A STUDY TO FIND THE DISTRIBUTION OF ABO BLOOD GROUP IN BETA THALASSEMIA

Physiology

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ABSTRACT

INTRODUCTION: - Beta thalassemia (β -thalassemia) is an inherited hematological disorder involving decreased amount of hemoglobin production. It is a major problem of concern causing high mortality rates in children. Thalassemia patients suffer from severe anemia due to which they need to get repeated blood transfusion after a regular period of time. Many studies have reported association of ABO blood group with diseases. **AIM AND OBJECTIVES:** - To study the relation between the ABO blood group and beta thalassemia. **MATERIALS AND METHODS:** - This was a cross sectional, observational survey-based on study conducted at Dept. of Physiology, A'bad with the help of Thalassemia Care Centre, Civil Hospital, Ahmedabad. The study was conducted on 300 registered beta thalassemia major patients during February 2019 to August 2019 over a period of 6 months. These patients visited the thalassemia care center for repeated blood transfusion. Blood group of the patient was determined by Slide Agglutination Method at Department of Physiology. Results were prepared & tabulated in Microsoft Excel 2013. **RESULTS:** - It is found that among the study that males were more affected than females. It is more prevalent in Rh positive individuals as compared to Rh negative. Frequency of blood groups affecting patients were O>B>A>AB. **CONCLUSION:** - Thalassemia is more prevalent in males than females. The most commonly affected blood group is O positive followed by B positive, A positive and last AB positive. Among the Rh blood group, Rh positive were more as compared to Rh negative but Rh-negative females were more common than Rh positive males.

KEYWORDS

Thalassemia, ABO Blood group, RH blood group.

INTRODUCTION

Thalassemia are group of inherited hematological disorder involving decreased amounts of hemoglobin production (2). It is caused by the mutations in the DNA of cells that make hemoglobin molecule which is responsible for carrying oxygen throughout the body. It is a major problem of concern causing high mortality rates in children. These diseases are passed on from parents to their children.

Hemoglobin molecules are normally made up of alpha (α) globin chains and beta (β) globin chains. These chains are affected by the mutations which can cause reduced production of chains or abnormal RBCs (5). Based on the type of chains affected, thalassemia is differentiated into alpha thalassemia and beta thalassemia. The severity of this depends on how many of the four chains of α globin or two chains of β globin are affected. The β form is particularly more common and prevalent among the Mediterranean people (9).

Beta Thalassemia is caused by the reduced or absent synthesis of β chains of hemoglobin that result in variable outcome ranging from severe anemia to clinically asymptomatic individuals. β -thalassemia occur due to malfunctions in the hemoglobin subunit beta. The β globin gene is located on chromosome number 11. β thalassemia occur in 3 forms: β thalassemia minor, β thalassemia intermedia & β thalassemia major. β thalassemia major is the most severe form in which patient's body is unable to construct beta chains which leads to underproduction of HbA that causes microcytic anemia. Individuals present with severe anemia due to ineffective erythropoiesis and increased RBC destruction, poor growth and skeletal abnormalities during infancy (2,4). Patients need to get repeated blood transfusion after a regular period of time. Many studies have reported association of ABO blood group with diseases (4). This study is done in order to explore the relationship between blood groups and β thalassemia and to meet the regional demand of blood groups of patients.

MATERIAL & METHODS:-

This was a cross sectional, observational survey-based study conducted at Department of Physiology, B J Medical college, Ahmedabad in collaboration with Thalassemia Care Centre, Civil Hospital, Ahmedabad. The study was conducted on 300 registered beta thalassemia major patients during February 2019 to August 2019 over a period of 6 months. These patients visited the thalassemia care center for repeated blood transfusion. After approval from the center and informed consent of the patients, patients were tested for ABO blood group and Rh blood group at Department laboratory by slide

agglutination technique. 2.5% suspension of RBC was prepared in 0.9g/dl NS. A drop of Anti-A, Anti-B and Anti-D human polyclonal serum was placed on the different slides and to each of them was added a drop of RBC suspension with the help of pipette (5). With separate stirrer the serum was mixed with suspension and observe for agglutination after 5 minutes. Results were prepared and tabulated in Microsoft Excel 2013

