Clinical Oncology: Case Reports

Opinion

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Pancreatic Adenocarcinoma

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Abstract

A frequent kind of gastrointestinal cancer with a dismal prognosis is pancreatic cancer. Low disease prevalence and the expensive expense of screening techniques like endoscopic ultrasonography and cross-sectional imaging are obstacles to efficient pancreatic cancer screening. Additionally, the majority of patients are asymptomatic in the early stages of the condition, which frequently causes a delay in diagnosis. Palliative care, chemotherapy, and surgery are available as treatment options.

Keywords: Pancreatic cancer; Radiotherapy; Chemotherapy; Surgery; Diagnosis

Introduction

The second most frequent gastrointestinal cancer in Americans is pancreatic cancer. This year, pancreatic cancer will be discovered in about 53,000 patients. It's interesting that it tends to affect older folks and African-Americans more frequently than men and women. Pancreatic cancer is the fourth greatest cause of mortality for both men and women, while having a very low incidence when compared to other more prevalent malignancies (such as prostate, lung, colorectal, etc.). Cigarette smoking is thought to be one of the biggest risk factors and may be linked to up to 25% of all pancreatic tumors. Pancreatic cancer is also thought to be influenced by diabetes mellitus, though the precise mechanism by which this happens is not known. Patients with type 2 diabetes frequently exhibit compensatory hyperinsulinemia along with years or decades of insulin resistance. Insulin's mutagenic capabilities could be the reason for the link between type 2 diabetes and many cancers. Alcohol consumption, obesity, and various genetic syndromes are additional known risk factors for pancreatic cancer, though they only contribute to less than 10% of cases. It is thought that concurrent risk factors work in concert. The outlook for pancreatic cancer is generally not good. The total mortality rates at one and five years are 24% and 6%, respectively. At the time of diagnosis, 80% of patients have either localized or metastatic illness. This emphasizes the need for better pre-operative staging, early identification, enhanced screening methods, and improved therapy alternatives.

Pancreatic adenocarcinoma is commonly referred to as "pancreatic cancer." Although there are different forms of pancreatic cancer, the emphasis in this review will be centered on pancreatic adenocarcinoma. Adenocarcinoma-like characteristics are present in more than 95% of the malignant neoplasms of the pancreas, which develop from the exocrine parts of the gland (ductal and acinar cells). In order to be diagnosed with familial pancreatic cancer, a patient must have two first-degree relatives with a history of the disease. Even though hereditary factors only contribute for about one in ten cases of pancreatic cancer, it is crucial to identify patients who are at increased risk due to genetic abnormalities early on in order to develop the best screening and surveillance plans. The majority of known causes of hereditary pancreatic cancer are patients with BRCA2 gene mutations. A mutation in the PRSS1 gene on chromosome 7.7, which is autosomal dominant, is another frequent cause of hereditary pancreatitis. These patients had a cumulative risk of more than 50% for developing pancreatic cancer by the age of 75. Hereditary nonpolyposis colorectal cancer (mutations in MLH1, MSH2, MSH6, PMS2, or the EPCAM gene), Peutz-Jeghers syndrome (STK11 gene mutation), Familial Atypical Mole-Malignant Melanoma (FAMMM) syndrome (germline mutation in the P16 gene), and mutations in PALB2 are additional genetic syndromes linked to an increased risk of pancreatic cancer.

The low prevalence of the illness and the high expense of screening techniques like endoscopic ultrasonography and cross-sectional imaging are barriers to efficient pancreatic cancer screening. The primary method used in modern medicine to determine a patient's risk of developing pancreatic cancer is family history. Patients who have a family history that satisfies the requirements for pancreatic cancer screening and who have a genetic mutation known to increase risk for pancreatic cancer should be enrolled in a screening program. There is no agreement on when screening should begin, however it may involve endoscopic ultrasound or Magnetic Resonance Cholangiopancreatography (MRCP). Every six months, those who fit the criteria should be checked by MRI or EUS, alternately. According to the CAPS consortium's recommendations, many practitioners begin screening patients between the ages of 40 and 50. Although the American Gastroenterological Association (AGA) advises screening patients with hereditary pancreatitis at age 35 and those with other familial pancreatic cancer syndromes 10 years before the age of the index case, this recommendation is not universally accepted.

According to autopsy data, 60% to 70% of pancreatic tumors are found in the organ's head, followed by 5% to 10% in the body and 10% to 15% in the tail. The typical size of a pancreatic cancer at diagnosis is 3 cm when found in the head of the pancreas, compared to 6 cm when found in the body or tail of the pancreas. This is accounted for by the earlier onset of symptoms and signs in proximal tumors caused by obstruction of the pancreatic duct and common bile duct. Distal pancreatic tumors have a higher potential to spread outside of the pancreas, into the retroperitoneal tissues, and into the vasculature, including the portal vein and superior mesenteric artery and vein. Spleen, stomach, colon (transverse colon or splenic flexure), and the left adrenal gland are other sites of invasion with extra-pancreatic extension. Lymph nodes, the liver, and the peritoneum are frequent locations for distant metastases in more severe illness. Lung and bone metastases are less frequent.

