

# HIV-HCV Co-Infection among Multitransfused Thalassemic Individuals-A Review

**Keywords:** HIV; Ribavirin; DNA virus; HBV; Co-infection; HCV; Thalassemic patients

**Abbreviations:** Hb: Hemoglobin; HIV: Immunodeficiency Virus; HBV: Hepatitis B Virus; HCV: Hepatitis C virus; WHO: World Health Organization; RBV: Ribavirin; ART: Antiretroviral Therapy

## Introduction

Patients affected from thalassemia major have a high prevalence of transfusion transmitted infection, mainly as a consequence of viral infections acquired through blood transfusion. Thalassemia is an inherited hematological disorder where hemoglobin production is halted or stopped due to abnormal synthesis of respective alpha ( $\alpha$ ) or beta ( $\beta$ ) chains of hemoglobin. Individuals with this disorder undergo lifelong blood transfusion to keep standard hemoglobin (Hb) levels for their health management. The severe anemia related to this condition can be life-threatening. Other signs and symptoms associated with this disease include paleness, a poor appetite, failure to thrive, jaundice, enlarged organs, frequent infections [1].

Human immunodeficiency virus (HIV) and Hepatitis B and C virus (HBV and HCV) are three most common chronic viral pathogens among multitransfused thalassemic major individuals. HCV and HIV consist of a positive single stranded RNA genome, whereas HBV is a partially double stranded DNA virus. These viruses have similar routes of transmission, namely through blood and blood products, sharing of needles for injecting drugs. Co-infections of HIV in HCV positive patients are associated with reduced survival and an increased risk of progression to severe liver diseases with higher susceptibility towards hepato-toxicity due to antiretroviral therapy [2]. Co-infection is therefore common in people with high exposure to blood and blood products. The primary concern with HIV/HCV co-infection is that it can lead to more severe liver diseases and an increased risk for progression to liver cancer especially to immunocompromised thalassemic patients [3]. There are reports related to HCV and HIV co-infection from different parts of India, but no such detailed study on HCV and HIV co-infection among thalassemic patients [4,5].

## Epidemiology of HIV/HCV co-infection

HBV infection could be controlled with active vaccination program. But HIV and HCV infections are till global public health problems; especially in multitransfuse patients in developing countries where NAT based blood screening is not mandatory. Co-infection rates of HCV in HIV patients varies worldwide and largely depends upon the geographic location, risk groups, the type of exposure involved and the socioeconomic condition of that particular region. At present, an estimated 40 million people are infected with HIV and 180 million people are infected with HCV worldwide [4]. A recent study conducted by World Health Organization (WHO) estimated that 2.3 million people living

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with HIV are co-infected with hepatitis C virus (HCV), worldwide [6]. In India, HCV seroprevalence in thalassemic patients varies from 11% to 30% [7]. Previous studies showed about 9% of thalassemia patients to be anti-HIV positive by ELISA [7]. Moreover literature regarding the prevalence of HIV co-infection in HCV seroreactive multitransfuse thalassemia patients in India is sparse. According to our study, around 3.34% of HCV seroreactive thalassemic individuals were affected by HIV in eastern part of India (unpublished data).

## Diagnosis of HIV/HCV-co-infected thalassemic patients

The presence of HCV and HIV can be confirmed serologically through the detection of antibodies to the virus by ELISA. Loss of HCV antibodies, which can be observed in very advanced immunodeficiency in HIV/HCV co-infection, does not necessarily indicate viral clearance. Therefore, a single negative HCV-antibody does not exclude HCV infection in HIV-positive patients. Nucleic acid Test (NAT assay) is the right choice to detect both HIV and HCV RNA in HCV co-infected HIV positive thalassemia patient [8,9].