RESULTS AND DISCUSSION:-

The data regarding gender, age, groups and the types of ABO blood groups was collected and analyzed for statistical analysis using Microsoft Excel 2013. Data was expressed as mean, standard deviation and percentage as an when required. Chi square test was used to find out significant association and p value <0.05 was considered significant

Table 1: Distribution of ABO blood group in beta thalassemia patient.

VARIABLE	NUMBER OF PATIENTS	% POPULATION
ABO BLOOD GROUP		
A	60	20%
B	91	30.34%
AB	35	11.66%
O	114	38%
Total	300	100%
RH BLOOD GROUP		
Rh positive	288	96%
Rh negative	12	4%
GENDER		
Male	185	61.67%
Female	115	38.33%
AGE (IN YEARS)		
Age less than 5	132	44%
5-10	97	32.34%
10-15	59	19.66%
More than 15	12	4%

Table 2: Gender and blood group wise distribution of thalassemia patients.

	Male		
Bld. Grp.	Rh +ve	Rh -ve	Overall
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A	32 (10.66%)	1 (0.33%)	33 (11%)
B	56 (18.66%)	1 (0.33%)	57 (19%)
AB	24 (8%)	1 (0.33%)	25 (8.33%)
O	68 (22.66%)	2 (0.66%)	70 (23.33%)
Total	180	5 (1.66%)	185 (61.66%)
Female			
Bld. grp.	Rh +ve	Rh -ve	Overall
A	26 (8.66%)	1 (0.33%)	27 (9%)
B	32 (10.66%)	2 (0.66%)	34 (11.33%)
AB	9 (3%)	1 (0.33%)	10 (3.33%)
O	41 (13.66%)	3 (1%)	44 (14.66%)

Table 3: Distribution of ABO blood group in beta-thalassemia patients according to gender

Blood group	Male	Female	Chi	p-value
A	33	27	1.42	0.2
B	57	34	0.05	0.8
AB	25	10	1.51	0.2
O	70	44	0.005	0.9
Rhesus Factor	Male	Female	Chi	p-value
Positive	180	108	2.11	0.14
Negative	5	7		
Age (in yrs)	Male	Female	Chi	p-value
<5	78	54	0.66	0.4
5-10	60	37	0.002	0.9
10-15	39	20	0.61	0.4
>15	8	4	0.13	0.7

As per the Table 1 shows, prevalence of beta thalassemia among ABO blood group is in order of O>B>A>AB. It is found that among the study of 300 cases, the maximum patients were of O blood group (38%) followed by B blood group (30.34%), later by A blood group (20%) and least were of AB blood group (11.66%). In study population, males (n=185) were more affected than females (n=115). It is more prevalent in Rh positive blood group individuals (n=288) as compared to Rh negative (n=12). Among the age distribution, children less than 5 years of age were more affected (n=132) which is about 44% of study population, whereas the children of age group 5-10 years were 97 in number comprising of about 32.34% of population. Also, the children of age 10-15 years and above 15 years were 59 and 12 respectively which contributed to about 19.66 and 4% of study population.

In Table 2, distribution of thalassemia according to gender shows that O positive males were more commonly affected (n=68, 22.66%) and among females, prevalence was more in O positive females (n=41, 13.66%). The order of prevalence in each gender in Rh positive individuals was same as in general distribution, i.e., O>B>A>AB. On the contrary, females were more affected as compared to males amongst the Rh-negative individuals. In Table 3, on applying Chi-square test there was no significant correlation in distribution of blood group among males and females and in Rh positive and Rh negative people.

