

Newcastle HPB MDM updated radiology imaging protocol recommendations

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This document is intended as a guide to aid radiologists and clinicians who are involved with the imaging of patients with hepatobiliary disorders. The exact imaging protocol utilized should be decided on by the supervising radiologist and obviously depends upon many factors including the patient's fitness and clinical question to be answered.

The protocols have been adapted from the Royal College of Radiology (RCR) guidelines for cross sectional imaging in cancer (1). The main differences compared with the RCR guidelines are that I have tried to give more specific protocols for common HPB disorders and, in particular, I recommend a pre contrast examination in many of our CT protocols particularly for the initial CT examination.

1. CT pancreatic cancer staging:

Stage before biliary stenting if possible.

Triple phase CT protocol including pre, arterial and portal venous imaging. Exact parameters will vary with different CT units but require thin slice arterial/early pancreatic parenchymal phase imaging. For our arterial/parenchymal phase, we scan at 40 seconds post contrast and obtain 1mm and 3mm slices with axial and coronal reconstructions. Pre-contrast (i) and portal venous imaging 3mm axial and coronal reconstructions.

Also NOW recommend CT thorax (ii)

- (i) The RCR guidelines (1) do not include a pre-contrast scan in pancreatic cancer staging although we recommend it particularly for the initial imaging to detect CBD calculi which may be mistaken for an enhancing pancreatic mass.
- (ii) CT thorax should be restricted to those patients who have imaging suspicious for pancreatic malignancy and is not recommended for routine pancreatic cyst patient follow up.

2. Pancreatic cyst initial analysis

Triple phase CT protocol including pre, arterial and portal venous imaging. Imaging as for pancreatic cancer staging but routine CT thorax not recommended.

In a young patient, consider MRCP and contrast enhanced MRI pancreas as an alternative to CT imaging if there is local expertise in pancreatic MRI imaging available.

3. Suspected Hepatocellular carcinoma

To establish diagnosis, either four phase CT (i) or contrast enhanced MRI. Local clinical team preference on individual patient basis accounting for factors such as age and fitness.

If imaging is consistent with malignancy consider completing staging with a CT chest, abdomen and pelvis if clinically indicated.

- (i) CT triple phase liver protocol now updated to 4 phases. Pre-contrast, arterial and portal venous phases as previously. **Now recommend an additional delayed scan at 150 seconds to evaluate lesion wash-out.**

4. Liver mass.

- (i) **Suspected benign liver lesion incidentally detected by ultrasound with low clinical risk of malignancy**

In a fit and healthy young adult, without history of previous malignancy or other significant past medical history, incidental liver lesions are usually benign. In this situation, **MRI liver performed initially with a standard gadolinium agent should be the next imaging investigation of choice rather than CT.** If initial MRI imaging is consistent with hepatic adenoma or focal nodular hyperplasia and depending on available local MRI expertise, consider further lesion characterisation with a liver-specific gadolinium contrast agent such as Primovist.

- (ii) **Liver mass lesion with clinical or radiological suspicion of malignancy**

A **CT chest, abdomen and pelvis** examination including a **four phase CT liver examination** (as for HCC) is indicated to characterise the liver lesion, complete staging and help determine if the liver lesion is a metastatic deposit or a primary liver tumour.

5. Liver metastases including colorectal cancer

CT chest, abdomen and pelvis.

Consider triple phase CT liver if known hypervascular primary tumour. Baseline MRI liver also recommended when liver metastases present if patient is a candidate for liver resection, chemotherapy or local therapy. We use gadolinium rather than Primovist for initial scan in colorectal cancer patients but follow-up examinations performed with Primovist

6. Hilar biliary obstruction including suspected Cholangiocarcinoma

CT staging crucial before stenting

Optimise scan using modern CT scanner without excessive dose reduction.

Triple phase CT liver and pancreas: pre, arterial and portal venous phases. Arterial imaging reconstructed at 1mm and 3mm with axial and coronal reconstructions to assess arterial anatomy.

Delayed phase may also be useful but not compulsory

Consider additional MRCP to evaluate the extent of ductal involvement and to guide interventional drainage procedures.

7. Gallbladder mass including suspected gallbladder malignancy detected on abdominal ultrasound.

(i) Suspected benign gallbladder mass particularly in a younger patient, MRCP and contrast enhanced MRI liver recommended initially.

(ii) In suspected malignant gallbladder mass, a triple phase CT examination of the liver and gallbladder to establish diagnosis. CT Thorax, abdomen and pelvis should also be performed to detect metastatic disease if clinically indicated.

A pre contrast examination is essential to differentiate an enhancing gallbladder lesion from biliary sludge or calculi.

In potentially operable cases consider MRCP and contrast enhanced MRI liver following CT.

8. Acute pancreatitis

Ultrasound of the upper abdomen should be the initial investigation of the biliary system.

Initial CT scan should include pre-contrast examination of the biliary system and pancreas to detect gallstones or pancreatic ductal calcification followed by a **60 – 70 second post intravenous contrast abdominal CT**. Include the pelvis in severe cases or if there are significant fluid collections. Omit pre-contrast examination for subsequent CT examinations unless new indication.

Additional arterial phase indicated if history of haemorrhage to detect arterial pseudoaneurysms.

9. Chronic pancreatitis.

Ultrasound of the upper abdomen

Pre-contrast pancreas recommended for initial examination to detect pancreatic ductal calcification followed by **CT upper abdomen performed 60 - 70 seconds post contrast injection.**

Arterial phase imaging not routinely required unless assessing for arterial complications e.g. haemorrhage or pseudoaneurysm, there is a clinical suspicion of malignancy or the patient is to undergo pancreatic surgery.

Reference:

1) Royal college of Radiologists. Recommendations for cross-sectional imaging in cancer management, second edition. Reference BFCR (14) 2, published 2006 and updated 2014 (available free on line.)

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