EARLY DETECTION OF PANCREATIC DUCTAL ADENOCARCINOMA: CURRENT STRATEGIES AND EMERGING APPROACHES

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Background: Pancreatic ductal adenocarcinoma (PDAC) accounts for roughly 90% of pancreatic malignancies and remains one of the most lethal solid tumors, with a five-year survival rate of about 13%. Its poor prognosis is largely due to late diagnosis: fewer than one in five patients have surgically resectable disease at presentation, because early-stage tumors rarely cause specific symptoms.

Objective: This review summarizes current and emerging strategies for detecting PDAC at a curable stage.

Main findings: Population-wide screening is not recommended because of the disease's low incidence and the lack of sufficiently accurate tests. Surveillance programs using endoscopic ultrasound and magnetic resonance imaging are increasingly offered to high-risk groups, including people with germline mutations (such as BRCA2, PALB2, CDKN2A, and STK11), strong family history, or mucinous cystic lesions. Surveillance in these cohorts has been associated with detection of earlier-stage, more often resectable tumors. New-onset diabetes in adults over 50 has emerged as a potential marker for enriched-risk populations. The serum marker CA 19-9 is useful for monitoring treatment but lacks the sensitivity and specificity needed for screening. Promising investigational approaches include multi-analyte blood tests, circulating tumor DNA, exosomal biomarkers, and artificial intelligence applied to routine CT imaging to identify subtle pre-diagnostic changes.

Conclusion: Improving outcomes in PDAC depends on shifting diagnosis to earlier stages. Risk-stratified surveillance, combined with validated liquid biopsy and AI-assisted imaging tools, offers the most realistic path forward, though prospective validation in large cohorts is still needed.

Keywords: pancreatic cancer, early detection, biomarkers, surveillance, CA 19-9, liquid biopsy

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