

Imaging and staging

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Abstract Content

Hepatocarcinoma represents the fifth most common cancer in the world and the third most common cause of cancer-related mortality. Its incidence is higher in the developing countries and its rising in Europe and United States equal that observed in Japan is expected in 20 years.

Cirrhosis is the main risk factor, and is clearly associated with hepatitis B virus chronic infection in Asia and Africa and hepatitis virus C in Western countries.

More recently, the metabolic NASH (non-alcoholic steato-hepatitis) related to diabetes and obesity has been considered to be an increasing risk factor for HCC in developed countries.

In the last three decades, surveillance programs and improvement in diagnosis have enabled clinicians to identify tumours at early stage when effective treatment is available and improvement in survival can be reached.

Early HCC was defined as tumours less than 3 cm. EASL and AASLD established that nodules larger than 2 cm which are hypervascular on any imaging method may be regarded as HCC and if two imaging techniques show hypervascularity in nodules between 1 and 2 cm it is also regarded as HCC.

But some nodules larger than 2 cm are not hypervascular and 10 percent of HCC are iso- or hypovascular. Otherwise some hypervascular nodules larger than 1 cm are not HCC. So recent studies have used sequential imaging and biopsy of indeterminate small nodules to show that a substantial proportion of HCCs of fewer than 2 cm are missed when EASL criteria are applied.

Which technique for early HCC diagnosis?

US is less sensitive than CT and MRI, although there is some evidence that combining CT and US increases sensitivity.

Gd-enhanced MRI is superior to either CT as US. In addition to techniques relying on the parameter of arterial hypervascularity, other indicator of functional assessment using intracellular contrast agents in MRI (EOB-DTPA) was added. Some recent studies recommend to change the main diagnostic modality for HCC smaller than 2 cm from CT arterioportal angiography (considered as a standard) to CEUS and Gd-EOB-DTPA MRI with combined sensitivity as high as 94%.

HCC is two diseases in one, tumour and cirrhosis in most instances, so extent in underlying liver disease should be carried out.

Child-Pugh system is traditionally used but it considers only cirrhosis.

Different staging systems have been developed to combine cancer-related parameters and the extent of cirrhosis: Cancer of the Liver Italian Program index (CLIP) used in Western countries or Chinese University Prognosis index in East Asian countries. The main limits of these systems are

the lack of reproducibility in different ethnic populations and the lack of correlation with the treatment strategies available. The Barcelona Clinic Liver Cancer (BCLC) staging system published in 1999 by Llovet stratifies patients affected by HCC according to the extent of disease, performance status and underlying cirrhosis assessed by Child- Pugh score. So different stages (early, intermediate, advanced or terminal stages) are defined for which an appropriate treatment can be administered.

In conclusion, the topic of this lecture is 1) to review and summarize the state of the art imaging techniques used for detection of small HCC and 2) to indicate and explain the actual staging principles of this disease according to most popular staging method and especially BCLC staging which permits to stratify patients according to the best actual treatment.

References

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Learning Objective

1. To describe state- of- the- art techniques for liver tumour imaging
2. To discuss staging protocols
3. To analyse the results of the different modalities in detection, characterization and staging of HCC