

FDG-PET/CT Identifies a Curable Pancreatic Cancer Surgical Tract Metastasis after Failure by Other Imaging Modalities

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With pancreatic cancer as a leader in cancer-related deaths, it is of utmost importance to attain the fastest means of diagnosis and treatment. This case study attempts to evaluate the efficacy of the various diagnostic imaging modalities available in the treatment of pancreatic carcinoma and metastases. Furthermore, it clearly demonstrates a rare case of treatable post-surgical seeding of pancreatic cancer cells along the tract of an abdominal surgical drainage tube. Contrast-enhanced computed tomography and endoscopic ultrasound remain the gold standard for diagnosing, evaluating and staging patients with pancreatic neoplasms. The addition of positron emission tomography and PET superimposed hybrid-scan (PET/CT) to the imaging repertoire allows for diagnosis when EUS and contrast-enhanced CT have negative findings in selected patients. PET/CT is well established for diagnosing distant metastases [1]. It has also been shown to yield positive results when EUS and contrast-enhanced CT fail to detect the origin of increased tumor markers.

Patient Description

A 49 year old man diagnosed in 2003 with adenocarcinoma of the body and tail of the pancreas underwent curative distal pancreatectomy with splenectomy and wedge resection of the stomach. Postoperative chemotherapy and radiation therapy were instituted and the follow-up was uneventful until CA 19-9

(then 40–160 units within 1 month) rose dramatically 18 months after surgery. Evaluation for suspected recurrence included a negative whole-body high resolution triple-phase contrast-enhanced CT, including an extra-high resolution set (3 mm slice) in the pancreatic region. EUS was then performed, which also yielded negative findings. Subsequent FDG-PET exam with both coronal and trans-axial images identified a single area of increased uptake in the right anterior mid-abdomen. PET/CT precisely localized the single metastasis to the right external abdominal oblique muscle [Figure]. This location corresponded with the previous insertion of the surgical abdominal draining tube.

Ultrasound-guided fine-needle aspiration of the abdominal lesion revealed a pancreatic adenocarcinoma metastasis. Complete surgical resection of the lesion was achieved. The solitary metastasis was removed, and at follow-up 1 month later the CA 19-9 levels dropped to well within the normal range. Four years after removal of the solitary metastasis affecting the abdominal wall, the patient is alive, has recurrent disease, and is continuing working while receiving chemotherapy.



PET/CT precisely localizes the area of increased FDG uptake in the right external abdominal oblique muscle.

Comment

In the presence of chronic pancreatitis the ability of EUS to distinguish between malignant and benign pancreatic processes is limited, although the use of FNA may be helpful. However, FNA increases the risk of complications, and the decision of whether and where to biopsy is often difficult [2]. Despite the risks, a caveat of the procedure is the possibility of tumor seeding along the procedure tract. A seeding pattern in pancreatic cancer is exceedingly rare. Only one case report was identified in which a patient developed an apparent gastric wall tumor seeding that occurred as a result of EUS-FNA of a mass in the tail of the pancreas [3].

The technical limitation of EUS emphasized in this report is that EUS can only

FNA = fine-needle aspiration

PET = positron emission tomography
EUS = endoscopic ultrasound

image lesions with reasonable resolution if they are ≤ 5 cm from the probe. The EUS probe can only be placed inside the gastrointestinal tract. Thus EUS, although best in resolution, can be applied to only a few topographic areas in the body.

Contrast-enhanced CT shows moderate to low sensitivity and specificity for the detection of lymph node involvement [2]. Additionally, contrast-enhanced CT has demonstrated only modest results in diagnosing peritoneal disease, including ascites, mesenteric nodules and mesenteric lymph nodes. Another drawback of contrast-enhanced CT is missed diagnosis of small adenocarcinomas due to poorly timed sequences and large slices. Small primary and metastatic tumors can be especially difficult to diagnose in the setting of postoperative inflammatory changes.

^{18}F FDG-PET is an imaging technique that takes advantage of increased glucose metabolism by tumor cells and may improve the diagnostic accuracy of preoperative studies of pancreatic adenocarcinoma. Fusion of PET data with computed tomography improves the localization and specificity of the FDG-avid sites [4]. In a study by Rose et al. [1], patients with suspected primary or recurrent pancreatic adenocarcinoma were examined by contrast-enhanced CT and by ^{18}F FDG-PET imaging. In 18 patients with false negative CT scans the diagnosis was clarified by true-positive ^{18}F FDG-PET imaging.

Additionally, it was found that ^{18}F FDG-PET imaging was superior to CT in the categories of sensitivity, specificity and positive predictive value (92%, 85% and 96% vs. 65%, 62% and 87% respectively) [1]. PET/CT in conjunction with CT or magnetic resonance imaging has been shown to be useful in searching for distant pancreatic metastasis, especially within the peritoneal cavity. PET/CT also proves useful in differentiating benign from malignant lesions when compared with other diagnostic modalities. Furthermore, PET scanning has been successful in obtaining information about suspicious CT findings. PET/CT has an advantage over CT alone in being a combined anatomical and physiological study, adding to accuracy, compared to CT for detecting both primary tumors and distant metastases.

This report clearly demonstrates a rare post-surgical seeding of pancreatic cancer cells along the tract of an abdominal drainage tube. Although such metastases are rare, they may be considered when other parameters favor a situation of potentially treatable recurrence. It exemplifies the value of PET/CT in detecting metastasis of pancreatic cancer after failure of various other imaging modalities, including whole-body high resolution contrast-enhanced CT and endoscopic ultrasound. Due to its false positive and negative findings in co-morbidities such as pancreatitis and diabetes among others,

PET/CT will not serve as a replacement for other imaging modalities. PET/CT has proven to be a useful adjunct in the diagnosis of malignancies; it should be considered for confirming diagnoses of recurrence in carefully selected patients and may significantly alter their disease management and treatment.

References

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