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Multi-biomarker panel prediction model for diagnosis of pancreatic cancer

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Introduction: The current study aimed to develop a prediction model using a multi-marker panel as a diagnostic screening tool for pancreatic-ductal-adenocarcinoma.

Methods: Multi-center cohort of 1,991 blood samples were collected from January 2011 to September 2019, of which 609 are normal, 145 are other-cancer (colorectal, thyroid, and breast cancer), 314 are pancreatic-benign-disease, and 923 are pancreatic-ductal-adenocarcinoma. The automated multi-biomarker Enzyme-Linked Immunosorbent Assay kit was developed using three potential biomarkers, LRG1, TTR, and CA 19-9. Using a logistic regression model trained on training data set, the predicted values for pancreatic-ductal-adenocarcinoma were obtained, and the result was classified into one of the three risk groups: low, intermediate, and high. The five covariates used to create the model were sex, age, and three biomarkers.

Results: Participants were categorized into four groups as normal (n = 609), other-cancer (n = 145), pancreatic-benign-disease (n = 314), and pancreatic-ductal-adenocarcinoma (n = 923). The normal, other-cancer, and pancreatic-benign-disease groups were clubbed into the non-pancreatic-ductal-adenocarcinoma group (n = 1,068). The positive and negative predictive value, sensitivity, and specificity were 94.12, 90.40, 93.81, and 90.86, respectively.

Conclusions: This study demonstrates a significant diagnostic performance of the multi-marker panel in distinguishing pancreatic-ductal-adenocarcinoma from normal and benign pancreatic disease states, as well as patients with other cancers. The model satisfies the requirements of an ideal screening test, being simple to use, less expensive, and having a good diagnostic efficacy with NPV, PPV, Sen, and Spe, all greater than 90.0%.

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