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Contrast-Enhanced Imaging Characteristics of Steatohepatitic Hepatocellular Carcinoma and Clinicopathological Investigation

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Abstract

With 906,000 newly diagnosed cases worldwide in 2020, hepatocellular carcinoma is the sixth most common malignant tumour and the third leading cause of cancer-related deaths. The prevalence of HCC varies by ethnicity, with the majority of patients suffering from chronic infections of the hepatitis B and C viruses, metabolic-dysfunction-associated fatty liver disease, or alcoholic steatohepatitis. MAFLD, formerly known as nonalcoholic fatty liver disease, is characterised histologically by hepatocyte steatosis, steatohepatitis, Mallory's body, and fibrosis. MAFLD currently affects 30% of the global population, despite the fact that only 5% of patients will progress to MAFLD-related fibrosis or HCC. Although chronic HBV infection remains a major cause of HCC in China, MAFLD-related primary liver cancer has increased.

Keywords: Steatohepatitic • MAFLD • Hepatocellular carcinoma • HBV

Introduction

According to the 2019 World Health Organization (WHO) digestive tumour pathological classifications, HCC is a genetically heterogeneous entity that can be further subdivided into numerous specific variants such as clear cell, macrotrabecular-massive, steatohepatitic, or fibrolamellar carcinoma; for example, steatohepatitic hepatocellular carcinoma is a distinct histologic variant for the presence of steatohepatitis, including the It has been linked to HCV infection, type 2 diabetes, obesity, and the presence of underlying MAFLD. Patients with partial SH-HCC who do not have a fatty liver may have tumour-specific genetic changes. They stated that SH-HCC can exist in the absence of a steatohepatic background.

The incidence of SH-HCC is rapidly increasing worldwide due to the prevalence of lifestyle-related diseases such as obesity, metabolic syndrome, and risk factors for MAFLD. In our study, SH-HCC patients had a higher rate of obesity and T2DM than non-SH-HCC patients. SH-HCCs were mostly seen as hyperechoic lesions with a regular shape and well-defined margin on BMUS. They were rapidly hyperenhanced in the arterial phase and had late washout during the late phase after the injection of SonVue. SH-HCC was characterised by a signal drop in the T1WI opposed-phase, indicating significant intratumoral fat deposition. According to CEMRI, the enhancement performance of SH-HCCs was comparable to that of non-SH-HCCs. SH-HCC patients had significantly higher rates of hepatic steatosis in non-tumor liver parenchyma, according to histopathology [1].

Literature Review

We found no statistically significant difference in the rates of HBV and HCV infection in SH-HCCs. In contrast, HCV infection in SH-HCC patients has been reported to be significantly different from HCV infection in non-SH-HCC patients. The reason for this could be that HBV infection is much more common among Chinese people. Furthermore, tumour size in SH-HCCs has been reported to be larger than in non-SH-HCCs, whereas the current study found no significant difference in tumour diameter between SH-HCCs and non-SH-HCCs. The most likely explanation is that chronic hepatitis B patients account for more than half of SH-HCC/non-SH-HCC patients; routine imaging and laboratory tests are performed to detect cancer as early as possible.

In addition, two SH-HCC lesions in our study showed rim-like enhancement in the early arterial phase and significant washout in the late phase, mimicking hepatic metastasis. When a core needle biopsy is required, it is recommended. Furthermore, three SH-HCCs that showed hyper or iso-enhancement in the late phase were misdiagnosed as hepatic angiomyolipoma, hepatocellular adenoma, or focal nodular hyperplasia. In addition, a case of SH-HCC that was rapidly hyperenhanced in the arterial phase but had a washout in the late phase was observed. This is significant for differential diagnosis because nearly all benign hepatic focal lesions exhibit continuous hyper- or iso-enhancement in the late phase. The portal vein supplies the early HCC in the multistep process of tumorigenesis, which exhibits atypical mild hyperenhancement.

Discussion

Cytogenetics is the branch of genetics that deals with the study of chromosomes and their abnormalities. Chromosomes are the structures in cells that contain the genetic material, DNA. They play a critical role in the inheritance of traits from one generation to the next. The study of cytogenetics has greatly expanded our understanding of genetics and the mechanisms of inheritance, and has numerous applications in medicine, agriculture, and forensics. Chromosomes are organized structures made up of DNA and proteins. The DNA in chromosomes carries the genetic information that is passed on from one generation to the next. In humans, there are 46 chromosomes, which are organized into 23 pairs. Each pair consists of one chromosome from the mother and one chromosome from the father. The first 22 pairs are called autosomes, while the 23rd pair are the sex chromosomes (XX in females and XY in males).

The SH-HCCs in the current study, on the other hand, were all moderately differentiated (46.2% of grade II and 53.8% of grade III, respectively). A steatohepatitis-like change in FNH and HAML may also share characteristics with SH-HCC; however, the non-cirrhotic liver background of SH-HCC complicates the diagnosis. In such cases, an elevated serum AFP level may aid in the diagnosis of cancer. If not, histological confirmation should be performed before surgery to ensure an accura te diagnosis. The MRI characteristics of SH-HCCs were also thoroughly examined in this study. The most notable finding was a signal drop in 84.6% of SH-HCCs in the T1WI opposed-phase compared to the in-phase.

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Furthermore, 57.7% of SH-HCCs had a diffuse fat mass change [2].

Cytogenetics has numerous applications in medicine. It is used to diagnose and monitor genetic disorders, such as Down syndrome, Turner syndrome and Klinefelter syndrome. These disorders are caused by abnormalities in chromosome number or structure, and can be detected using karyotyping or FISH. Cytogenetics can also be used to identify genetic mutations associated with cancer, which can aid in the development of targeted therapies. In addition to its diagnostic applications, cytogenetics has also been used to develop new treatments for genetic disorders. For example, in some cases, gene therapy can be used to replace or correct faulty genes. This involves introducing a functional copy of the gene into the patient's cells, which can be accomplished using techniques such as FISH.

Steatosis in the non-tumor hepatic parenchyma differed significantly between SH-HCCs and non-SH-HCCs. Previous research has also described this phenomenon. Microvascular invasion (MVI) is the presence of tumour cells in the peritumoral of surgical specimens as determined by microscopic examination, and it is a well-established prognostic parameter of early recurrence after curative resection. The MVI negative nodules in the SH-HCC group were significantly higher than those in the non-SH-HCC group. During follow-up, SH-HCC patients had significantly longer PFS than non-SH-HCC patients, but there was no significant difference in OS between the groups. HCC has a poor prognosis in general, with a 5-year survival rate of less than 20%, but those with SH-HCC have a better overall survival rate [3-6].

Conclusion

Several constraints should be mentioned. First, despite the fact that our study enrolled participants over a long period of time, the number of SH-HCC patients was limited. Second, only surgically resected patients were evaluated, raising the possibility of selection bias. Finally, due to the small number of cases of SH-HCCs, a subgroup analysis of imaging features was not performed. In conclusion, the frequency of metabolism-related diseases was significantly higher in SH-HCC patients than in non-SH-HCC patients. The imaging characteristics of SH-HCC combined the fatty change with the typical enhancement performance of non-SH-HCC, as seen with CEUS/CEMRI.

Acknowledgement

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Conflict of Interest

There are no conflicts of interest by author.

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