Prevalence of Antibody to Hepatitis C Virus in Pakistani Thalassaemics by Particle Agglutination Test Utilizing C 200 and C 22-3 Viral Antigen Coated Particles

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Abstract

Exposure to hepatitis C virus (HCV) and its effect on ALT levels was studied in 35 transfusion dependent cases of thalassaemia major. Twenty-one (60%) cases were anti HCV positive and also showed raised Alanine Transaminase (ALT) levels. Of 14 anti HCV negative, Hepatitis B Surface Antigen (HBs Ag) negative seven showed raised ALT levels, indicating the chances of acute viraemia. Thus there is an urgent need to start anti HCV screening on all blood donations (JPMA 45:11995).

Introduction

Hepatitis C virus (HCV) is the major cause of non A non B (NANB) post-transfusion hepatitis (PTh). More than 50% cases of HCV post transfusion hepatitis progress to chronic liver disease and 20% of these patients eventually develop cirrhosis[1]. In most developed countries, routine screening of all blood donations for anti HCV has drastically reduced the incidence of PTh. In Pakistan, the problem of screening blood donations has remained unexplored, due to high cost of screening for HBs Ag, anti-HIV and now anti HCV. To understand the severity of the problem in our community, we studied children suffering from thalassaemia major, who had been repeatedly transfused.

Patients and Methods

Thirty-five cases of thalassaemia major who had received regular blood transfusions (average about two units in one year) were studied. Each patient received blood from different sources at different times and therefore the transfused blood varied from no screening at all to screening for anti HIV and HBsAg. None of the patients received blood which was screened for anti HCV. A careful history was taken in each case regarding anorexia, fatigue, jaundice and high coloured urine. In all these children Hepatitis B Surface Antigen was done by reverse passive haemagglutination assay (Serodia HB, Fujirebio Inc, Tokyo) and anti HIV antibodies by gelatin particle agglutination test (Serodia HIV, Tokyo). Anti-HCV was done by gelatin particle agglutination test (Serodia HCV, Tokyo). In this method the gelatin particles are sensitized with recombinant C 22-3 and C 200 antigens. These sensitized particles are agglutinated by the presence of antibodies to HCV in serum specimens. Alanine transaminase (ALT) levels were done by kinetic photometric method, (Cromatest, Espana). The normal range of ALT as specified in the kit was up to 40 u/l.

Results

Demographic profile of these children is shown in Table I.

Table I. Age, Sex and Number of blood units transfused to patients with thalassaemia major.

Age (Years)	Mean	6.5
	Range	1-17
Sex (M/F)	30/5	
Units of blood transfused	Number of patients	
2-10	6	
10-20	2	
20	27	

One male child (age 4 years) gave history ofjaundice, one year back and was HBs Ag positive at that time. When repeated, the test after 1 year was positive for HBs Ag and anti HCV and he had raised ALT levels. No other patient gave a positive history of jaundice, anorexia or fatigue. The ALT levels of all patients are shown in Table II.

Table II. ALT levels in patients with negative and positive anti HCV test.

Anti HCV Age (years)	Negative (14) ALT (U/L) (Normal: Upto 40 U/L)	Anti HCV Positive (21) Age (Years)	ALT (U/L) (Normal: Upto 40 U/L)
4	30	4*	90
5	90	12	123
1	24	7	110
5	94	2*	120
12	45	17	70
2.5	40	10	80
5	120	6	17
2	40	5.5	390
2	44	3	54
4	50	2	50
9.5	26	7.5	32
4	84	7	64
5	31	9	53
7	39	12	130
		9	129
		6	150
		8.5	204
		5	169
		6	90
		9	97
		7	140

*HBs Ag = Positive.

Twenty one patients were strongly positive for anti HCV antibodies. Two in addition were positive for HBs Ag and their ALT levels ranged from 17-390 u/I (mean 112±78 SD) (Table III).

Table III. Statistical analysis of ALT values in patients with negative and positive anti HCV test.

	Anti HCV Negative	Anti HCV Positive
Range	24-120 U/l	17-390 U/l
Mean	54	112
Standard Deviation	30	78
P= 0.05		

Fourteen patients were negative for HBs AG and anti HCV and their ALT levels ranged from 24-120 u/L (mean 54±30 SD) (Table III). The youngest child positive for both HBs Ag and anti HCV was 2 years of age and had an ALT level of 120 uJL. Of 21 children 18 had received more than 20 units of red cell concentrates and 3 had received 2-10 units of blood.

Discussion

Patients who receive multiple transfusions are at a higher risk of acquiring post-transfusion infections. Chronic liver disease secondary to HCV earned a high morbidity and . Unfortunately, very few centres within the country are performing tests of anti HCV on blood donations. We have selected the Serodia particle agglutination (PA assay),which utilize the same polypeptide antigens (C 200 and C 22) as that of the second generation ELISA. The reactivity of the particle agglutination assay has been shown to be similar to that of second generation ELISA[2]. Raised ALT levels in 7 cases who were HCV negative may indicate false negative anti HCV test, early infection with HCV or HBV and possibly due to a non B non C hepatitis. HCV RNA can be detected in the absence of anti HCV antibodies[3] and patients who were negative for antibodies against HCV and raised ALT may belong to this category. A 60% frequency of HCV infection in the present study is lower than the Italian study[4] (unpublished data), in which over 1000 thalassaemics, who received blood transfusions prior to anti HCV screening, were evaluated. They found 90% positivity of anti HCV by ELISA-2 while 80% were confirmed by RIBA-II. This study reflects a dire need to immediately implement anti-HCV screening of all blood donations in our population. The cost of screening of a single unit of blood for anti HCV test by ELISA technique is 4-5 limes more expensive as compared to a single test for HBs Ag or anti HIV antibody. Although, this has been a major limiting factor in our set-up, but we feel strongly that it will be highly unjustified to risk the patients receiving blood transfusions, to a chronic illness with significant morbidity and mortality. If the cost of management of the patients developing post-transfusion acute and chronic hepatitis, cirrhosis and hepatocellular caivinoma secondary to HCV is calculated, it may exceed the cost of prevention programme through blood donations. Post-transfusion HCV liver disease is a major challenge confronting transfusion services in Pakistan. Prompt measures are required to prevent immediately any future transmissions. Prospective studies are necessary to determine the prevalence of antibodies to HCV in the donor population.

References

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