Discussion

However, most patients fail to report symptoms in the early stages

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of their illness, which frequently delays diagnosis. One of the most common initial signs, particularly in cases with pancreatic head tumors, is jaundice. Pancreatic exocrine insufficiency, which can cause a variety of symptoms such as steatorrhea (oily, frothy, loose, greasy, foul-smelling faeces), malabsorption, weight loss, stomach discomfort, and abdominal bloating, is a condition that some people experience. Others may exhibit dull, non-specific pain, which typically results from tumor invasion of the superior mesenteric artery plexus or the celiac plexus. Nausea, anorexia, weight loss, and newly developed diabetes mellitus are other common clinical signs and symptoms of pancreatic cancer. Even while higher liver test results may indicate biliary obstruction, routine lab testing is typically non-specific. There are occasionally increased serum levels of lipase and amylase. Although they are not frequently employed for screening purposes, serum markers have some use in the assessment of pancreatic cancer. The most well-known and perhaps most helpful is Cancer-Associated Antigen 19-9 (CA 19). It assists with diagnosis and the monitoring of treatment response. However, it should be emphasized that cholestasis associated with non-malignant obstruction (such as choledocholithiasis, cholangitis, and chronic pancreatitis) might produce false-positive results (high values of CA 19-9 in the absence of cancer).

Radiologic Imaging: The preferred radiologic modalities for identifying and helping stage pancreatic cancer are MRI of the pancreas (with MRCP) or Computed Tomography (CT) of the pancreas (pancreatic protocol CT), with MRI being preferred over CT. This is true even though many patients who present with jaundice frequently undergo trans-abdominal ultrasound as part of the initial evaluation for jaundice. The criteria for unrespectable pancreatic cancer are met by any one of the following: distant metastases (liver, peritoneum, etc.); and specific arterial/vascular involvement (celiac axis or superior mesenteric artery, or occlusion of the portal vein or superior mesenteric vein), which may be institution-specific. CT is associated with a high degree of accuracy in this regard. Magnetic resonance imaging (with MRCP) benefits from iodine-free contrast and the absence of radiation. Price and a lack of availability are the primary MRI/MRCP drawbacks. Due to the lack of anatomical information, Positron Emission Tomography (PET) paired with CT is not effective as a primary diagnostic imaging examination for pancreatic cancer. However, PET/CT may be helpful in determining the locations of distant metastases and in monitoring tumor recurrence following resection or neoadjuvant chemotherapy.

Endoscopic Imaging: It is believed that Endoscopic Ultrasonography (EUS) is the test that best identifies pancreatic cancer. Although there haven't been any prospective head-to-head studies contrasting the two modalities, it has been demonstrated to have a greater sensitivity and specificity than CT for detecting pancreatic masses. In comparison to imaging tests, the ability to combine Fine Needle Aspiration (FNA) cytology with EUS boosts the specificity of detecting pancreatic cancer. But there is a catch: EUS is very operator dependent and demands a wealth of expertise. Therefore, it is advisable to do this study at a high volume center. The biliary and pancreatic ducts can be radiographically seen via Endoscopic Retrograde Cholangiopancreatography (ERCP). But ERCP shouldn't be the only method used to check for pancreatic cancer; it should only be performed therapeutically to alleviate ductal blockage. If necessary, ERCP does permit tissue sample in addition to procedures like biliary or pancreatic stenting. An alarming finding on an ERCP (and on imaging tests like a CT or MRI) is a "double duct" sign, which denotes simultaneous dilatation of the common bile duct and pancreatic duct due to obstruction. This obstruction may be caused by pancreatic cancer. Prior to becoming complacent with other diagnostic options, it is crucial to evaluate for pancreatic cancer when this "double duct" sign is present.

After a pancreatic cancer diagnosis has been obtained, staging may involve a chest, belly, and pelvis CT or MRI with IV contrast. In addition, EUS is crucial for both staging and the procurement of tissue for diagnosis. With staging, patients are frequently divided into one of four different groups, and the treatment strategy is then decided. Patients in the first category are those with stage 1 (obviously treatable) illness, and they should be referred as quickly as possible to a surgeon to see if additional medical comorbidities make them candidates for resection. Patients who have "borderline resectable" disease are included in the second category; they are more likely to benefit from neoadjuvant chemo radiation. Third, we include patients who have locally advanced illness that is still unrespectable but does not have any metastases. After a successful down staging, these individuals may be candidates for neoadjuvant chemo radiation and maybe surgery. Patients with metastatic disease who do not benefit from surgical resection make up the fourth and final category. Chemotherapy and palliative care are used in the treatment of this population of patients. At laparoscopy, it is discovered that 1 in 4 patients with localized pancreatic cancer as seen on a CT scan have metastatic disease. Therefore, staging diagnostic laparoscopy is advised in the majority of patients prior to surgical exploration (to identify tiny lesions with visual inspection that may be missed on imaging investigations).

Palliative Care: Significant jaundice and intestinal blockage are frequent symptoms in patients with incurable illness. Either duodenal or endoscopic biliary stenting is really beneficial for these patients. Endoscopy is linked to minimal procedure-related morbidity and mortality as well as a high success rate of palliation. It might be challenging to control pain in people with unresectable pancreatic cancer. Given the high success rate of 70% to 80% pain reduction after surgery, these patients should be sent for EUS-guided celiac plexus necrolysis. Patients who are considered unsuitable for therapy or who decide against it should be referred to hospice. Finally, a number of charitable organizations are helpful sources for families and patients with pancreatic cancer.

Conclusion

With overall one and five-year mortality rates of 24% and 6%, respectively, pancreatic cancer has a terrible prognosis and is the second most frequent gastrointestinal tumor in the United States. Age, smoking, type 2 diabetes mellitus, and a number of genetic disorders are risk factors. It is believed that Endoscopic Ultrasonography (EUS) is the test that best identifies pancreatic cancer. It has been demonstrated to be more sensitive and specific than CT for finding pancreatic masses. Since surgery is the only potentially curative treatment option for pancreatic cancer, patients with stage 1 disease should be referred as soon as possible for evaluation for surgical resection. The best decisions about surgery, chemotherapy, radiation

therapy, and other treatment modalities should be made in a large volume referral facility with a multidisciplinary approach after discussions with the patient. Palliative chemotherapy and/or hospice care should be recommended for patients with advanced illness.

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