Diagnostic Imaging Pathways - Pancreatic Cancer (Suspected and Staging)

Population Covered By The Guidance

This pathway provides guidance on imaging patients with suspected pancreatic cancer to confirm the diagnosis and to aid in determining the subsequent course of treatment.

Date reviewed: October 2011

Date of next review: 2017/2018

Published: October 2011

Quick User Guide

Move the mouse cursor over the PINK text boxes inside the flow chart to bring up a pop up box with salient points.
Clicking on the PINK text box will bring up the full text.
The relative radiation level (RRL) of each imaging investigation is displayed in the pop up box.

SYMBOL	RRL	EFFECTIVE DOSE RANGE
	None	0
	Minimal	< 1 millisieverts
	Low	1-5 mSv
	Medium	5-10 mSv
	High	>10 mSv

Pathway Diagram

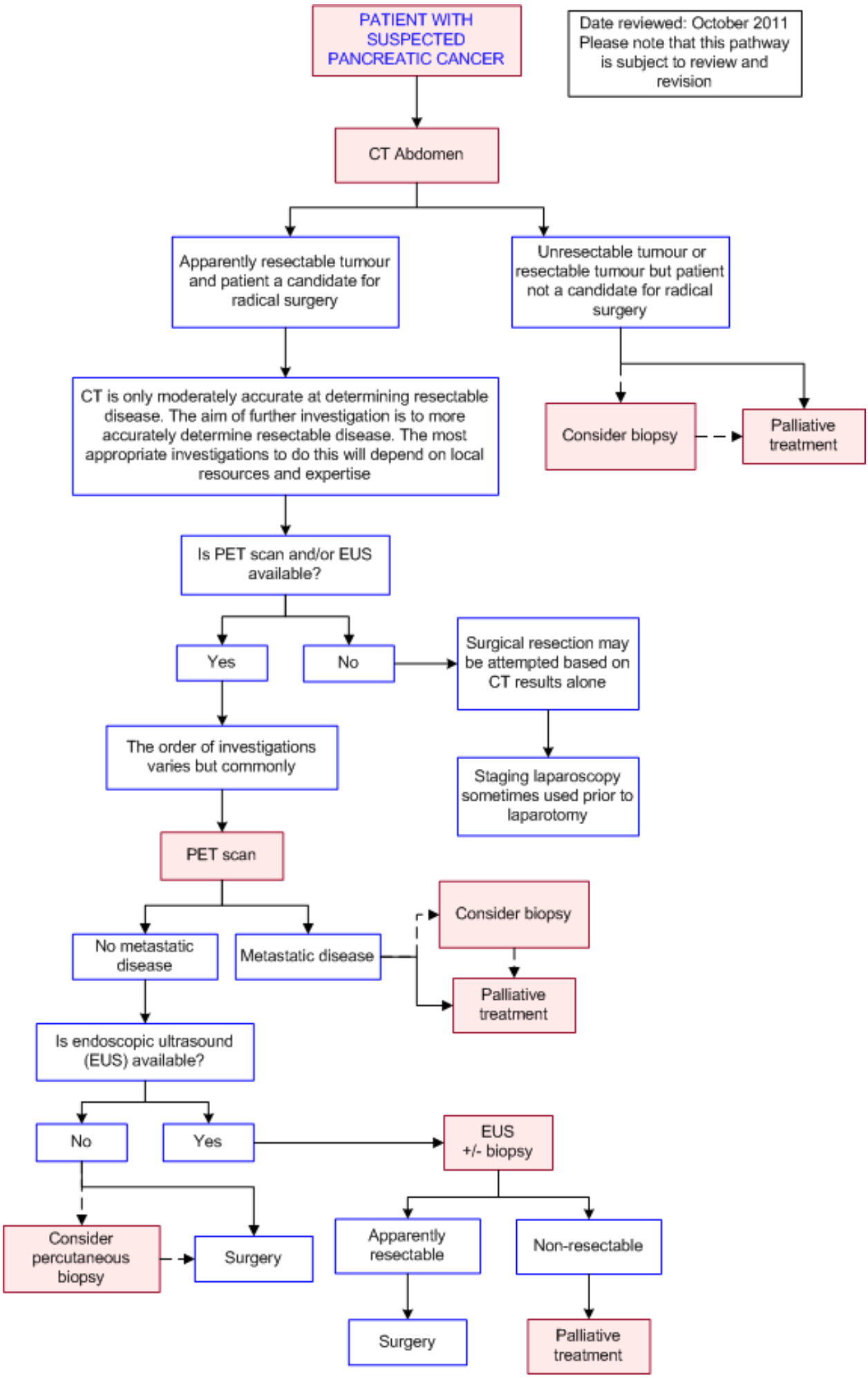
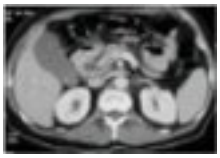


Image Gallery

Note: These images open in a new page

1a



1b

1c

Pancreatic Carcinoma

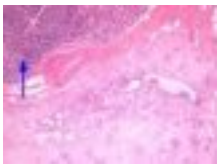
Image 1a, 1b, and 1c (Computed Tomography): Dilated common bile duct, pancreatic duct, and gallbladder. There is a mass located in the head of pancreas with involvement of the mesenteric vessels.

2

Pancreatic Carcinoma

Image 2 (ERCP): "Double-duct" sign - strictures are seen in the common bile duct (yellow arrow) and pancreatic duct (grey arrow) with dilatation of the pancreatic duct.

