

Significant Increase of HBV Infection in HIV Infected Patients With Disease Progression in China Based on Two MSM HIV Infected Cohorts

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Short report

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**Significant increase of HBV infection in HIV infected patients with disease progression
in China based on two MSM HIV infected cohorts**

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Abstract

The data about the condition of HBV co infection with the disease progress of HIV is limited. To investigate whether the incidence of HBV co-infection is significantly higher in HIV patients with disease progression in China, we compared rates of HBV co-infection in HIV patients based on an acute and a chronic HIV infected cohort. Significance was assessed with Chi-square. HBV infection is diagnosed by the presence of hepatitis B surface antigen.

The HBsAg positive rate increased from 6.18% in acute HIV infection to 11.44% in chronic HIV infection. Thirty-four acute HIV patients had been tested for HBV in their chronic phase, four of them had HBV -specific antigens and/or specific antibodies changes. The number of Hepatitis B virus-specific antibodies decreased from acute phase to chronic phase in four patients and two patients' HBsAg changed from negative to positive. There is an increased prevalence of HBV infection in HIV patients with the disease progression in China.

Key words: HIV; HBV; Disease progression; Co-infection rate.

1. Introduction

The issue of viral co-infection among human immunodeficiency virus (HIV) /acquired immunodeficiency syndrome (AIDS) patients represents a growing public health concern worldwide. HIV and hepatitis B virus (HBV) have same routes of transmission (1), and HIV/HBV coinfection is associated with liver-related disease and morbidity and mortality rates (2). HIV-infected persons are less likely to clear acute HBV infection spontaneously when their immune system is significantly compromised (3).

China has the highest prevalence of chronic HBV with carrier rates of more than 7% ⁽⁴⁾. HBV infection in China has remained a public health issue and a major cause of mortality. So far, there are no defined studies to show that in what way HIV infection will facilitate HBV infection in China. It is imperative to obtain evidence about whether and the extent the progression of HIV infection can facilitate the HBV co-infection in China.

Since 2016, China has implemented a strategy of treatment immediately after HIV infection is detected. In this study, two cohorts of HIV infection were established in Youan hospital before 2016 ⁽⁵⁾, one was the acute phase of HIV infection, the other was the chronic phase of HIV infection. Without treatment, we observed the situation of HBV co infection with the progress of HIV disease. The purpose of this study was to investigate if HBV co-infection is significantly increased in HIV patients with disease progression in China.

2. Materials and Methods

2.1. Study population

The data were collected from clinic-based MSM (men who have sex with men) cohorts in Beijing Youan Hospital from June 2006 to August 2015. Both acute and chronic HIV infection cohorts were incorporated in this study. The characteristic of patients are shown in Table 1. This study was approved by the Ethical Committee at Beijing Youan Hospital (YAH200605010) and written informed consent was obtained from all participants.

For acute HIV cohort, there were 372 consenting patients who were recently infected (from Fiebig stage I to Fiebig stage V (4)) with HIV. All patients were from a cohort of HIV-negative high-risk MSM who were screened every 2 months for HIV infection in Beijing You-an Hospita (5). CD4, viral load, HBV-specific antigens and specific antibodies were detected after identification of HIV infection.

For chronic cohort, there were 306 HIV-infected individuals with diagnosis of HIV infection for more than 6 months for their first visit. CD4, viral load, HBV-specific antigens and specific antibodies were detected for the first visit. All patients have not been on antiretroviral treatment.

2.2. Detection of HBV Infection

HBV-specific antigens and specific antibodies in patient plasma were detected in the clinical laboratory at Youan hospital using the Elecsys® HBsAg Immunoassay (Roche diagnostics GmbH, Mannheim, Germany), the immunoassay analyzer cobase 411 (Roche diagnostics GmbH, Mannheim, Germany), or specific ELISA test kits (PRECHEK Bio, Anaheim, USA), respectively, according to manufacturer's instructions.

HBV infection is diagnosed by the presence of hepatitis B surface antigen (HBsAg), which is

indicative of acute or chronic infection (6).

2.3. Liver Function Tests

Alanine aminotransferase (ALT) and aspartate aminotransferase (AST) levels were determined in patient plasma by UV-LDH method test kit (Fortress Diagnostics Limited, United Kingdom).

2.4. Markers of HIV disease progression

Absolute blood CD4+ T-cell counts were measured using a FACSCalibur flow cytometer. Viral load was measured by the Amplicor HIV monitor ultrasensitive method with a detection limit of 40 copies/mL of plasma.

2.5 Statistical analyses

All statistical analyses were performed using SPSS 23.0 (Chicago, IL, USA). Two-sided $p < 0.05$ was accepted as statistically significant. The Chi-square test for categorical variables were used for comparison between two groups.

