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Short Communication

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A NOTE ON HEPATITIS VIRUSES CAUSING CANCER IN HUMAN

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Abstract: Hepatitis is an inflammation of liver mainly caused by the infection of hepatitis viruses as A, B and C. Chronic infection of these viruses produces liver cancer, most commonly known as the hepatocellular carcinoma (HC). This is a kind aggressive tumor formed in liver due to the infection of these viruses. Since, the understanding of these viruses with the development of hepatocellular carcinoma is essential for the future design of treatment, the present short communication highlighted the risk factors for infection and hepatocarcinogenesis of hepatitis viruses. The present paper is also an attempt to make the people aware of the fact that chronic viral hepatitis infection in human might cause liver cirrhosis and hepatocellular carcinoma developed in future.

Keywords: Hepatitis B and C viruses, Hepatocellular carcinoma, Liver cirrhosis.

INTRODUCTION

In 1960, Baruch Blumberg, isolated and characterized a virus named hepatitis B virus and was honored with Nobel Prize for physiology and medicine in 1976. This virus had been established as an oncovirus causing hepatocellular carcinoma in 1980 by R. Palmer Beasley (Beasley *et al.*, 1981; Baruch Blumberg, 2010). Similarly, in the year 1987 hepatitis C virus in the series was discovered by Michael Houghton and Bradley (Choo *et al.*, 1989). It was also subsequently shown to be a major oncovirus causing hepatocellular carcinoma worldwide. Though, hepatitis A virus has not been reported to cause liver cancer but is linked in some other cancers developed like non-Hodgkin lymphoma, a kind of blood cancer (Liao, 2006; Mc Donald *et al.*, 2008; Shlomai *et al.*, 2014).

People infected with HBV or HCV have a higher risk of developing hepatocellular carcinoma (HC), also known as hepatoma. HC is a type of aggressive liver cancer of hepatocytes that commonly occurs in people with chronic liver diseases most specifically infected with hepatitis B and C viruses. Approximately, 75 % of all liver cancers have been reported by these viruses. While hepatitis is spread from close contact, HC metastases in other parts of the body as well

including lungs, abdominal lymph nodes, pancreas, adrenal gland, bones and brain. The important HC symptoms are yellowing of the skin, unbearable upper right-side abdominal pain and weight loss. But, unfortunately these and even other associated symptoms appear quite late after many years when the disease has already been established (Beasley *et al*., 1981; Mc Donald *et al*., 2008; Arzumanyan *et al*., 2013; Marc *et al*., 2017; Petruzziello, 2018; Liu, 2020).

While HBV is a DNA virus; HCV contains RNA as their genetic material. HBV is more likely to show symptoms such as flu like illness and jaundice. Chronic infections have a higher risk of liver cancer. These infections are spread in much the same way as HIV. HCV seems to be the more dangerous as it develops liver cancer asymptomatically and chronically. The hepatitis B virus is able to multiply inside the human body so silently that it without even causing hepatitis can damage the hepatocytes developing cancer at higher risk of death from HC, cirrhosis and liver cancer (Choo *et al*., 1989). Integration of HBV-DNA into the human genome has been considered as an early event in carcinogenesis inducing insertional mutagenesis and chromosomal instability. The hepatitis B viral proteins thus formed cause cancer in hepatocytes. Several proteins encoded by DNA viruses are capable of binding to p53 to regulate apoptosis (Patrick and Michael, 2001). A large number of clinical studies have also shown that chronic HBV infection also causes destruction of innate and adaptive immune responses in human (Anthony *et al*., 2015). However, HBV infections are cleared by the immune system, the HCV infections can't be cleared persisting lifelong in the body. Finally, these hepatitis viruses damaging the DNA of host cells causing cancer in liver is not yet fully understood (IARC, 2012 and Brown *et al*., 2018).

The hepatitis viruses are found in saliva, semen, blood and vaginal fluids. And, it can easily be transmitted via kissing and close contact. In case of a married couple the partner is only safe when vaccinated. There is no cure for HBV infection and the treatment can only help to keep the virus under control. Cancer patients usually experience unusual kinds of treatment approaches (Saha *et al*., 2020). However, both HBV and HCV are being treated with drugs. Most adults recover completely from HBV infection within a few months (Bruix and Sherman, 2011). Some of these effective antiviral drugs are as tenofovir (viread), adefovir (hepsera), entecavir (baraclude), lamivudine (epivir) and telbivudine (tyzeka) (Anna *et al*., 2015). Similarly, interferon therapy has also got their own limitations by cost and side effects (Bruix and Sherman, 2011 and Arzumanyan *et al*., 2013). Further, it appears that at present vaccination is the only effective control measure to save the people from hepatitis viruses. There is a vaccine to prevent HBV infection but none for HCV. The high rate of mutability and adaptability has caused the hepatitis C virus poorly suited to vaccines (Laura *et al*., 2016 and Schille *et al*., 2020).

CONCLUSION

The most important hepatitis virus influencing the liver is hepatitis A, B and C viruses. Viral hepatitis is a well known liver disease of human developing hepatocellular carcinoma in future. This is a 3rd leading fatal cancer of the world. It may progress to scarring of the liver causing liver cirrhosis, liver failure and liver cancer. But, how exactly hepatitis causes liver cancer is not yet fully known. Several mechanisms have been put forward to explain the oncogenic potential of these viruses. The role of HBx in the development of hepatocellular carcinoma is one of them (Koike *et al*., 2009). Despite all progresses made in advancement of the study of hepatitis viruses, it appears that there is a substantial gap exists in our ability to understand the viral hepatitis link with the development of liver cancer (Shlomai *et al*., 2014). Last but not the least, cancer often takes years, even decades to develop after a person gets an infection, there is nothing more to worry about it except to be alert. Similarly, since there is no way to know which people who have cancer causing pathogens will develop cancer, it arises from his bad luck (Masroor *et al*., 2018 and 2019).

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CONFLICTS OF INTEREST

There are no conflicts of interest. The authors have approved the final version of the manuscript contributing equally.

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