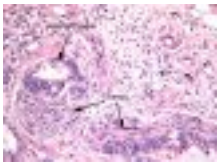
3a



Pancreatic Cancer

Image 3a (H&E, x2.5) and 3b (H&E, x10): Histological sections of a pancreatic adenocarcinoma showing the typical appearance of irregular malignant glands set in abundant desmoplastic stroma. Note, the residual normal pancreatic parenchyma (blue arrow). Image 3b shows the predisposition of this cancer for perineural invasion.

3b



Teaching Points

- The role of imaging in the patient newly diagnosed with pancreatic cancer, is the selection of

appropriate candidates for potentially curative surgical resection
- If for any reason, the patient is not suitable for surgery palliative options are recommended
- Staging begins with a tri-phasic CT scan of the abdomen
- Further evaluation is with PET scan or Endoscopic US (EUS) depending on local resources and expertise

Computed Tomography (CT) Abdomen

- Involves the use of intravenous contrast and timed image sequences that enable the evaluation of vascular structures around the pancreas
- Features
    - Very accurate at determining unresectable disease with positive predictive values for unresectability varying from approximately 89% to 100% 2,3,4,6
    - For determining resectability, the sensitivity of spiral CT is 81-90% and specificity is 82%. This is comparable to conventional CT and MRI. However, spiral CT has the added benefit of superior sensivity (91-98%) for the initial diagnosis of pancreatic carcinoma compared to conventional CT (86%) and MRI (84%) 23,25
    - Multidetector CT (MDCT) with multiplanar reformatted images offers improved evaluation of vascular involvement and liver metastases and is more accurate in assessing tumour resectability compared to single detector CT. The positive predictive value for detemining resectability is 91% 26,27,28
    - Demonstration of tumour involvement of more than one half of the circumference of major vessels is highly specific for unresectable tumour 5
- Limitations
    - Missed liver and lymph node metastases and missed vascular invasion of major peripancreatic vessels are the main causes for a false diagnosis of resectability 4,6,14

Endoscopic Ultrasound (EUS)

- Not available at all centres but is useful for identifying unresectable pancreatic tumours
- Patients are given conscious sedation usually with fentanyl and midazolam and an echo-endoscope is passed to the second part of the duodenum to view the pancreas
- The results of studies looking at the accuracy of EUS in the staging of pancreatic cancer have been highly variable due to various factors 11
- Seems to most useful in staging small tumours less than 2-3cm in size 12,13
- The accuracy of EUS for determining unresectable disease has varied from approximately 71-96% 11,15,16,17,18,19
- As the accuracy of CT improves with the introduction of faster, higher resolution helical scanners, the future role of endoscopic ultrasound may change

Suspected Pancreatic Cancer

- This pathway outlines the diagnostic and staging investigations used to confirm the diagnosis of pancreatic cancer and to determine if a patient is suitable for potentially curative surgery
- Surgical resection involving pancreaticoduodenectomy is the only potentially curative treatment for patients but it does have a significant risk of morbidity 1
- Accurate staging of patients is therefore very important for determining those patients who will

benefit from surgery

Positron Emission Tomography (PET)

- Benefit of FDG-PET in staging pancreatic cancer has not been conclusively proven and it is currently not rebatable under Medicare for this indication
- There have been conflicting studies as to the usefulness of PET and its cost effectiveness 21,22
- However PET has several potential advantages
    - Non invasive means of determining if a patient has metastatic disease.
    - The findings on PET scan can lead to a reduction in unnecessary laparotomies in patients with incurable disease 7,22
    - In another study, the addition of PET to CT altered surgical management in 43% of patients with suspected pancreatic carcinoma 8
    - In patients with pancreatic carcinoma, PET has been shown to be better than CT at detecting hepatic metastases greater than 1cm in size 9
    - Has an approximately 61% sensitivity for detecting lymph node metastases in patients with pancreatic cancer 10

Tissue Diagnosis

- For potentially resectable tumours on imaging, it is controversial whether preoperative biopsy should be performed and is highly dependent on the institution. 29 Advantages include avoiding unnecessary surgery in patients with an unexpected benign diagnosis and confirmation of pathology prior to surgery and initiation of neoadjuvant therapy. Disadvantages include potential needle tract tumour seeding, risk of bleeding and acute pancreatitis which may render the tumour unresectable
- However, there is general consensus that histological confirmation is necessary for inoperable tumours and patients who are not medically fit for surgery but who are candidates for chemoradiation 30
- Extrapancreatic metastases should be targeted preferentially due to easier accessibility, higher cell retrieval and lower complication rates 30
- Options for tissue sampling of the primary tumour include

Percutaneous Biopsy

- The sensitivity of percutaneous fine needle aspiration (FNA) under ultrasound or CT guidance ranges from 45 to 100% and the specificity, from 91 to 100%. 31 The false negative rate is reported at approximately 20% 30
- There are no large studies comparing percutaneous core biopsy and FNA for pancreatic cancers

Endoscopic Ultrasound (EUS) Guided Biopsy

- Compared to percutaneous biopsy, EUS-guided biopsy has greater sensitivity for smaller lesions with reduced risk of needle tract tumour seeding. Regional lymph nodes may also be easily sampled 32
- The sensitivity of EUS guided FNA ranges from 54 to 95% and the specificity, from 71-100%. 3 Early trials suggest a superior accuracy of EUS guided FNA compared to ultrasound and CT guided procedures 33,34

References

References are graded from Level I to V according to the Oxford Centre for Evidence-Based Medicine, Levels of Evidence. Download the document

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