

Short Communication

Chronic viral hepatitis and their relation to ABO blood groups and rhesus (Rh) factor

Alireza Emami Naeini*, Mojtaba Rostami and Sahar Emami Naeini

Department of Infectious and Tropical Diseases, Isfahan Infectious Diseases Research Center, Isfahan University of Medical Sciences, Isfahan, Iran.

Accepted 26 August, 2010

ABO blood groups have shown some association with various diseases. Although there are small studies in literature about association between ABO blood groups and chronic viral hepatitis, only few studies found relation between fibrosis severity in chronic viral hepatitis C (CVHC) and ABO blood groups. The aim of this survey is to determine the frequency of different blood groups and Rh (Rhesus) factor in chronic viral hepatitis B (CVHB) and C, to find out if such a host factor may play a role in trend of these viral infections. This is a case control study on patients with CVHB and CVHC referring to infectious diseases research center, Isfahan, Iran and healthy blood donors (HBDs) referring to Isfahan blood bank were selected as control during April 2003 and April 2007. 170 cases with chronic viral hepatitis (130 CVHB and 40 CVHC) and 680 cases of healthy blood donor enrolled in this study. Statistical analyses were performed using SPSS v. 11.0.1 using χ^2 test. Distribution of blood groups and Rh in CVHB were as the following: Group A, 42 (32.3%), B, 30 (23.1%), AB, 10 (7.7%), O, 48 (36.9%). 115 (88.46%) were Rh positive and 15 cases (11.54%) Rh negative. In CVHC 10 (25%) cases were blood group A, B 14 (35%) cases group B another 14 (35%) case were AB and 2 cases (5%) group B, out of them 37 (92.5%) were Rh positive and remaining 3 (7.5%) were Rh negative. In healthy blood donors 212 (31%) were group A, 183 group B (26.8%), 66 group AB (9.7%) and 222 (32.5%) group B. Positive Rh found in 611 individuals (89.45%) and Rh negative 72 (10.55%). Comparing relative frequency of ABO blood groups and Rh between cases of chronic viral hepatitis and control blood donors, there was no significant difference between blood groups ($p > 0.5$) or Rh ($p > 0.5$) with chronic viral hepatitis.

Key words: Chronic viral hepatitis, blood groups, rhesus (Rh) factor, liver fibrosis.

INTRODUCTION

Host genetic and environmental factors may be important in the genesis of diseases. ABO blood groups are one set of agglutinogens (antigens), which are genetically determined carbohydrate molecules carried on the surface membranes of the red blood cells. ABO blood groups have shown to have some association with various non-infectious (Umit et al., 2008) and infectious diseases (Jefferys et al., 2005; Tursten et al., 2008). In most people A and B antigens are secreted by the cells and are present in the blood circulation. It seems that non-secretors are susceptible to a variety of infections. The possible pathogenesis for this susceptibility is that as

many organisms that may bind to polysaccharide on cells and soluble blood group antigens may block this binding (Jefferys et al., 2005). The progression of fibrosis in hepatitis C virus (HCV) infection is a process in which genes interact with environmental factors. As we know a "clotting process" may be involved in fibrogenesis. ABO blood groups distribution is associated with thrombotic events; non-O blood groups increase the risk of these venous thromboses (Armelle et al., 2006). ABO blood groups have shown some association with various diseases. Although there are small studies in literature about association between ABO blood groups and chronic viral hepatitis, only few studies found relation between fibrosis severity in chronic viral hepatitis C (Armelle et al., 2006). Acute viral hepatitis in some patients may progress to a state of chronic hepatitis with

*Corresponding author. E-mail: a_emami35@yahoo.com.

Table 1. Distribution of blood groups and Rh in CVHB*, CVHC**, and HBDs***.

Blood group and Rh	CVHB no. (%)	CVHC no. (%)	Healthy blood donors no. (%)
A	42 (32.3)	10 (25)	212 (31)
B	30 (23.1)	14 (35)	183 (26.8)
AB	10 (7.7)	2 (5)	66 (9.7)
O	48 (36.9)	14 (35)	222 (32.5)
Rh+	115 (88.46)	37 (92.5)	611 (89.45)
Rh-	15 (11.54)	3 (7.5)	72 (10.55)
Total	130 (100)	40 (10)	683 (100)

*CVHB: Chronic viral hepatitis B, **CVHC: Chronic viral hepatitis C, ***Healthy Blood Donors.

aggressive changes; a significant reduction of blood group O patients has been reported and seems such patients are more resistant to the possibly dangerous sequelae of acute viral hepatitis (Erin et al., 2008). It is not clear if ABO blood groups have a role in progression of viral hepatitis to chronic form of disease. We are going to try association of various blood groups with chronic viral hepatitis in our patients in comparison with healthy blood donors.

This survey is a case control study on patients who fulfilled criteria for chronic viral hepatitis B (HBs Ag positive, HBeAg positive or HBV-DNA positive) and Chronic viral hepatitis C (Anti-HCV positive) with hepatic inflammation (serum aminotransferase > 2 times of normal limits and necrosis (by liver needle core biopsy) for a duration of at least 6 months period, as case group, who were referred to infectious diseases research center, Isfahan, Iran and healthy blood donors referring to Isfahan blood bank for blood donation during April 2003 and April 2007, as control group and had no positive marker for viral hepatitis. 170 cases with chronic viral hepatitis (130 CVHB and 40 CVHC) and 680 cases of healthy blood donors enrolled in this study. Patients not previously grouped were ABO – typed by blood filtration and investigation Co (Palayesh and Pajohesh of Blood Company) Lot No: MAbA09 antiserum. Data were analyzed by SPSS v. 11.0.1 using χ^2 test.

