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Triple Co- Infection - Rare in Northeren India

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ABSTRACT

INTRODUCTION: Dual or triple infections with human immunodeficiency virus (HIV), hepatitis B and C viruses (HBV and HCV) is a major public health problem, as most drugs have considerably enhanced the control of monoinfections but now triple co-infection can pose a bigger challenge in future.

AIM: The aim of present study was to determine the triple Co-infection of hepatitis B, C and HIV virus at Tertiary care centre of Northern India.

MATERIAL AND METHODS: The present study was conducted to determine the triple co-infection in patients reporting at Medical Gastroenterology department of Post Graduate Institute of Medical Sciences in North India. A total of 12,311 serum samples of Hepatitis B (5000 Patients), Hepatitis C (4000 Patients) and HIV (3311 Patients) confirmed patients were tested for co-infection with other viruses.

OBSERVATIONS: Out of total pool of 12,311 patients, triple co-infection was seen only in 5 patients (0.04%) who were all males, majority in younger age group, sexually active and were intravenous drug abusers.

CONCLUSION: Triple co-infection is very rare in this part of country in view of less number of intravenous drug abusers in this geographical area.

KEYWORDS: Hepatitis B, Hepatitis C, HIV, Triple co-infection, Intravenous drug abuse

INTRODUCTION

Dual or triple infections with human immunodeficiency virus (HIV), hepatitis B and C viruses (HBV and HCV) is a major public health problem, as most drugs have considerably enhanced the control of mono infections [1]. Now, triple infections of HIV/HBV/HCV is also becoming a common unrestricted health issues [2] which affects the clinical course of the disease [3,4] and share common modes of transmission [5-7], thus People living with HIV (PLHIV) are at risk of dual or triple infections with HBV and HCV infections [8]. Long-lasting effects of triple Co- infections may potentially be as a result of virological interactions and underlying immunological

mechanism [4,9,10]. Dual infections with HIV/HBV or HIV/HCV and triple infections with HIV/HBV/HCV is common problem among intravenous drug users (IDUs) [11-13]. Amongst the transmissible blood-borne viruses through the Parenteral route (blood transfusion and sexual intercourse), HIV, HBV and HCV are significant [13-15]. However, epidemiology of HIV-HBV-HCV triple infections varies as a result of differences in background of hepatitis infections and routes of HIV transmission [16] and can lead to major illness and death [17]. The entry of human body by any of HIV, HBV or HCV is initially known to innate immunity, thereafter to the cellular and humoral immune reaction [18-22] with aim of shedding of HIV, HBV and HCV from the body of immunocompetent ill persons. This leads to immune-intermediated hepatocytes (liver) impairment [23]. The Highly active antiretroviral therapy (HAART) has turned HIV and AIDS from a consistently deadly ailment into a controllable long-lasting infection [24,25]. The gains made by HAART might be conceded by dual or triple infections with hepatitis viruses as they are recognized to have antagonistic consequences on the scenario of HIV and hepatitis infections [26]. Hence, attention has to be paid on dual or triple infections of hepatitis viruses and HIV.

Table 1- Showing Sex Distribution in Triple Co-infection patients

Total Number of Triple Co-infection Patients	Male	Female	Transgender
5	5 (100%)	0 (0%)	0 (0%)

Table 2- Showing Risk Factors Distribution in Triple Co-infection patients

Triple Co-infection Patients	Married	Unmarried	Rural	Urban	History of I/V Drugs, Alcohol, Smoking	No History of I/V Drugs, Alcohol, Smoking	History of Previous Surgery and Tattooing
5	3(60%)	2 (40%)	3(60%)	2(40%)	4 (80%)	1 (20%)	2 (40%)

Table 3- Showing Age Distribution in Triple Co-infection patients

Age Group of Triple Co-infection Patients	**Total Number**
10-20 yrs	0 (0%)
20-30 yrs	3 (60%)
30-40 yrs	1 (20%)
40-50 yrs	1 (20%)

Table 4- Showing Treatment Parameters in Triple Co-infection patients

Triple Co-infection Patients	ON HAART	ON HCV TREATMENT	ON HBV TREATMENT	SVR ON HCV TREATMENT
5	5 (100%)	5 (100%)	0 (0 %)	5 (100%)

AIM

To determine triple Co-infection of hepatitis B, C and HIV virus at Tertiary care centre of Northern India.

MATERIAL & METHODS

This study was conducted by Department of Medical Gastroenterology at Post Graduate Institute of Medical Sciences, Rohtak, India over a period of ten years i.e. from 1st April, 2011 to 31st March, 2021 for determining the Triple co-infection in patients. A total of 12,311 of confirmed cases of Hepatitis B (5000 Patients), Hepatitis C (4000 Patients) and HIV (3311 Patients) were enrolled in the study after proper consent and then tested for co-infection with other viruses. About 5 ml of whole blood was collected aseptically by venipuncture. The collected blood was allowed to clot; serum was separated by centrifugation at room temperature and then were tested for HCV, HBV and HIV by Enzyme linked immunosorbent assay. In all the enrolled patients, detailed history, physical and clinical examination was done. Every patient underwent complete biochemical examination which included complete haemogram, liver & renal function tests, viral screen, viral load, ultra sonogram abdomen, Fibroscan and upper Gastrointestinal endoscopy and Triple phase computed tomography scan wherever indicated.

