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THE FREQUENCY OF BLOOD-BORN VIRAL INFECTIONS IN A POPULATION OF MULTITRANSFUSED BRAZILIAN PATIENTS

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SUMMARY

The frequency of viral markers for hepatitis B (HBV) and C (HCV), human immunodeficiency virus-1 (HIV-1) and human T-lymphotropic virus-1 (HTLV-1) was evaluated in 32 Brazilian β-thalassemia multitransfused patients. Additionaly the serum concentrations of ferritin and alanine aspartate transaminase (ALAT) were determined. The results show a high prevalence of markers of infection by HBV (25.0%) and HCV (46.8%) and a low prevalence of markers for HIV-1 and HTLV-1. No correlations were demonstrated between the presence of the hepatitis markers and the number of units transfused or the serum concentrations of ferritin and ALAT.

KEY WORDS: Blood-Born Viral Infections; β-thalassemia; Hepatitis; HIV-1; HTLV-1.

INTRODUCTION

Multitransfused thalassemia patients are a population at high risk for blood-born viral infections, especially for the hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV-1) and human T-lymphotropic virus (HTLV-1). The reported frequency of infection varies significantly for different countries, due to different prevalences and sensitivity of the diagnostic methods[7,8].

Althought data for Europe, North America and Asia are known, data for Latin America are scarse or nonexistent. In addition, only limited studies have been carried out to evaluate the prevalence of HTLV-1 in multitransfused patients worldwide.

We report the results of a serologic survey for HBV, HCV, HIV-1 and HTLV-1 carried out in a population of Brazilian β-thalassemia multitransfused patients, which indicates a high prevalence of HBV infections. Additionaly, we measured the serum concentrations of ferritin and ALAT (alanine aspartate transaminase) as indicators of liver iron content and liver damage, respectively[1,12].

PATIENTS AND METHODS

Thirty-two transfusion dependent thalassemia patiens were studied (17 males and 15 females) and their ages ranged from 1 to 49 years (median: 12 years). The patients were under regular follow-up at Regional Blood Center and Department of Hematology of University Hospital of School of Medicine of Ribeirão Preto, Brazil.

The markers for hepatitis B virus (HBsAg, HBeAg, anti-HBc, anti-HBs, anti-HBe), hepatitis C virus (anti-HCV 2nd. generation), HIV-1 (anti-HIV-1 recombinant) and HTLV-1 (anti-HTLV-1) were determined by ELISA methods (Abbott, North Chicago, Illinois, USA). Serum alanine aspartate transaminase (ALAT) was measured by autoanalysis (upper limit = 30 U/l) and serum ferritin by ELISA (Abbott) (normal range: male 29-278 ng/ml; female 5-96 ng/ml). None of the patients studied had received hepatitis B vaccine.

Only the samples repeatedly reagent (RR) on a second or subsequent test were reported as positive. The samples RR for anti-HCV were confirmed by RIBA confirmatory assay (Ortho Diagnostics) and the samples RR for HIV-1 were confirmed by Western Blot (Dupont).

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TABLE 1

Ages, number of units transfused, serum concentrations of ferritin and ALAT for 32 Brazilian β-thalassemia multitransfused patients classified in accordance with the presence of hepatitis markers.

HEPATITIS MARKERS	N. (%)	age (years) median (range)	unit. transf. mean (range)	ALAT (U/l) mean (range)	ferritin (ng/ml) mean (range)
Group 1: HCV positive and HBV negative	12 (37.5%)	12.5 (3-49)	192.1 (12-568)	52.3 (11-49)	4,997 (1,808-15,700)
Group 2: HCV positive and HBV positive*	3 (9.4%)	20 (20-27)	336 (177-583)	36.6 (36-38)	21,906 (1,004-57,779)
Group 3: HCV negative and HBV positive*	5 (15.5%)	11 (3-19)	263.3 (49-495)	38.7 (14-70)	3,949 (2,509-7,306)
Group 4: HCV negative and HBV negative	12 (37.5%)	8.5 (1-18)	135.2 (16-373)	36.7 (9-80)	3,390 (626-9,869)

