Pancreatic tuberculosis is often mistaken for malignancy and can pose a diagnostic challenge. A high degree of suspicion is necessary to diagnose this condition which responds well to antituberculosis treatment (ATT). Fine-needle aspiration cytology helps to differentiate malignancy from treatable conditions like tuberculosis. Records of four patients treated for pancreatic tuberculosis between 1997 and 2006 were studied. All patients had a pancreatic mass which was suspected to be malignant at imaging. The diagnosis of tuberculosis was established by FNAC in one case and after laparotomy in one; two had tuberculosis of other systems. All showed good response to ATT which included resolution of the pancreatic mass over mean follow up of 2 years. We suggest that all inoperable masses of the pancreas should be subjected to FNAC to rule out treatable conditions like pancreatic tuberculosis.

**Case Reports**

**Case 1:** A 46-year-old man presented in December 2003 with fever and hepatosplenomegaly for 6 months. He was evaluated for pyrexia of unknown origin (PUO). Ultrasound of the abdomen and computerized tomogram (CT) (Figure) showed a heterogeneously enhancing mass in the head of pancreas. There was also a lytic lesion in the body of the twelfth thoracic vertebra with an enhancing paravertebral soft tissue mass. Spinal tuberculosis with coexistent advanced pancreatic malignancy and portal hypertension was considered. As CT-guided biopsy of the pancreatic mass carried a risk of bleeding in view of extensive portal vein collaterals, CT-guided biopsy of the right para-vertebral mass was done which showed features consistent with tuberculosis. Cultures for tuberculosis were negative.

The patient was started on ATT. Fever subsided in 2 months and he gained 8 Kg weight after one year of ATT. Follow up scan (Figure) showed decrease in size of the pancreatic head mass. He was last reviewed in November 2006 when he was clinically well.

**Case 2:** A 30-year-old man presented in March 2003 with fever for one year, loss of weight and obstructive jaundice for 6 months. Ultrasound of the abdomen showed a 4.5 cm x 3.5 cm mass in the head of pancreas encasing the celiac axis, narrowing of the portal vein and terminal superior mesenteric vein. His liver function tests showed features of cholestasis. Endoscopic retrograde cholangiopancreatographic (ERCP) showed focal narrowing of distal common bile duct (CBD) and main pancreatic duct at the neck. The CBD was stented. CT-guided fine needle aspiration cytology (FNAC) of the pancreatic mass showed granulomatous inflammation suggestive of tuberculosis. One year after ATT, ultrasound and CT scan showed resolution of the pancreatic head mass.

He underwent stent exchanges for repeated episodes of cholangitis due to stent blockage. Open cholecystectomy and choledochoduodenostomy were done for distal CBD stricture in December 2006. At surgery, the CBD was found to be dilated with few residual enlarged retropancreatic nodes which on histology showed reactive hyperplasia. There was no mass in the head of pancreas. At last follow up in December 2006, he was clinically well.

**Case 3:** A 51-year-old man presented in June 2006 with episodes of right upper abdominal pain for 3 months. He had low grade fever, loss of weight and appetite. CT scan showed biliary dilatation and an ill-defined mass in the pancreatic head, extending inferiorly to the uncinate process and surrounding the gastroduodenal artery. There was also marked thickening of the ileocecal junction. Colonoscopy showed nodularity and ulceration in the ileocecal region; biopsies from this region features suggestive of tuberculosis. The diagnoses at this stage were inoperable malignancy in the pancreatic head and ileocecal tuberculosis. The patient was put on ATT and followed over the next six months; he gained about 6 Kg of weight and his fever had subsided. CT scans done on follow up showed significant resolution of the pancreatic mass.

**Case 4:** A 53-year-old man presented with pain and fullness in the left upper abdomen for six months. He was found to have a 10 cm x 10 cm mass in the left hypochondrium. CT scan showed a large mass arising from the posterior wall of gastric fundus extending into the adjacent gastroplenic ligament and tail of pancreas. A diagnosis of leiomyosarcoma or...
gastrointestinal stromal tumor (GIST) arising from the stomach was considered. At laparotomy there was a mass arising from the tail of pancreas infiltrating the spleen with stomach apposed to but free of tumor. There were enlarged lymph nodes along the inferior surface of the pancreas. The patient underwent en-block excision of the mass with distal pancreatectomy and splenectomy. Histology of the mass was reported as tuberculosis. The patient was started on ATT. He was pain free and well one year after the operation.

Discussion
Abdominal tuberculosis usually affects the ileocecal region, abdominal lymph nodes and peritoneum. The spleen and rest of the gastrointestinal tract are involved less often.\(^3\) The pancreas is thought to be biologically resistant to seeding by *Mycobacterium tuberculosis* due to the presence of pancreatic enzymes. The pancreas is affected in 2.1% to 4.7% of cases of miliary tuberculosis.\(^3\) It is postulated that the tuberculosis bacilli reach the pancreas by hematogenous spread, through direct spread from adjacent involved peripancreatic nodes, or due to reactivation of an old dormant focus.\(^1\)

Pancreatic tuberculosis can present with abdominal pain, fever, obstructive jaundice due to biliary obstruction or variceal hemorrhage due to splenic vein thrombosis. There are reports of it presenting as a pseudocyst and cystadenocarcinoma.\(^5\) It can often mimic pancreatic carcinoma. In view of this varied presentation, clinical diagnosis of pancreatic tuberculosis is usually difficult.

CT scan, ultrasound or magnetic resonance imaging may show a multicystic heterogenous mass, often in the head of pancreas, mimicking pancreatic malignancy or pseudocysts. Focal hypodense masses with peripheral rim enhancement, pancreatic nodules, features of splenic vein thrombosis and biliary dilatation due to CBD obstruction may also be seen. The provisional diagnosis is often advanced pancreatic cancer.

Diagnosis of tuberculosis is often an unexpected finding from histopathology of material removed at laparotomy or less often from FNAC of a pancreatic lesion. Biopsies reveal granulomas with caseation in 60% of cases. Smears and cultures for acid fast bacilli are positive less often (33% - 41%).\(^1,2\) Response to standard ATT regimen is excellent (90%) with the pancreatic masses showing varying degrees of resolution.\(^1,2\)

Pancreatic tuberculosis is rare but should be considered in patients presenting with pancreatic masses, especially in the head of pancreas, and with constitutional symptoms. As it often mimics pancreatic neoplasm, all inoperable lesions of the pancreas should be subjected to CT- or ultrasound-guided FNAC.

References

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