

Co-infection of hepatitis B and C viruses in patients infected with Human Immunodeficiency Virus in Sudan

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Abstract

Background: Co-infection with hepatitis B and C among people infected with human immunodeficiency virus is a major health problem and occurs frequently because of common routes of transmission.

Objective: The aim of this study was to determine HBV and HCV co-infection in HIV-positive patients in Sudan, July 2008 to January 2009.

Method: The study included patients infected with HIV in Khartoum state. A total number of 100 samples were collected from patients infected with HIV. Enzyme Linked Immuno Assay (ELISA) was used to diagnose Hepatitis B and C viruses. Statistical Package for Social Science (SPSS) was used to analyze collected data.

Result: Study population included 74 males and 26 females ranged between 2 – 70 years. it was found that the high rate of the HIV infection (63%) was found between the age group (21- 40 year). The frequency of serological markers of HBsAg in HIV positive samples were 15 (15%) distributed in to 12 male and 3 female. The rate of HCV antibody was found in 3 (3%) of HIV positive patients and only one sample (1%) was positive for both HBV and HCV.

Conclusion: Patients infected with HIV should be screened for both HBV and HCV at early stage of infection.

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Introduction

Human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV) are major health problem all over the world and specially in developing countries. Globally, it is estimated that 10% of the 40 million people infected with HIV have a chronic Hepatitis B virus infection¹. In patients acutely infected with HBV, prior infection with HIV predisposes them to the development of the chronic HBV-carrier state². These patients are more likely to express HBeAg which has important implications for infectivity. Those with HIV-HBV co-infection appear more likely to progress to cirrhosis. In fact, in one study of 132 homosexual men with chronic hepatitis B, the risk of cirrhosis was increased 4.2-fold in the presence of HIV infection³. The management of chronic hepatitis C virus infection in HIV patients become a major treatment challenge. This situation increase the hepatic necrosis and accelerate the fibrosis process which may lead hepato-cellular carcinoma (HCC, or liver failure⁴. In United State and Europe, about 30% of HIV- positive individuals are infected with HCV. It was found that HIV patients are at high risk to get HBV and HCV infection. Patients with HIV positive and co-infected with HBV and HCV have an increased risk in progression to sever liver disease such as hepatotoxicity associated with antiretroviral therapy⁵. HIV co infection with HBV and HCV has been reported and some studies indicated that the prevalence of HBV is higher than HCV infection⁶. In Malawi, the prevalence of HBV and HCV in patients infected with HIV was studied and HIV/HBV co infection rate was 20.4% , and HIV/HCV was 5%⁷. In study conducted in Iran, HIV co infection with HBV and HCV was 14.5% and 72% respectively⁸. HIV co-infection with HBV and HCV are major public health concern . These viruses are shared the main routes of transmission and they have effective impact on treatment. The aim of this study was to determine the rate of HBV and HCV co-infection in HIV-positive patients in Sudan.

Methodology

Data was collected from new HIV patients referring to virology department, National health laboratory. A purposive sampling technique was used to recruit study participants. The study was carried out during a period from July 2008 to January 2009. A total number of 100 confirmed

HIV positive samples were selected randomly to be included in the study. Informed consent was taken from each participant. Data such as gender and age group was collected and entered in to the statistical programme (SPSS). For Hepatitis B virus diagnosis, commercial ELISA kit (Enzygonost) was used to detect HBsAg . the ELISA plate was coated with sheep antibodies for HBsAg. For hepatitis C virus commercial (innotest) ELISA kit the detection of antibodies to human hepatitis C virus in human serum and. the Microtitre plate coated with HCV antigen.

Results

A total number of 100 HIV positive patients with mean age 34.6 ± 12.5 were included in the study. This number consists of 74 (74.0 %) males and 26 (26.0%) females. The highest rate of the HIV infection (63.0%) was found between the age group (21- 40 year). The serological markers of HBsAg in HIV positive patients were 15 (15.0%) distributed in to 12 male and 3 female ($P = 0.413$) . Also, the highest paercentage of HBV infection was found in the age group between 21 and 40 years (10.0%) – (Table -1).

