



COMPUTED TOMOGRAPHY

- CT with the administration of contrast is used to characterise liver lesions. Images are commonly taken during the:
 - Arterial phase (20-30 seconds after administration of contrast): useful for identifying hypervascular lesions.

- Portal venous phase (70-80 seconds after administration of contrast) - often sufficient for hypovascular metastases.
- Classical appearances of different types of liver lesions include:
 - Haemangiomas: initial peripheral enhancement with subsequent delayed filling of the lesion. [1,2](#)
 - Metastases: Hypovascular metastases show low attenuation compared to surrounding liver during the portal venous phase.
 - Hepatocellular carcinoma: Usually appears as a discrete nodule that rapidly enhances (hyperattenuation) during the arterial phase, with washout (hypoattenuation) during the portal venous phase. [3-5](#)

MAGNETIC RESONANCE IMAGING

- Usually breath hold T1 and fast spin-echo T2 weighted images are used for the evaluation of a liver nodule.
- Gadolinium-enhanced dynamic MRI imaging improves the characterisation of liver lesions. [6,7](#)
- There is significant overlap between the MRI characteristics of various liver lesions. However, classical appearances include:
 - Haemangiomas: progressive centripetal enhancement after initial peripheral nodular hyperintense enhancement. [6](#)
 - Hepatocellular carcinoma: hyperintense on T1-weighted images, variable signal intensity on T2-weighted images, discrete capsule and rapid enhancement. [7](#)
- MRI has a better sensitivity and specificity than CT for the detection of hepatocellular carcinoma in patients with cirrhosis. [8](#)

ULTRASOUND

- Considered better than CT for identifying cystic hepatic lesions. [9](#)
- Typical appearances of different types of liver lesions include:
 - Haemangiomas: homogenous echogenic focal lesion sometimes with posterior acoustic enhancement. [18](#)
 - Focal Nodular Hyperplasia: highly variable appearance but often homogeneously isoechoic compared to normal liver. [10](#)
 - Hepatocellular carcinoma: small lesions tend to be hypoechoic while larger ones develop a more heterogenous pattern. [19](#)
- Has a sensitivity of approximately 58% for the detection of hepatocellular carcinoma, being inferior to both CT and MRI. [11](#)
- The use of quantitative dynamic contrast enhanced sonography has been found to improve the characterisation of focal liver lesions. [12,13](#)

TECHNETIEM-99m LABELLED RED BLOOD CELL SCAN

- Hepatic haemangiomas occur in up to 7% of the population and are the most common benign tumour of the liver. [13](#)
- Some of these do not demonstrate the characteristic CT and ultrasound appearance and can be difficult to distinguish from other causes of a focal liver lesion. [14](#)
- A labelled RBC Scan is a non invasive test that has a high specificity and positive predictive value for hepatic haemangiomas. [13](#)
- An increase in delayed blood pool activity is typical of a haemangioma and this appearance is rarely seen with other causes of liver nodules. [15](#)
- The test has a limited sensitivity for the detection of small lesions and those located adjacent to the heart or major vessels. [16,17](#)

POSITRON EMISSION TOMOGRAPHY

- Malignant cells characteristically have increased metabolism compared to normal cells, and may be reflected by areas of increased activity on PET scanning. [20](#)
- Increased uptake is seen in around 50-70% of patients with hepatocellular carcinoma. In these patients PET imaging may help assess tumor differentiation and may be a useful test in conjunction with CT for staging. [20,21](#)
- Higher sensitivity compared to CT, MR and US for detection of hepatic metastases from cancers of the colon, rectum, stomach, and oesophagus. [22,23](#)

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