Research Article

Study of relationship between thalassemia disease and blood groups, weight and some of blood parameters

Qasim Hamadi Abid, Ashjan Mohammed Ereiby*

ABSTRACT

Background: Thalassemia is disease spread in around the world, but in largest percent in some countries such as countries of Mediterranean, therefore this disease called anemia of Mediterranean, and this diseases well-known since old time in this region. **Materials and Methods:** The present study was conducted in Thalassemia Center of Imam Al-Hussein Medical City in Karbala taken 105 samples for female persons infected in thalassemia and 105 samples for female healthy persons and they were 1–50 years old. **Results:** The results of present study showed that blood group A+ are formed of the largest percent while blood group AB- is formed of the smallest percent. The results of blood parameters showed that there is significant ($P \leq 0.05$) decrease in packed cell volume (PCV) value, hemoglobin (Hb) concentration, and red blood cells count in persons infected with thalassemia compared with healthy persons. Results of weight showed that there is significant decrease ($P \leq 0.05$) in weight in persons infected with thalassemia compared with healthy persons. **Conclusion:** There is a relationship between different blood groups, loss of weight, PCV, Hb, and thalassemia disease.

KEY WORDS: ABO, Obesity, Thalassemia

INTRODUCTION

Thalassemia is disease spread in around the world, but in largest percent in some countries such as countries of Mediterranean, therefore this disease called anemia of Mediterranean, and this diseases well-known since old time in this region.[1]

Thalassemia is a genetic disease effect in biosynthesis for blood and its components, therefore, occur disorder in function of hemoglobin (Hb) present in red blood cells (RBCs) due to genetic disorder infect of children since early stages of their life as a result for reception of child on two ailing inherited, one of inherited from parent and other from mother.[2]

Thalassemia disease is divided into two types which are alpha-thalassemia and beta-thalassemia depending on disorder site, either inherited responsible for the synthesis of alpha-poly-proteins chain or beta-poly-proteins chain in Hb, respectively.[3]

Pair of genes that code of alpha chains located on 16 chromosome, while pair of genes that code of beta chains located on 11 chromosome; therefore, beta-thalassemia is the more common due to decrease in genes.[4]

Return of the first appears to ABO system to 1900 by Karl Landsteiner when noticed the presence of adhere at a mixture of RBCs for some persons with blood other persons while discovery rhesus (Rh) by Levine, 1941.[5]

Children from O^+ blood group are more exposed to infection by thalassemia disease compared with other children from other blood groups.[6]

At blood transport processes must be blood group that gives to patient matching to patient blood group because if give do not match blood group lead to agglutination of RBCs that lead to break and sedimentation of RBCs in kidneys that cause dead of patient, therefore, must be knowing blood group for each person to avoid occur agglutination of RBCs as well as knowing some diseases that have relationship with blood group.[7]

MATERIALS AND METHODS

Study Groups and Blood Samples Collection

The present study was conducted in Thalassemia Center of Imam Al-Hussein Medical City in Karbala

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Department of Pathological Analysis Techniques, Al-Safwa University College, Karbala 56001, Iraq

***Corresponding author:** Ashjan Mohammed Ereiby, Department of Pathological Analysis Techniques, Al-Safwa University College, Karbala 56001, Iraq. E-mail: omf060053@gmail.com

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taken 105 samples for female persons infected in thalassemia and 105 samples for female healthy persons and they were 1–50 years old and taken 5 ml of blood sample, 1 ml uses for blood groups test and 4 ml put in anticoagulant tube for blood parameters test.

Blood Groups Test

Use of ABO blood group sets that contain anti-A, anti-B, and anti-D (Rh) depending on the following method:

1. Take three drops of blood and put on slide
2. Put drop of A antigen on the first blood drop and drop of B antigen on the second blood drop and drop of D antigen on the third blood drop
3. Mixture both two drops together by sticks and leave it for a period of time.

Read the result as follows:

1. If occur agglutination on the first blood drop and A antigen is A blood group
2. If occur agglutination on the second blood drop and B antigen is B blood group
3. If occur agglutination on both the first and second blood drop and both A and B antigens are AB blood group
4. If do not occur agglutination on both the first and second blood drop and both A and B antigens are O blood group
5. If occur agglutination on the third blood drop and D antigen is Rh+ and if do not occur agglutination on the third blood drop and D antigen is Rh−.

Blood Parameter Tests

Blood parameters were done using automated hematoanalyzer (Sysmex xp300 B1269). The blood parameters were included packed cell volume (PCV), Hb concentration, and RBCs count.

Measure of Weight

The measure of weight for 105 women is infected in thalassemia and 105 healthy women using specific balance.