DISCUSSION:-

Amongst all the 3 forms of beta thalassemia, beta thalassemia major have severe expression of the disorder hence they require regular blood transfusion. Thalassemia patients need repeated transfusion so it is necessary to determine the frequency of ABO blood groups. As per our study we found that males were more commonly affected than females which is in agreement with other studies like Laghari (2017), Khan (2015) and Bejaoui (2013) (1,9,10). We also found in our studies the prevalence of beta thalassemia was more among Rh positive individuals than Rh Negative individuals (1,5,6). On contrary we have also found more prevalence among Rh negative females than males particularly O negative (1). The ABO blood group affected were in order of O>B>A>AB in males and females in our studies which is also found in studies like Sarah (2018), Sinha (2017), Laghari (2017) and Verma (2013). On contrary we have also found more prevalence among rh negative females than males. Among the age distribution we found that children less than 5 years are more commonly affected than other age group as this disease is an inherited and occurs in infancy (10). Similar pattern is also seen in study of Laghari (1). This all findings needs further investigations and evaluations.

CONCLUSION:-

Thalassemia is more prevalent in males than female. The most

commonly affected blood group is O positive followed by B positive, A positive and last AB positive. Among the Rh blood group, Rh positive were more affected as compared to Rh negative but Rh-negative females were higher than Rh positive males. This study will be helpful in making public health policies for blood availability for patients with thalassemia as per regional demand.

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Ethical approval: not required

REFERENCES:-

1. Z. A. Laghari, N. M. Baig, T. R. Charan, K. H. Lashari, R. Suhag, "Distribution of ABO Blood Groups and Rhesus Factor In β -Thalassemia Patients at Thalassemia Care Center NawabShah, Pakistan.", Sindh Univ. Res. Jour. (Sci. Ser.) Vol. 50 (001) 123-128(2018).
2. Sinha PA, Mulkutkar SH, Bhavani JB. Study of distribution of ABO blood groups in β -thalassemia patients. Int J Res Med Sci 2017;5:3479-83.
3. Hananajassim Hammoud, Thanaa Abdulmahdi Mokif, Hussein Jasim Al-Harbi, "The correlation between thalassemia with body mass index and blood groups in children and adult patient in the province of Babylon, Iraq" Asian J Pharm Clin Res, Vol 11, Issue 9, 2018, 509-512.
4. Mohssin MY, Mahmood AE, Kamal SB, Batah EH. Frequency distribution of hemoglobin variant and ABO blood groups among thalassemia patients from Ibn-Al-Baladi pediatric hospital in Baghdad/Iraq. W J Pharma Pharmaceut Sci. 2015;4(11):31-9.
5. Sarah M. Mahmoud Marbut, Maha A. Hamdi, Abdulhadi M.Jumaa, Basma Abbas Salman, "Distribution of ABO blood groups in beta thalassemia patients dependent on blood transfusion In Baghdad city." Journal Of Madent Alelem College VOL 10 NO 2 YEAR 2018.
6. Verma, P., (2013). "Prevalence of Hemoglobin Variants, ABO and Rhesus Blood Groups in Northern Uttar Pradesh, India." Biomedical Research 24(3).
7. Saha AK, Sahadala BS. Frequency and distribution of blood groups in the donors of a rural hospitals, West Bengal, India. Int J Pharma Bio Sci. 2016;7(1):B414-8.
8. Iqbal M, Niazi A, Tahir M. Frequency of ABO and Rh blood groups in healthy donors. J Rawalpindi Med Coll. 2009;13(2):92-4.
9. Bejaoui, M. and N. Guirat (2013). "Beta thalassemia major in a developing country: epidemiological, clinical and evolutionary aspects." Mediterranean journal of hematology and infectious diseases 5(1).
10. Dr. Vandana Bharadwaj, Dr. Maneesh Sulya. " Study Of Abo Blood Group Distribution In β -thalassemia Patients In A Tertiary Care Hospital." Indian Journal Of Applied Research, Volume-9, Issue-7, July – 2019, PRINT ISSN No. 2249 - 555X