

PATTERN OF THE FREQUENCY OF OCCURRENCE OF ABO AND RHESUS BLOOD GROUPS IN HUMAN IMMUNODEFICIENCY VIRUS INFECTED PATIENTS.

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Abstract

Blood group status appears to be associated with susceptibility to infections. Sixty two Human Immunodeficiency virus (HIV) Seropositive patients (32 females and 30 males) aged 1-61 years and two hundred (120 females and 80 males) aged 1-70years were recruited into the study as test and control participants. HIV screening and confirmatory tests were carried out on each of the participants. The AB.O and Rhesus blood grouping was carried out by standard tube and tile technique. The patterns of the frequency of occurrence of ABO and Rhesus blood groups in HIV infected patients and the HIV seronegative participants were the same. The frequency of occurrence of blood groups A and B was lower in HIV infected patients than the HIV seronegative participants while the frequency of occurrence of blood groups O and AB was higher in HIV seronegative control participants. This study has therefore been used to examine the pattern of the frequency of occurrence of ABO and Rhesus blood groups in HIV infected patients. It is therefore recommended that individuals irrespective of the blood groups should undergo voluntary counseling and testing to determine their Human Immunodeficiency virus status. This will enable early management if found positive to prevent progression to Acquired Immunodeficiency Syndrome. The susceptibility of AB and D blood groups to HIV infection compared to other blood groups should also be further examined as this may also contribute to the struggle in finding lasting solution to the spread of the infection.

Introduction

Blood group status appears to be associated with susceptibility to infections such as; cholera (blood group O); gonorrhoea (blood group B) and Escherichia coli infection of the urinary tract (groups B and AB). The reasons for these associations are not clear but may be related to crossreactions between isohaemagglutinins or isoantibodies and cell wall antigens of various microorganisms. Such natural antibodies may act by blocking attachment of the bacterium to its target cell (Weir, 1991).

The human immunodeficiency virus (HIV) was discovered in 1983 and in 1984 as the aetiological agent for the infectious disease, acquired immunodeficiency syndrome (AIDS) and belongs to the family of viruses called retrovirus. (Olaleye, 2003).

The viruses carry their genetic message in the form of RNA. On infection a cell, the RNA is converted to DNA, in a process known as reverse transcription effected by a viral enzyme, - reverse transcriptase. (Weir, 1991 and Salimonu et al 2003 and Caetano, 1991). The DNA copy (provirus) is integrated into host cell genome and replicated along with the host cell DNA (Salimonu et al 2003 and Cheesbrough, 2000) Human Immunodeficiency virus 1 and HIV-2 with their genetic subtypes have been identified and fully characterized (Olaleye, 2003, change et al, 1993 and Arya et al, 1987) HIV-1 is ubiquitous, HIV-2 was originally seen only in West Africa (Arya et al, 1987). As of December 2001, the prevalence of HIV-1 in Nigeria was 97.5% compared to HIV-2 (2.4%) and co- infection of both viruses (0.1%) (Salimonu et al 2003) HIV can be transmitted through infected body fluids, blood and blood products, contaminated needles and syringes, use of contaminated instruments for therapeutic procedures in some area of the world, donated organs or semen, hetero and homosexual intercourse and vertically from mother to child in uterus, during delivery or through breast milk. (Salimonu et al 2003, and Olaleye, 2003).

The ABO and Rhesus blood group systems are clinically the most important (Cheesbrough, 2000). Person's ABO blood group depends on the A, B, or O gene (located on chromosome 9) inherited from each parent (Cheesbrough, 2000).

A person who inherits a gene along with another O (AO) or A (AA) gene from the parents belongs to group A and expresses A antigen on their red cells and anti-B antibody in the plasma or serum. If another person inherits B gene along with another B (BB) or O (BO) gene from both parents that person belongs to Group B and expresses B antigen on their red cells and anti A antibody in the plasma or serum; an individual that inherits A and B genes belongs to Group AB and expresses both A and B antigens on their red cells and lacks ABO antibodies in their plasma/serum; a person who inherits O genes (OO) from both parents belongs to Group O and does not express A or B antigens on their red cells and anti- A and anti-B antibodies in their serum/plasma. (Weir, 1991 and Cheesbrough, 2000).

Rhesus blood group system is the next most important system to the ABO groups. The rhesus (Rh) blood group antigens present in the red cells of 96-98% Asian, 94-95% African, 99-100% Nepalese 99-100% and about 85% Caucasians with marked differences in figures ethnic groups, (Cheesbrough, 2000 and Weir, 1991). The most common of the rhesus antigen are C, D, E and with their corresponding allelomorphs c, d, e (Cheesbrough 2000 and Weir, 1991). The association of blood group status with the susceptibility to bacteria infection has been well documented but much has not been said about the frequency of occurrence of the blood groups and Human Immunodeficiency Virus.