OBSERVATIONS

A total of 5000 confirmed patients of HBV, 4000 patients of HCV and 3311 of HIV infected patients were screened for other two virus co-infections. Out of this total pool of 12,311 patients, only 5 patients (0.04%) were found to be having triple Co-infection. All these 5 patients were males (100%). On analyzing rural/urban

distribution, 3 patients (60%) belonged to rural background and 2 patients (40 %) to urban areas. On marital analysis, 3 patients (60%) were married and 2 patients (40 %) were unmarried. Out of the total five patients, four (80%) gave history of intravenous drug abuse, alcohol intake and were smoker. Out of these 5 patients, 2 (40%) gave history of previous surgery and tattooing. The most common age group having triple co-infection was 20-30 yrs of age, as out of total 5 patients, 3 patients (60%) belonged to this age group. The remaining two patients were distributed equally i.e. one patient each in 30-40 yrs and 40-50 yrs of age group. One thing common noted in all the five patients was that all five were non-cirrhotic and were on HARRT with HCV dominance over HBV which was in inactive stage i.e. with low viral load. All these five patients have completed their HCV treatment and achieved SVR successfully without any flare of HBV.

DISCUSSION

Although the HIV dual or triple infections with HBV and/or HCV has been documented globally in persons prone to blood-borne diseases, restricted data are obtainable on the degree of dual or triple infection and consequence of these viruses on the immune system [8]. The present study highlighted the presence of HIV, HBV and HCV Triple Co-infection in patients who came for treatment for either of these infections. In our study, majority of patient's age was 20-30 yrs and they were sexually active. This finding was in concordance to that reported previously [27,28]. Moreover, the isolated HBV and HCV Co-infections are also most commonly seen in younger age group only and this fact has been highlighted in the study conducted by Malhotra etal [29-31]. There was male predominance in our study group which is in agreement with study conducted with Gupta etal in which HCV Co-infection was higher in HIV-positive male patients in comparison to female group, perhaps attributable to higher rate of sexual promiscuity [32]. The reason for male predominance can also be explained on basis of overall more number of males in total pool of HBV, HCV and HIV patients who were enrolled in the study. The predominance of younger age group who were married and sexually active with rural background is due to overall more representation in total pool of our study group. The one characteristic finding which was revealed was that majority of patients were intravenous drug abusers, were alcoholic as well as smokers. The intravenous drug abuse is well established fact for isolated, dual or triple co-infection with HBV, HCV and HIV. The history of past surgery and tattooing was also seen in forty percent of patients which have also been documented as a risk factor for causing isolated or co-infection with these viruses. On analyzing status of viral predominance, it was seen that all five patients were on HAART and HCV was predominant on HBV which was in inactive carrier stage. All five patients were non-cirrhotic and were treated with oral directly acting antiviral treatment i.e. sofosbuvir 400 mg & Daclastavir 60 mg for twelve weeks. All of them had hundred percent compliance and sustained virological response after 12 weeks of completion of treatment. One important aspect which is reflected in our large study group of 12,3311 patients, is low percentage of patients having triple Co-infection, despite being collected from an area which is hot spot both for hepatitis B and hepatitis C. Normally, it is seen that chances of HBV/HCV Co-infection in HIV patients are less if there is sexual route of transmission then in comparison to intravenous drug abusers where there are higher chances of Co-infection. In our study group, the way unexpectedly lower percentage of triple Co-infection was detected, then it seems that sexual route of transmission must have been there in our study group. The other point which should be thought, is that whether there is any possibility that HBV, HCV and HIV inhibit each other in the human body as already proved in case of HBV and HCV infection where usually one virus is predominant, HCV being in most of cases. The number of patients with dual or triple positivity is lesser but the combination of HIV and HBV and/or HCV is a precarious and might lead to increased morbidity and mortality of the infected persons [33-35]. Moreover, dual or triple infections may aggravate hepatotoxicity of HAART and possibility of inception of an AIDS-defining illness, likened with infection with HIV only [36]. The previous studies have already proposed that dual positivity of HIV/HBV or HIV/HCV and triple positivity HIV/HBV/HCV leads to dampened immune reaction to HAART likened with those with only HIV [37-40]. Some others studies have reported some degrees of immune reinstatement in individuals with HIV/HBV or HIV/HCV dual-infection [40-45]. Management of either hepatitis virus is multipronged because of pharmacokinetic interactions with constituents of HAART regimens, raising cause for concern.

CONCLUSION

The HBV, HCV and HIV triple co-infection was found only in 0.04% of patients which is surprisingly less, as Haryana is hotspot both for hepatitis B & C. The PLHIV have a risk of acquiring HBV and HCV co-infections, thus should be mandatory screened for the same. Our study has provided the much needed trigger for future large scale studies in this field before reaching any definitive conclusion.

LIMITATION OF STUDY

The PLHIV are at maximum risk of developing dual or triple co-infection and in this study group, the HIV infected patients contribution was less than in comparison of HBV and HCV infected patients. Hence, there is need of studying triple co-infection in larger study group exclusively of PLHIV.

CONFLICTS OF INTEREST

The Editors declare that there were no conflict of interest.

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