

Strategies for Early Detection of Pancreatic Cancer

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Introduction

Pancreatic cancer arises when cells in the pancreas, a glandular organ behind the stomach, begin to multiply out of control and form a mass. These cancerous cells have the ability to invade other parts of the body. A number of types of pancreatic cancer are known. The most common, pancreatic adenocarcinoma, accounts for about 90% of cases, and the term "pancreatic cancer" is sometimes used to refer only to that type. These adenocarcinomas start within the part of the pancreas that makes digestive enzymes. Several other types of cancer, which collectively represent the majority of the nonadenocarcinomas, can also arise from these cells. About 1–2% of cases of pancreatic cancer are neuroendocrine tumors, which arise from the hormone producing cells of the pancreas. These are generally less aggressive than pancreatic adenocarcinoma.

Background of the Research

Pancreatic cancer rarely occurs before the age of 40, and more than half of cases of pancreatic adenocarcinoma occur in those over 70. Risk factors for pancreatic cancer include tobacco smoking, obesity, diabetes, and certain rare genetic conditions. About 25% of cases are linked to smoking, and 5–10% linked to inherited genes. Pancreatic cancer is usually diagnosed by a combination of medical imaging techniques such as ultrasound or computed tomography, blood tests, and examination of tissue samples (biopsy). The disease is divided into stages, from early (stage I) to late (stage IV). Screening the general population has not been found to be effective. The risk of developing pancreatic cancer is lower among non-smokers, and people who maintain a healthy weight and limit their consumption of red or processed meat. Smokers' chances of developing the disease decrease if they stop smoking and almost return to that of the rest of the population after 20 years. Pancreatic cancer can be treated with surgery, radiotherapy, chemotherapy, palliative care, or a combination of these. Treatment options are partly based on the cancer stage. Surgery is the only treatment that can cure pancreatic adenocarcinoma, and may also be done to improve quality of life without the potential for cure. Pain management and medications to improve digestion are sometimes needed. Early palliative care is recommended even for those receiving treatment that aims for a cure. In 2015, pancreatic cancers of all types resulted in 411,600 deaths globally. Pancreatic cancer is the fifth most-common cause of death from cancer in the United Kingdom, and the third most-common in the United States. The disease occurs most often in the developed world, where about 70% of the new cases in 2012 originated. Pancreatic adenocarcinoma typically has a very poor prognosis; after diagnosis, 25% of people survive one year and 5% live for five years. For cancers diagnosed early, the five-year survival rate rises to about 20%. Neuroendocrine cancers have better outcomes; at five years from diagnosis, 65% of those diagnosed are living, though survival

considerably varies depending on the type of tumor. The next-most common type, acinar cell carcinoma of the pancreas, arises in the clusters of cells that produce these enzymes, and represents 5% of exocrine pancreas cancers. Like the 'functioning' endocrine cancers described below, acinar cell carcinomas may cause over-production of certain molecules, in this case digestive enzymes, which may cause symptoms such as skin rashes and joint pain. Cyst adenocarcinomas account for 1% of pancreatic cancers, and they have a better prognosis than the other exocrine types. Pancreatoblastoma is a rare form, mostly occurring in childhood, and with a relatively good prognosis. Other exocrine cancers include adenosquamous carcinomas, signet ring cell carcinomas, hepatoid carcinomas, colloid carcinomas, undifferentiated carcinomas, and undifferentiated carcinomas with osteoclast-like giant cells. Solid pseudopapillary tumor is a rare low-grade neoplasm that mainly affects younger women, and generally has a very good prognosis. Pancreatic mucinous cystic neoplasms are a broad group of pancreas tumors that have varying malignant potential. They are being detected at a greatly increased rate as CT scans become more powerful and common, and discussion continues as how best to assess and treat them, given that many are benign.