Table -1- HBV, HCV infection among HIV distributed by age group

Age Group (years)	Hepatitis B virus		Hepatitis C virus	
	Positive	Negative	Positive	Negative
1-2	1	7	0	8
21 -40	10	53	0	63
41 -61	3	24	2	25
Over 60	1	1	1	1
Total	100		100	

Infection with HCV was 3 (3.0%) among HIV positive patients, two of these cases were males and one was female (P = 0.487). Distribution of HCV infection in regard to age groups was statistically significant (P = 0.001) (Figure -1). Only one sample (1.0%) was positive for both HBV and HCV.

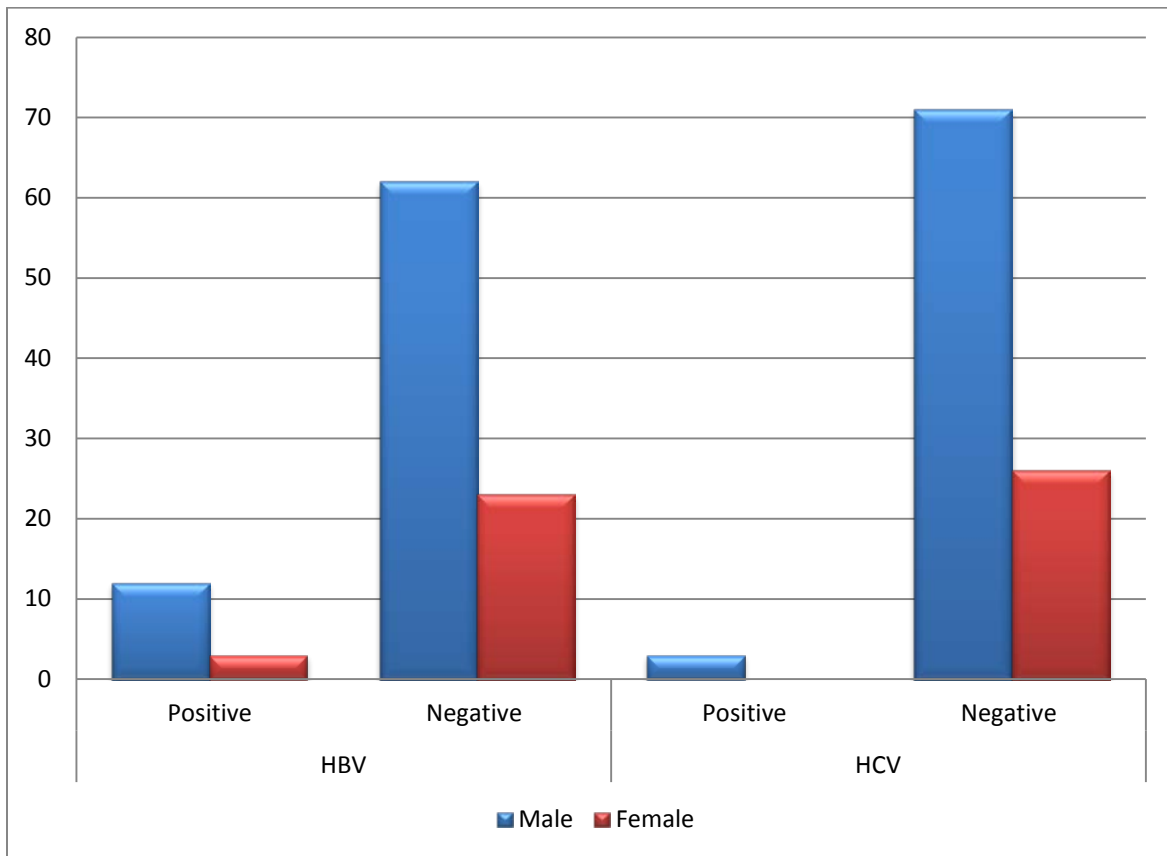


Figure 1: distribution HBV & HCV infection among HIV patients by gender.

