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HIV Seropositivity among Thalassemia Patients Visiting ICTC at Tertiary Care Teaching Center in North India

Ritu Aggarwal[1*], Priyanka Soni[1], Deepinder Singh[1], Aparna[1], Kiran Bala[1], Vipul Kumar[2]

[1]Department of Microbiology, Pt. B. D. Sharma Postgraduate Institute of Medical Sciences, Rohtak, Haryana, India
[2]Department of Chest & TB, Pt. B. D. Sharma Postgraduate Institute of Medical Sciences, Rohtak, Haryana, India

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***Corresponding author:** Ritu Aggarwal

Abstract | **Original Research Article**

Background: Thalassemia is an inherited blood disorder which requires regular blood transfusion and chelation in developing countries. These patients are at risk of acquiring blood borne infection like HIV and hepatitis. Prevalence of HIV in thalassemia patients varies worldwide, from less than 1% to more than 20%. Therefore, screening of blood products is most effective strategy to prevent HIV infection in such scenerio. This study was undertaken to ascertain the prevalence of HIV seropositivity among thalassemic patients. ***Methods:*** Data of samples of thalassemia patients received from January 2016 to December 2018 at ICTC, Microbiology Department of PGIMS Rohtak was retrospectively analyzed. Testing of patients was conducted according to NACO guidelines. ***Results:*** Total 2742 samples were received from January 2016 to December 2018 out of which 55% were male and 45% female. Out of these samples, 6 (0.2%) were found to be seroreactive. ***Conclusion:*** Althoughlow seropositive rate was found in our study still strict donor selection, education of patients and routine screening of blood products by more stringent method are mandatory to prevent transfusion related HIV infection.

Keywords: HIV, Seropositivity, Seroprevalence, Thalassemia, Blood Transfusion, Transfusion transmitted infections, ICTC, NACO.

INTRODUCTION

Thalassemias are a group of inherited hemolytic disorders characterized by anomalies in the synthesis of one or more of the globin subunits of normal human haemoglobin. The clinically most significant form of thalassemia is beta thalassemia major with reduced or absent beta chain production resulting in variable phenotypes ranging from mild to severe anaemia. According to literature, worldwide approximately 15 million people have clinically apparent thalassemic disorders. Beta-thalassemia major is prevalent in Mediterranean countries, the Middle East, Central Asia, India, and Southern China, north coast of Africa and in South America. The highest carrier frequency is reported in Cyprus (14%), Sardinia (10.3%) and Southeast Asia [1]. The same prevalence in Indian population varies between 3.5 to 14.9% with high incidence reported from states of Punjab, Gujarat and West Bengal [2]. Treatment of thalassemia major mainly includes regular RBC transfusions, iron chelation and management of secondary complications of iron overload. The goals of transfusion therapy are correction of anaemia, suppression of erythropoiesis and inhibition of gastrointestinal iron absorption. The decision to start transfusion in patients with confirmed diagnosis of thalassemia should be based on the presence of severe anaemia (Hb< 7 g/dl) for more than two weeks, excluding other contributory causes such as infections. This helps in preventing growth impairment and organ damage, thus improving the quality of life [3, 4]. Although red cell transfusions are lifesavers for such patients, these are responsible for various complications like iron toxicity, hypersplenism, venous thrombosis, osteoporosis and risk of transfusion transmitted infections (TTIs) especially hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV) infections resulting in long term morbidity and mortality [5]. Among all the transfusion transmitted infections, the most dreaded one is transmission of HIV infection. The first reported case of transfusion associated AIDS was an infant from San Francisco, who had received multiple transfusions for anaemia at birth and died at age of 20 months [6]. In India it is made mandatory to screen donated blood for HIV 1 and 2 (since 1991), HCV (since 2000), HBV, syphilis, malaria infections. HIV prevalence among blood donors is different in various part of country. The risk of transfusion related transmission of HIV may be alarming

due to high seroprevalence of anti HIV-1 (0.5%) in blood donors. TTIs can still occur from marker negative blood donors and this residual risk of TTIs from screened blood depends on thesensitivity of the screening tests used, window period donations and other reasons such as mutant strains. Children with thalassemia are susceptible to HIV because they receive multiple blood transfusions [7].

Among these TTIs, hepatitis B virus (HBV) infection can be effectively prevented by vaccine, yet no such vaccine is available for human immunodeficiency virus (HIV). Therefore, screening of blood products is most effective strategy to prevent HIV infection in such scenerio. There is lack of sufficient reported data on transfusion transmitted infections (TTI) in beta thalassemia major from India. We analyzed the prevalence of HIV among multi-transfused thalassemia children in a tertiary care centre in the present study [8, 9].