This research work was therefore designed to examine the pattern of the frequency of occurrence of ABO and Rhesus blood groups in HIV infected patients

Procedure and Methodology

Subjects (Participants) / study area:-

Sixty two (62) HIV seropositive confirmed subjects aged 1-61 years (32 females and 30 males) were sampled randomly from the medical department of Baptist medical center, Saki- Oyo State, after the approval of ethical committee of the institution, as test participants. Two hundred HIV seronegative participants living in Saki town aged 1-70 years (120 females and 80 males) were also randomly sampled as control participants.

Materials

Five milliliter of venous blood was collected from each of the participants (test and control participants) into NAEDTA anticoagulated bottles for the tests. The plasma extracted by spinning down the red cells using bench centrifuge within 10 minutes was used for HIV tests and the detection of ABO and Rhesus antibodies while the red cell was used for the identification of ABO blood group antigens. Prepared red cells from known individuals with blood groups A, B, AB and O were used for serum grouping and commercially prepared Antiserum AB, Antiserum D and bovine albumin were used for the detection of ABO and Rhesus blood group antigens.

Methods

- (a) HIV screening was carried out using BIO-RAD GENIE II HIV-1/HIV-2 Kit of BIORAD, 3 boulevard Raymond poincare, 92430 Marnes La Coquette- france and the confirmation with western blot was carried out the university college Hospital, Ibadan. The participants were pre and post test counseled.
- (b) The ABO and Rhesus blood grouping was done using standard tube and tile techniques described by Cheesbrough, 2000.

Pattern of the Frequency of Occurrence of ABO and Rhesus Blood Groups in Human Immunodeficiency Virus Infected patients

Results Table 1

ABO and Rhesus Blood Group Pattern of the HIV Seropositive Patients (n=62).

ABO blood group	Frequency of occurrence	Rhesus blood group	Frequency of occurrence
A	14(22.6%)	Rhesus	
B	11(17.7%)	Positive	58(93.6%)
AB	5(8.1%)	Rhesus	
O	327(51.6%)	Negative	4(6.5%)

Table 2

ABO and Rhesus Blood Group Pattern of the HIV Seronegative participants (n=200).

ABO blood group	Frequency of occurrence	Rhesus blood group	Frequency of occurrence
A	51(25.5%)	Rhesus positive	187(93.5%)
B	44(22%)		
AB	10(5%)	Rhesus Negative	13(6.5%)
O	95(47.5%)		

The results obtained from this study were as shown in tables 1 and 2 below:

The frequency of occurrence of each of the blood groups of ABO rhesus blood group systems in HIV infected subjected was found to follow the same pattern compared with the frequency of occurrence of the groups in HIV seronegative control participants. The percentage of HIV infected subjects belonging to blood groups A and B was lower than the result obtained form HIV seronegative control participants of the same blood groups. No percentage difference was observed in HIV infected participants in the frequency of occurrence of Rhesus positive and Rhesus negative blood groups compared to the HIV seronegative participants of the same blood group. The percentage of HIV infected participants belonging to ABO blood groups AB and O was higher compared to HIV seronegative control participants of the same blood groups.

Discussion

The pattern of the frequency of occurrence of ABO and Rhesus blood groups of the HIV infected patients is comparable with those of the HIV seronegative control participants and the pattern reported by Cheesbrough, 2000 and Weir, (1991).

There were lesser number HIV infected patient belonging to blood groups A and B compared to the HIV seronegative participants belonging to the same blood groups. This observation is consistent with the observation of Weir, (1991)) that bacteria infection such as gonorrhoea is associated with blood group B status and more of the individuals of these blood groups (A and B) probably belong to bacteria infected subjects or the normal uninfected (with virus and bacteria) groups.

The percentage of the HIV infected patients studied belonging to blood groups AB and O which was higher than the HIV seronegative normal control participants belonging to the same blood groups (O and AB) can be attributed to the report of Weir, (1991) that blood group status appears to be associated with susceptibility to infections.

It is therefore recommended that:

- (a) Individuals irrespective of the blood groups should undergo voluntary counseling and testing to determine their human immunodeficiency virus status. This will enable early management and prevent degenerating into acquired immunodeficiency syndrome if the individual is tested positive.
- (b) The susceptibility of AB and O blood groups to HIV infection compared to other blood groups should also be further examined. This may also contribute to preferring a lasting solution to the spread of the infection.

In conclusion this recent study has therefore been used to examine the pattern of the frequency of occurrence of ABO and Rhesus blood groups in patients infected with human immunodeficiency virus. The pattern of the frequency of occurrence of the blood groups obtained among the HIV infected subjects compared to that of the HIV seronegative control participants was found to be same. It was also observed that more of the HIV infected patients belong to blood groups

O and AB compared with the HIV seronegative individuals belonging to the same blood groups and the reverse is the case in the result obtained about the frequency of occurrence of groups A and B.

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