

TITLE

Circulating Ensembles of Tumor Associated Cells are a Reliable Biomarker of Pancreatic Cancer

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ABSTRACT:

Background

Pancreatic Cancer is one of the most difficult to treat diseases with less than 20% one-year survival. Globally, about 0.45 million new cases of pancreatic cancer are expected during 2019 with 0.43 million deaths. Due to nonspecific and low-grade symptoms, pancreatic cancer is usually detected at an advanced stage. Screening for pancreatic cancer has remained challenging with no approved modality for clinical use. A non-invasive blood-based test with high specificity and sensitivity is thus an urgent unmet medical need. Considering that unprovoked thromboembolism is a significant risk in pancreatic cancer, we hypothesized that circulating thrombotic emboli from peripheral blood could comprise pancreatic cancer cells and with due characterisation with immunocytochemistry would serve as a reliable biomarker for detection of pancreatic cancer.

Methods

We obtained 15 ml of venous blood draw from 5,527 asymptomatic individuals including 2,250 (40.7%) males and 3,277 (59.3 %) females who had been evaluated for CA 19.9 and CEA tumor markers and found to be within normal range as well as 156 known patients of pancreatic cancer. Circulating Tumor Associated Cells (C-TACs) were enriched by paradoxical cytotoxic processing and characterised for cancer (EPCAM, PanCK) and pancreatic specific antigen CEA and CA 19.9 by immunocytochemistry (ICC).

Results

C-TACs (EPCAM and CK positive) could be obtained from 146 samples out of 156 (93.5 %). 24 samples were stained for CEA and CA 19.9 antigens, which resulted in 18 samples testing positive for CEA and 5 samples were positive for CA 19.9. Among the asymptomatic cohort 88 individuals (1.6 %) had detectable C-TACs which were however negative for pancreatic specific markers.

Conclusions

Our results show that C-TACs harvested from peripheral blood using paradoxical cytotoxicity offer a sensitive and highly specific pancreatic cancer test for screening asymptomatic individuals.