Hepatoma and trematode infestation: a short review

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ABSTRACT

Hepatoma is a common cancer that can be seen around the world and clinical correlation between infection and hepatoma is evident. Hepatitis virus infection is proved for its relationship with hepatoma. However, the knowledge of other infections is still limited. In this short review, the relationship between hepatoma and some trematode infestation including echinococcosis, fascioliasis, opisthorchiasis, clonorchiasis and schistosomiasis are described and discussed. Opisthorchiasis and clonorchiasis are confirmed for cholangiocarcinoma carcinogenesis but still lack evidence for hepatoma carcinogenesis. Schistosomiasis can increase the severity of hepatoma.

Key words: Hepatoma; infestation; trematode

INTRODUCTION

Hepatoma is a common malignancy seen around the world. The clinical correlation between infection and hepatoma is very interesting. Relationship between hepatitis virus infection and hepatoma is confirmed. Chronic hepatitis B and chronic hepatitis C infects can result in hepatoma carcinogenesis. However, the knowledge on other infections is still limited. Many tropical infections have been continuously studies for the relationship with hepatoma. Here, the authors summarize and present the information on hepatoma and trematode infestation.

HEPATOMA AND ECHINOCOCCOSIS

Echinococcosis is a parasitic infestation primarily observed in liver (in humans), which is associated with liver cystic disorder called hydatid cyst. Previous reports indicate a positive correlation between liver hydatid cyst and hepatoma.11-14 Although it is rare, hydatid disease needs to be included in differential diagnosis of hepatoma.15-18 Hoffmann et al.16 noted that the final diagnosis could be derived only if the histopathological examination is done. At present, it is accepted that the co-incidence between hydatid disease and hepatoma is possible, however, there is still no conclusion on the carcinogenesis process due to hydatid disease. Kübeck et al.19 recently noted that some authors considered echinococcosis as a trigger for hepatoma and suggested for further study on such relationship. In fact, hydatid disease has a role in causing liver fibrosis and cirrhosis,20 which is a precancerous liver lesion. However, the lesion due to hepatic cyst and fibrosis is usually severe. The patient should not have a long survival to have a fully developed hepatoma as a consequence.

HEPATOMA AND FASCIOLIASIS

Fascioliasis is another common human parasitic infestation.10 The relationship between fascioliasis and biliary cirrhosis is speculated in some publications. Vitovec11 mentioned for the role of biliary cirrhosis of fasciolar origin...
HEPATOMA AND CLONORCHAIASIS

Liver fluke infestation or opisthorchiasis is another important parasitic infestation. It is common in Indochina and has been proved for its relationship in the occurrence of cholangiocarcinoma.[13] However, the role of opisthorchiasis on hepatoma carcinogenesis is still not conclusive at present. There are some reports on co-incidences between opisthorchiasis and hepatoma.[14,15] Nevertheless, the epidemiological investigation still reveals no clear evidence that opisthorchiasis can induce hepatoma carcinogenesis. Suksumek et al.[16] recently studied Opisthorchis viverrini DNA in patients with hepatocellular carcinoma (HCC) and found that the presence of parasite had no relationship to any cancer. In fact, the finding by Suksumek et al.[16] is not surprising since the main mechanism of cholangiocarcinoma carcinogenesis is due to chronic biliary tract irritation by parasitic infestation. Since the O. viverrini does not infest in hepatic parenchyma, the induction of the HCC should not occur.