Discussion

The study was conducted to determine the co infection of HBV and HCV among patient infected with HIV. HIV Distribution among males was rather higher than female. This is contrary to the situation found in many sub-Saharan African countries where the high rate of infection was

reported among women .For instance, study conducted in Uganda found that HIV infection among female groups was more than male group, and this finding was disagree with our study⁹. In this study the rate of co-infection of HbsAge among HIV patient was 15%. this percentage was high when compared with similar study conducted in Kenya, where the rate of HBV infection was 6.1%¹⁰. In other study conducted among HIV patient in Nigeria , the rate of HBV infection was low (6.6%) when compared with our study . On contrary, this study agree with that the rate of HBV infection was high in male when compared with female infected with HIV¹¹. Furthermore, in study conducted among Gambian patients infected with HIV the rate of infection with HBV was 12.2% and this percentage was low when compared with our study¹². The distribution of HBV was high in male rather than female and this is similar to our study. Reviewing a study conducted in Iranian HIV positive population, the result of HBV was low (11.4 %) and this disagree with our finding¹³. In addition, another study in India indicated that the rate of HBV co infection was also low (2.25%)¹⁴. HBV co infection with HIV was studied and found that the rate was (3%) which indicated a low percentage and this disagree our study¹⁵. In Germany, the co infection of Hepatitis B and C in HIV infected patients was 9% and this showed low rate of infection when comparing with the study conducted in Sudan¹⁶.

In patients infected with HBV, prior infection with HIV predisposes them to the development of the chronic HBV-carrier state . These patients are more likely to express HBeAg which has important implications for infectivity, and are less likely to have spontaneous seroconversion of HBeAg to anti-HBe an event that usually hinder the clearance of the virus and this lead to the liver damage¹⁷. The HIV/HBV co-infection patient are liky to die of liver-related causes compared to those infected only with HBV¹⁸. Many studies indicated that, infection of HCV in HIV positive patient increase the degree of hepatic necrosis and inflammation and accelerates the fibrotic process that ultimately leads to cirrhosis and complications such as HCC, liver failure, and death. Despite the major benefits of antiretroviral therapy on HIV outcomes, antiretroviral therapy is not sufficient to halt the complications of HCV¹⁹.

Conclusion

Patients with HIV that co-infected with HBV or HCV are at high risk to serious complications that threaten their life. They are more likely to progress liver diseases faster than patients who have no viral hepatitis co-infection. Co-infection with HBV and HCV among HIV patients

increase the risk of cirrhosis and liver deficiency in comparison with a patient infected with only one of these viruses. co-infected with HBV and HCV may serve as catalyst for catalyst for apoptosis, thereby accelerating the depletion of CD4 cells before the onset of therapy. Viral hepatitis infection also complicate the treatment of HIV patients because it may cause liver damage.

Further research and Recommendations

HIV co-infection with HBV or HCV is not well studied particularly for those who under treatment. Clinical studies are needed to determine exactly the level of HBV DNA that needed to start anti-HBV treatment in HIV-HBV co-infected patients.

The study recommended that safe blood transfusion services should be provided in order to minimize the risk of getting infected with any of these viruses. For HIV patients, monitoring the co-infection with HBV and HCV should be maintain by regular screening.

Limitations

The sample size was small due to financial constraints and this may be affected the final results. A limitation of the current study was that history of HIV patient treatment status was not included in the study. Another limitation was that the lack of prior research studies which is essential in literature review and discussion parts .

Abbreviations

DNA	Deoxyribonucleic acid
ELISA	Enzyme Immuno sorbent Assay
HBeAg	Hepatitis B virus e Antigen
HBsAg	Hepatitis B virus Surface Antigen
HBV	Hepatitis B virus
HIV	Human Immuno-deficiency virus
HCV	Hepatitis C virus
SPSS	Statistical Package for Social Sciences).

Competing interests

Authors declare that no conflict of interest found.

Authors' contribution

Habab collected the data and conducted laboratory work. Adel drafted, prepared, and submitted the manuscript.

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