To biopsy or not to biopsy: a predictive model for liquid biopsy in advanced pancreatic cancer

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Abstract

Background: Monitoring circulating tumor DNA (ctDNA) clearance offers a cutting-edge approach to predicting treatment response. However, the high cost of liquid biopsy underscores the need for predictive tools that can identify patients most likely to benefit from ctDNA testing.

Objective: This pilot study aims to develop a model predicting ctDNA positivity in liquid biopsy for pancreatic cancer.

Methods: Adult patients with locally advanced or metastatic pancreatic adenocarcinoma were included from Hôtel-Dieu de France, and clinical parameters were collected (Ethics Committee Approval Number CEHDF2368). A blood draw established genetic ctDNA profiles (KRAS, NRAS, BRAF) and inflammatory biomarkers (CRP, RBC, Hemoglobin, MCV, Hematocrit, Platelets, WBC, Lymphocytes, Neutrophils, Eosinophils, Monocytes). After assessing which biomarkers were correlated to ctDNA positivity, a predictive algorithm was developed to determine the patients who are fit for ctDNA clearance surveillance. Based on the established algorithm, an online tool for predicting ctDNA positivity was created to aid physicians in their clinical decision.

Results: Twenty-three patients were included in the study, with 40% testing positive for KRAS ctDNA. Patient characteristics were matched between ctDNA positive and negative groups. Hemoglobin, Platelets, WBC, and Neutrophils demonstrated statistically significant differences ($p<0.05$) and correlations ($r^2>0.25$), leading to their selection for establishing the predictive score. A multivariable analysis yielded an equation predicting ctDNA positivity with an AUC of 0.953. The Youden Index determined a 70% optimal cut-off. A tool, “CTDNA Outcome in Metastatic Pancreatic Adenocarcinoma Screening Score (COMPASS)” was developed as a user-friendly website to assist clinicians in biopsy decisions.

Conclusion: This pilot study demonstrates the feasibility of a predictive model for guiding liquid biopsy decisions. However, the slightly lower ctDNA positivity rate observed compared to the literature warrants further investigation.

Do you have any conflicts of interest?

No, I do not have a conflict of interest.