HCV - Hepatitis C Virus
HBV - Hepatitis B Virus
* - one or more marker

RESULTS

The results of tests for hepatitis B, C, serum ferritin and ALAT are shown in table 1. Fifteen (46.8%) of 32 patients were anti-HCV positive, and 3 of them were concomitantly positive for hepatitis B markers (one or more). Five (15.5%) patients were positive only for hepatitis B markers and twelve (37.5%) were negative for all the hepatitis markers. None of the patients was positive for HBs-Ag or HBe-Ag. The ages of the patients positive for hepatitis (groups 1, 2 and 3 - table 1; mean = 15.2; range = 3-49) were statistically higher than the ages of negative patients (group 4 - table 1; median = 8.5; range = 1-18) (Mann-Witney test; $p<0.05$). Nevertheless, the number of units of blood transfused and the concentrations of ferritin and ALAT did not differ statistically between the two groups.

Two patients were positive for HIV-1; one was concomitantly positive for anti-HBs-Ag and the other was positive for anti-HCV.

No patient was positive for HTLV-1.

DISCUSSION

The results show a high prevalence of hepatitis B and C markers in the sera of multitransfused thalassemia patients. The frequency of HCV markers (46.8%) is substantially higher than that observed for voluntary blood donors of the Regional Blood Center (1.4%) or of other countries[3,4,6,10,11]. This figure is in accordance with the high incidence observed in similar groups of multitransfused patients from Britain (23.2%), Italy (92.9%) and Saudi Arabia (33.3%)[10,12]. Patients with HCV markers (groups 1 and 2 - table 1) were on average older than patients without hepatitis markers (group 4, table 1), but the two groups did not differ statistically in respect of numbers of units transfused, although fifteen patients (75.0%) of the HCV group had received more than 100 units of packed red blood cells in contrast to only five (42.0%) in the negative group. In respect to the serum concentrations of ferritin and ALAT the two groups did not differ although the means of the HCV group were higher than the means of the negative group (table 1).

The prevalence of HBV markers (25.0%) in these multitransfused patients reflects the incidence in general population (12.0% for all markers) and is lower than the observed in other countries (Greece - 73.3%; Saudi Arabia 79.9 - 97.9%) where the prevalence of HBV markers in the general population is higher[5,8].

The two cases positive for HIV-1 were infected prior to the introduction of the screening test in the blood bank. After the introduction of the test in 1987 none of the patients

seroconverted. This situation is in contrast with the high incidence of HIV-1 infection observed in the hemophiliacs treated in our Hospital, who have a positivity rate of 60%.

No patients were positive for markers of HTLV-1 in spite of the fact that the whole group received more than 6,250 units not screened for HTLV-1 antibodies. This is the consequence of the low incidence of HTLV-1 infection in general population (less than 0.05%).

In conclusion, our study showed a high frequency of infection by the viruses of hepatitis B and C and a low frequency of infections by the HIV-1 and HTLV-1 virus in a population of multitransfused thalassemia patients treated in Brazil.

RESUMO

Freqüência de infecções virais transmitidas por transfusões em uma população de pacientes brasileiros multitransfundidos

A freqüência de marcadores virais para hepatite B (HBV), C (HCV), vírus da imunodeficiência humana-1 (HIV-1) e vírus linfotrópico-T humano (HTLV-1) foi avaliada em 32 pacientes brasileiros multitransfundidos, portadores de β-talassemia. Adicionalmente determinou-se a concentração sérica de transaminase alanina aspártica (ALAT) e de ferritina. Os resultados mostraram alta prevalência de marcadores para HBV (25,0%) e HCV (46,8%) e baixa prevalência de marcadores para HIV-1 e HTLV-1. Não se demonstrou correlação entre a presença de marcadores para hepatite e o número de unidades transfundidas ou com as concentrações séricas de ferritina e ALAT.

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