3. Results

The data were collected from outpatient clinic-based MSM (men who have sex with men) cohorts managed in Beijing Youan Hospital from June 2006 to August 2012.

In the acute cohort, 23 out of 372 cases were HBsAg positive; HBsAg positive rate was 6.18%. In chronic cohort, were a total of 306 chronic HIV infected patients, 35 out of 306 patients were HBsAg positive, HBsAg positive rate was 11.44%. The rate of HBV co-infection in chronic HIV infection was significantly higher than that in acute stage ($p = 0.015$, Figure 1). The CD4 count decreased from average 445 in acute infection to 358 in chronic

infection ($p < 0.001$) (Table 1).

In total, 34 acute patients had detected HBV in the chronic phase, 4 of them had HBV-specific antigens and (or) specific antibodies changes (Table 2). CD4 counts decreased and viral load increased in these four cases from acute phase to chronic phase. The number of Hepatitis B virus-specific antibodies decreased from acute phase to chronic phase in four patients and two patients' HBsAg changed from negative to positive.

4. Discussion

We found HBV co-infection significantly increased from acute HIV infection to chronic HIV infection in China. Two cases in acute cohort have been detected HBV-specific antigens in chronic phase compared with HBV specific antibodies in acute HIV infection. All evidence suggested that the rate of HBV infection increased with the progression of HIV infection.

Data presented in this report obtained from one of major clinic in Beijing.

Most HBV infection is acquired during the perinatal period or early in childhood in high prevalence areas. In this study, we observed obvious increase in the rate of HBV infection with the disease progression and immune system damage in adult HIV patients. cccDNA has been shown to persist even in the liver of patients with successful cellular and humoral control of the infection (7). It suggests the possibility that HBV virus comes from cccDNA in the liver tissue. Other studies have shown that reactivation of HBV after undergoing anticancer therapy or rituximab-containing treatment (8, 9).

Given that HIV/HBV co-infection results in higher morbidity and mortality of liver disease compared to HBV mono-infection, greater attention should be paid to control HBV infections

in HIV patients in China. As the immune restoration by HAART treatment can improve HBV modulation, preventive regimen should be taken into consideration for immune compromised patients with HIV infection in China.

Abbreviations

HIV: human immunodeficiency virus; AIDS: acquired immunodeficiency syndrome; HBV: hepatitis B virus; MSM: men who have sex with men; HBsAg: hepatitis B surface antigen; ALT: Alanine aminotransferase; AST: Aspartate aminotransferase.

Declarations

Ethics approval and consent to participate

This study was approved by the Ethical Committee at Beijing Youan Hospital (YAH200605010) and written informed consent was obtained from all participants.

Consent for publication

Not applicable.

Availability of data and materials

All relevant data are within the manuscript. The datasets collected and/or analyzed during the current study are available on request from the author.

Conflict of interest statement

The authors declare no conflict of interest.

Authors' contributions

ZZ has made substantial contributions to the conception; YZ design of the work; QL has done the laboratory; TJ interpretation of data; YJ have drafted the work or substantively revised it.

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Figures

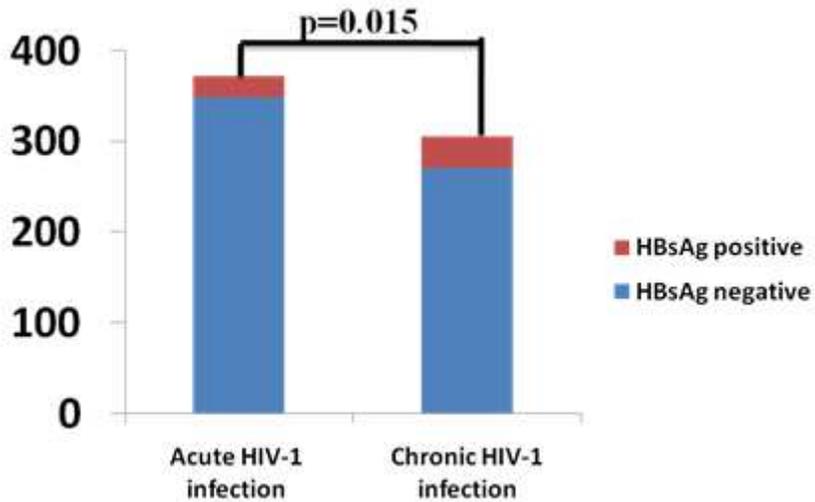


Figure 1

In chronic cohort, were a total of 306 chronic HIV infected patients, 35 out of 306 patients were HBsAg positive, HBsAg positive rate was 11.44%. The rate of HBV co infection in chronic HIV infection was significantly higher than that in acute stage ($p=0.015$, Figure 1).

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