features were significantly different among different types of pancreatic cystic neoplasms and were potentially helpful for the classification of pancreatic cystic neoplasms.