## Therapy of hepatitis C in HIV co-infected patients

The prevalence of HCV in the HIV co-infected thalassemia population reflects the route of transmission. HCV genotype 3 is the major genotype (~86%) followed by genotype 1 among thalassemic individuals in this region. Standard therapy applied to HCV patients consists of a combination of pegylated interferon (Peg-IFN) alpha 2a or b and ribavirin (RBV) for 24-48 weeks depending upon HCV genotype, viremia as well as host factors such as IL28B genotype, age, sex, race and liver fibrosis status [10]. But the response rates in HIV/HCV co-infected thalassemic individuals were very poor (unpublished data). High serum ferritin level, clinical parameters and host immune system of thalassemic

patients are important factors for clearing the virus. Overall, higher concentrations of HCV RNA are found in HIV seropositive thalassemic individuals than in HIV seronegative patients with HCV. Sustained virological response rates were between 15% and 42% at 24 weeks after the end of combination treatment (unpublished data). Moreover, rates of withdrawal owing to adverse events (hemolysis and iron toxicities) were high in the HIV/HCV co-infected thalassemic population, which highlights the limitations of this treatment [11]. Interferon therapy could not be applied to all HCV infected thalassemic individuals due to their low age group. Recently, sofosbuvir with ledipasvir for HCV genotype 1 or sofosbuvir with daclatasvir for HCV genotype 3 is used to treat the chronic HCV infected thalassemia patients, while antiretroviral therapy (ART) is generally used to control the HIV infection.

### Conclusion and Future Prospects

HIV accelerates the course of HCV-associated liver disease, so there is an urgent need for treatment strategies in this specific group of patients. The introduction of all oral direct acting antiviral against HCV therapy with antiretroviral therapy has greatly improved treatment options for HIV/HCV co-infected patients, leading to increase sustained virological response rate. Use of HAART therapy leads to an overall decline in liver-related mortality. Better blood screening procedure, development of novel, more effective treatment strategies and guidelines for the management of HIV/HCV co-infected multitransfuse thalassemic patients remains an important future goals for thalassemia affected countries, like India.

### References

1. Maria-Domenica C, Alan C, Androulla E, Antonio P, John P, et al. (2008) Guidelines for the Clinical Management of Thalassaemia, 2<sup>nd</sup> Revised edition. Thalassaemia International Federation ISBN-13: 978-9963-623-70-9.
2. Mohammadi M, Talei G, Sheikhian A, Ebrahimzade F, Pournia Y, et al. (2009) Survey of both hepatitis B virus (HBsAg) and hepatitis C virus (HCV-Ab) co-infection among HIV positive patients. *Virology* 6: 202.
3. Ganesh KA, Sridharan K, Thirunalasundari T (2007) Prevalence Pattern of Blood Borne Hepatitis Group of Viruses in Liver Disease Patients. *World Journal of Medical Sciences* 2 (1): 33-38.
4. Rockstroh JK, Spengler U (2004) HIV and hepatitis C virus co-infection. *Lancet Infect Dis* 4(7): 438-444.
5. Saha K, Firdaus R, Santra P, Pal J, Roy A, et al. (2011) Recent pattern of Co-infection amongst HIV seropositive individuals in tertiary care hospital, Kolkata. *Virology* 28: 116.
6. WHO (2016) More than 2 million people coinfecting with HIV and hepatitis C. World Health Organization.
7. Aritra B, Kahini S, Rushna F, Kallol S, Debanjali G, et al. (2016) Prevalence of Anti-HCV, HBsAg, HIV among multi-transfused thalassemic individuals and their socio-economic background in Eastern India. *Asian journal of pharmaceutical and clinical research* 9(1): 290-294.
8. Verma IC, Choudhury VP, Jain PK (1992) Prevention of thalassaemia: A necessity in India. *Indian J Pediatr* 59(6): 649-654.
9. Balgir RS (2000) The burden of hemoglobinopathies in India and the challenges ahead. *Current Science* 79(11): 1536-1547.
10. Fischer J, Böhm S, Scholz M, Müller T, Witt H, et al. (2012) Combined Effects of Different Interleukin-28B Gene Variants on the Outcome of Dual Combination Therapy in Chronic Hepatitis C Virus Type 1 Infection. *Hepatology* 55(6): 1700-1710.
11. Seyed MA, Hassan A, Seyyed MM, Maryam K, Pegah KE, et al. (2009) Safety and Efficacy of Pegylated Interferon Alfa-2a for the Treatment of Hepatitis C in Patients with Major Thalassaemia. *Iran Journal of Blood Cancer* 1(4): 129-137.