HEPATOMA AND CLONORCHAIASIS

Similar to opisthorchiasis, clonorchiasis is known for its relationship with cholangiocarcinoma.[17] The mechanism is the same as that described in opisthorchiasis model. For hepatoma, there are some reports on the co-incidence between clonorchiasis and hepatoma.[18] However, the role of clonorchiasis in hepatoma carcinogenesis is still controversial. A recent report by Tan et al.[19] concluded that clonorchiasis could be an important risk factor for hepatoma. When the course of clonorchiasis is prolonged, the risk of hepatoma could increase.[19] Hepatitis B virus (HBV) infection, alcohol consumption, and clonorchiasis might have synergistic actions in the development of hepatoma.[19] Chen et al.[20] found that excretory/secretory products of the parasite might plays an important role in hepatoma carcinogenesis. However, the study reported by Chen et al.[20] is only an in vitro study. Chen et al.[20] noted that “Csseverin”, an important excretory/secretory products, might exacerbate hepatoma carcinogenesis, however, this is only a speculation at this point.

HEPATOMA AND SCHISTOSOMIASIS

The role of schistosomiasis on hepatoma carcinogenesis is widely discussed. In animals, liver cirrhosis due to infestation can induce hepatoma carcinogenesis.[21,22] In humans, there are some reports on positive correlation between schistosomiasis and hepatoma.[23-25] Since the induction of liver fibrosis in human due to schistosomiasis is observed, it is proposed that this pathology can be the underlying cause of hepatoma which may occur in future.[25-27] In a case-control study by Khella et al.,[26] it was found that the history of schistosomiasis is significantly different between case and control. A similar observation was also reported by el-Zayadi et al.[31] Badawi and Michael[30] found that schistosomiasis increased the severity of HBV infection and elevated the risk of HCC associated with the HBV infection. However, Nakashima et al.[24] studied necropsies with hepatoma coincident with schistosomiasis, and concluded that chronic schistosomiasis, on its own, is unlikely to be the cause of primary liver cell carcinoma. Nakashima et al.[32] also reported that HCC related to viral hepatitis B and/or C also increased in cases with underlying schistosomiasis. Yosry[33] concluded that there is inadequate evidence for the carcinogenicity of Schistosoma mansoni in humans. S. mansoni may still be linked to HCC through potentiating effects of HBV and hepatitis C virus (HCV) on the liver. El-Tonsy et al.[34] concluded that schistosomiasis accelerates hepatic dysplastic changes in the presence of other risk factors making cancer appear early and with a more aggressive nature, compared to the same risk in absence of schistosomiasis. Therefore, it can be summarized that superimposing the effects of HBV and HCV on the liver can be expected in the cases with combined schistosomiasis and hepatitis virus infection.[35]

Conclusively, schistosomiasis can induce liver fibrosis, which is a precancerous lesion. In addition, chronic schistosomiasis is common. The increased argyrophilic nucleolar organizer regions proteins which related to increased dysplasia can be observed in the chronic schistosomiasis.[36] In addition, new observation on the deteriorating immunological status in chronic schistosomiasis is also reported.[34] Dysregulation of cellular immune responses, impaired T-lymphocytes and natural killer cells, can be seen in the patients and can ease the occurrence of cancer.[36] The poor immunity is said to be partially due to the poor nutritional status,[37] which is a common complication in chronic schistosomiasis.[38] Hence, it is no doubt that schistosomiasis can be the cause of hepatoma carcinogenesis. Focusing on the case with combined chronic schistosomiasis and chronic hepatitis B or hepatitis C infection, a more severe liver pathology can be expected. The precancerous liver pathological change due to hepatitis virus can be superimposed by liver fibrosis induced by schistosomiasis and this should be the explanation for finding that schistosomiasis increase the severity of hepatitis related hepatoma.
CONCLUSION

There are many reports on hepatoma and trematode infestation. Opisthorchiasis and clonorchiasis are confirmed for cholangiocarcinoma carcinogenesis, but there is still lack for the evidence on hepatoma carcinogenesis. For schistosomiasis, it is found that schistosomiasis increase the severity of hepatitis related hepatoma. Focusing on the mechanism, the trematode that has a possible role in hepatoma carcinogenesis usually has a chronic form of infestation. The chronic liver parenchyma pathology, especially for liver fibrosis and cirrhosis, is the main precancerous lesion that can further develop into hepatoma [Figure 1].

REFERENCES


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