RESULTS

Distribution of blood groups and Rh in CVHB were as the following: Group A, 42 (32.3%), B, 30 (23.1%), AB, 10 (7.7%), O 48 (36.9%). 115 (88.46%) were Rh positive and 15 cases (11.54%) Rh negative. In CVHC 10 (25%) cases were blood group A, B 14 (35%) cases group B another 14 (35%) case were AB and 2 cases (5%) group B, out of them 37 (92.5%) were Rh positive and remaining 3 (7.5%) were Rh negative. In healthy blood donors 212 (31%) were group A, 183 group B (26.8%), 66 group AB (9.7%), and 222 (32.5%) group B. Positive Rh found in 611 individuals (89.45%) and Rh negative 72 (10.55%). Details of frequency and distribution of ABO blood group and Rh in CVHB and CVHC and HBDs as

shown in Table 1.

DISCUSSION

In this study, we compared relative frequency of ABO blood groups and Rh between cases of chronic viral hepatitis and control healthy blood donors, there was no significant difference between blood groups ($p > 0.5$) or Rh ($p > 0.5$) and chronic forms of viral hepatitis. In Armelle et al. (2006) study about fibrosis severity in chronic viral hepatitis C in association with blood groups showed that group A, B and AB, ABO were associated with more thrombotic events. They concluded that non-O blood groups may have an increasing risk of venous thrombosis (Armelle et al., 2006). In addition non – O blood groups were associated with increase fibrosis (Armelle et al., 2006), even after adjustment on gender, age, alcohol consumption and duration of infection.

Chronic alcohol consumption has been identified as an important cofactor in exacerbation of HCV – related liver disease. Patients with continuous daily consumption of more than 50 g have a greater degree of inflammation, more rapidly progressive fibrosis and a higher incidence of liver decompensation and hepatocellular carcinoma (Erin et al., 2008; Seeff, 2002; Dey and Cederbaum, 2006). ABO blood group thrombotic effect is thought to be at least in part mediated through its influence upon plasma level of factor VIII (Koster et al., 1995). Subjects with non-O blood groups have higher concentrations of factor VIII are associated with an increased risk of venous thrombosis (Gill et al., 1987; Kraajenhagen et al., 2000; Kamphuisen et al., 2001). Mathew's study revealed that group O patients were more resistant to dangerous sequelae of acute viral hepatitis (Mathew and Ha, 1979), while instead of the above two studies, we did not find such a data, it might be due to smaller sample size and different design of study. In one study about ABO blood groups distribution in serum hepatitis (Hepatitis B) a disproportionate excess of blood group O was found in an outbreak of hepatitis B among patients and staff of a Hemodialysis Unit and more severe cases were also mostly of group O (Lewkonja, 1969).

REFERENCES

- Jefferys SD, Kenneth CA (2005). Transfusion Biology and therapy. In Gerad L. Mandell, Principles and practice of Infectious Diseases 6th ed. Philadelphia: Churchill Livingstone 2005, 46: 708.
- Umit T, Tiftik EN, Sakir U, Ozrur G, Tamer IK, Handan C (2008). Relationship between ABO blood group and skin. *Dermatol Online J.*, 11-3: 1-6.
- Armelle P, Pierre-Yves Boëlle, Dominique W, Raoul P, Annie R (2006). Association between ABO blood group and fibrosis severity in chronic hepatitis C infection. *Dig. Dis. Sci.*, 51: 1633-1636.
- Erin MM, Ljiljana S, Karla JH, Susan H, Brett J, Steven AW, Michael RB (2008). Alcohol metabolism increases hepatitis C virus and attenuates the antiviral action of interferon. *J. Infect. Dis.*, 198: 1766-1775.
- Seeff LB (2002). Natural history of chronic hepatitis C. *Hepatology*, 36: 35-46.
- Dey A, Cederbaum AI (2006). Alcohol and oxidative liver injury. *Hepatology*, 43: 63-74.
- Mathew T, Chan SH (1979). Aggressive Acute viral hepatitis. *Singapore Med. J.* 20: 378-380.
- Koster T, Blann AD, Briet E, Vandenbroucke JP, Rosendaal FR (1995). Role of clotting factor VIII in effect of von Willebrand factor on occurrence of deep-vein thrombosis. *Lancet*, 345: 152-154.
- Gill JC, Endres BJ, Bauer PJ, Marks WJ, Montgomery RR (1987). The effect of ABO blood group on the diagnosis of von Willebrand disease. *Blood*, 69: 1691-1695.
- Kraaijenhagen RA, Anker PS, Koopman MM, Reitsma PH, Prins MH, Van-den EA, Buller HR (2000). High plasma concentration of factor VIIIc is a major risk factor for venous thromboembolism. *Thromb Haemost.*, 83: 5-9.
- Kamphuisen PW, Eikenboom JCJ, Bertina RM (2001). *Arterioscler Thromb Vas Biol.*, 21: 731-738.
- Lewkonia RM (1969). ABO blood distribution in serum hepatitis. *Br. Med. J.*, 3: 168-269.