MATERIALS AND METHODS

Data of samples of thalassemia patients received from January 2016 to December 2018 at ICTC, Microbiology Department of PGIMS Rohtak was retrospectively analyzed. Information regarding age, sex and the status of HIV were recorded in standard performa. Testing of patients was conducted according to NACO guidelines. All the samples were first tested for HIV antibodies with test kit of highest sensitivity. Sample reactive with first test were further confirmed with two other HIV tests. Tests with high specificity were used as second and third tests. All the three kits used were based either on different principle or different antigen. The HIV test kits utilized in the laboratory for the testing of these samples were provided by the NACO through Haryana State AIDS Control Society (HSACS).

RESULTS

Total 2742 samples were received from January 2016 to December 2018at ICTC, Microbiology Department of PGIMS Rohtak. In the study group 55% were male and 45% female. Most common age group among received sample was 1 to 5 years (Table-1). Out of these samples, six (0.2%) were found to be seroreactive for HIV-1 (Figure-1). Out of these six seroreactive patients four were females and two were males. Age and sex distribution of six seroreactive patients is depicted in Table-2.

Table-1: Age wise distribution of thalassemia patients (Year 2016-2018)

Year / AGE (yrs)	2016	2017	2018	Total
<1	91	93	115	305
1-5	358	432	454	1244
5-10	252	283	303	838
10-15	29	34	39	103
15-20	49	61	68	178
20-25	14	16	21	51
>25	7	9	8	24
Total	**800**	**934**	**1008**	**2742**

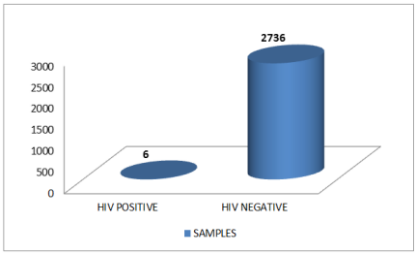

Fig-1: HIV seropositivity in thalassemia patients

Table-2: Age and sex distribution of six seroreactive patients

SEX / AGE(yrs)	MALE	FEMALE
<1	**0**	**0**
1-5	**0**	**0**
5-10	**1**	**0**
10-15	**0**	**2**
15-20	**0**	**1**
20-25	**0**	**0**
>25	**1**	**1**

DISCUSSION

Transfusion associated infections continue to be a big threat to the safety of blood supply especially in developing and underdeveloped countries. Patients of beta thalassemia major require multiple repeated blood transfusions exposing them to risk of TTIs. The probability of acquiring TTIs is related to the probability of being exposed to the infected units of blood, which depends on the prevalence of carriers among the blood donors in the population and the number of units transfused. Thus, the infection rate of TTIs increases with age in subsequent years. In the present study, data of samples of thalassemia patients received from January 2016 to December 2018 at ICTC, Microbiology Department of PGIMS Rohtak was retrospectively analyzed. In the study group 55% were male and 45% female with a ratio of 1.22:1 which is comparable with the study conductedby Mirmomen *et al.*, [10] where male to female ratio was 1.29:1. Most common age group among received sample was 0-5 years. Similarly, the study conducted by Bhavsar *et al.*, [11] reported major percentage of cases in agegroup of 0-5 years respectively. Our study reveals a low sero-prevalence rate of 0.2% which is comparable to Sidhu M *et al.*, [12], having HIV prevalence of 0.72%. In a previous study conducted at our center seroprevalence of 0.52% has been reported [13]. Slightly higher seroprevalence of 1.23% has been reported by Patel *et al.*, [14]. This

variation may be due to HIV seroprevalence and risk factor prevailing in the particular geographical area. This reduction in the seroprevalence of HIV may be attributed to mandatory screening of all blood bags, proper selection of donors, screening all blood donors by fourth generation ELISA test and increased awareness of people against HIV.

Despite of following standard preventive measures, finding detection of six HIV reactive cases is a worrisome issue. This rate can further be reduced by reducing window periodby using HIV viral RNA detection by RT-PCR test in window period. However, there is possibility of acquisition of infection in thalassemic patients during blood testing, any minor surgical procedures or blood transfusion at some remote or unauthorised centres, where mandatory screening and asepsis guidelines are not followed. Moreover, one male (45 years) and one female (27 years) seroreactive patients in the present study, are in sexually active age group, so possibility of sexual transmission cannot be ruled out. Hence, it will be inappropriate to state that HIV seropositivity in multi-transfused thalassemic patients iscertainly due to blood transfusion. As this is a retrospective analysis, the probable mode of transmission could not be ascertained and thus making it an obvious lacunae of the study.

CONCLUSION

Although low seropositive rate has been found in present study, stillstrict donor selection, education of patients and routine screening of blood products by more stringent methods ismandatory to prevent transfusion related HIV infection. All new patients coming to thalassemia clinics should be screened for HIV infection to get base line information and at frequent intervals thereafter to detect HIV seroconversion at an early stage.

Conflict of Interest

No financial interest or any conflict of interest.

Ethical Approval

It is not applicable.

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