Statistical Analysis

The data were showed as mean ± stander error and subjected to analysis of variance by using one way ANOVA Post hoc test was used LSD to specify the significant difference using computerized SPSS program version 17, $P < 0.05$ is considered to be statistically significant (Daniel, 1999).[8]

RESULTS AND DISCUSSION

Relationship of Thalassemia with Blood Groups

The results of present study showed that blood group A+ are formed of the largest percent while blood group AB- is formed of the smallest percent. Because of number of sample that is little[9] or because conjucation between globulin on 16 chromosome and type of antigen in RBCs.[10]

Effect of Thalassemia on Blood Parameters

In present study there are ideal reduction in Packed cell volume (PCV) value in patients compared with control because of PCV depend on morphological properties of RBCs.[11] In case of thalassemia, the RBCs affected in number and morphological properties during stages it composition inside of bone marrow as a result of RBCs become small in volume.[12] RBCs are exposure to rupture by macrophage that present in bone marrow tissue that leads to damage of large numbers of RBCs during stages it composition.[13] RBCs breakdown through circulatory system in human especially in spleen that is center for death of RBCs.[14]

Table 1: Relationship of thalassemia with blood groups

Blood groups	Groups		Total, *n* (%)
	Patient persons, *n* (%)	Healthy persons, *n* (%)	
A^+	32 (30.48)	18 (17.14)	50 (23.81)
A^-	4 (3.81)	4 (3.81)	8 (3.81)
B^+	18 (17.14)	22 (20.95)	40 (19.05)
B^-	5 (4.76)	5 (4.76)	10 (4.76)
AB^+	15 (14.29)	11 (10.48)	26 (12.38)
AB^-	5 (4.76)	2 (1.90)	7 (3.33)
O^+	22 (20.95)	33 (31.43)	55 (26.19)
O^-	4 (3.81)	10 (9.52)	14 (6.67)
Total	105 (100)	105 (100)	210 (100)

Table 2: Effect of thalassemia on blood parameters (means±standard error)

Groups	Parameters		RBC ($\times 10^6$ cell/mm^3)
	PCV value (%)	Hb (g/dl)	
Patient persons	A	A	A
	26.22±0.48	8.77±0.13	2.46±0.03
Healthy persons	B	B	B
	41.47±0.64	13.46±0.15	4.93±0.05

n=105. Different letters represent a significant difference at $P \leq 0.05$. PCV: Packed cell volume, Hb: Hemoglobin, RBC: Red blood cell

Table 3: Effect of thalassemia on weight (means±standard error)

Groups	Parameters weight (kg)
Patient persons	A 40.25±1.92
Healthy persons	B 62.14±2.41

n=105. Different letters represent a significant difference at $P \leq 0.05$

Also showed ideal low in Hb concentration in patients compared with control because of decrease in protein chains[15] disorder Alpha and Beta chains lead to stop synthesis Hem molecules.[16,17] The present study showed ideal low in red blood cells counts in patients compared with control because of death red blood cell,[18] at thalassemia disease occur decrease in RBCs because of disorder in bone marrow.[19]

Effect of Thalassemia on Weight

There are ideal low in weight in patients compared with control because reduction in growth[20], persons with this disease suffered to decrease in oxygen and breathing problems.[21]

CONCLUSION

From current results, it was concluded that:

1. There are conjugation between different blood groups and thalassemia disease because of genetic diseases
2. Knowing for person to type of blood group and RH factor.

REFERENCES

1. Greenberg PL, Gordeul V, Issaragrisil S, Siritanaratkul N, Fucharoen S, Ribeiro RC. Major hematologic diseases in the developing world new aspects of diagnosis and management of thalassemia, malarial anemia, and acute leukemia. Hematology Am Soc Hematol Educ Program 2001;2001:479-98.
2. Munize A, Martines G, Laiahqa J, Pacheco P. Beta thalassemia in cnbans. Am J Hematol 2000;64:7-14.
3. Berdoukas VA, Kwan YL, Sansott ML. A study on the value of red cell exchange transfusion in transfusion dependent anaemias. Clin Lab Haematol 1986;8:209-20.
4. Bilto YY. Prevalance of hemoglobin pathies in central region of Jordan. association Arabian universities. J Med Sci 1998;1:18-23.
5. Levine P, Katzin EM, Burnham L. Isoimmunization in pregnancy: Its possible bearing on the etiology of erythroblastosis fetalis. JAMA 1941;116:825-7.
6. Greenberg PL, Gordeuk V, Issaragrisil S, Siritanaratkul N, Fucharoen S, Ribeiro RC, *et al*. Major hematologic diseases in the developing world- new aspects of diagnosis and management of thalassemia, malarial anemia, and acute leukemia. Hematology Am Soc Hematol Educ Program 2000;1:479-98.
7. Jenkins PV, Donnell JS. ABO blood group determins plasma. Blood 2006;46:1836-44.
8. Statistical Packages for the Social Sciences. Statistical Software for Windows Version 13.0 Microsoft. Chicago, IL, USA: SPSS; 2001.
9. Woolf B. On estimating the relation between blood group and disease. Ann Hum Genet 1998;19:251-3.
10. Proceedings of the 3rd international symposium on bone marrow transplantation in thalassemia. Pesaro, Italy, 28-29 September 1996. Bone Marrow Transplant 1997;19 Suppl 2:1-213.
11. Dacie V, Lewis SM. Practical Hematology. 2nd ed. Philadelphia, PA, Tokyo: Lippincott Williams and Wilkins; 1995. p. 352-4.
12. Dedousis GV, Mandilara GD Boussin M, Loutradis A. HbF production in beta thalassaemia heterozygotes for the IVS-II-1 G-->A beta(0)-globin mutation. Implication of the haplotype and the (G)gamma-158 C-->T mutation on the HbF level. Am J Hematol 2000;64:151-5.
13. Pittigio DH, Sacher RH. Clinical Hematology and Fundamentals of Homeostasis. Philadelphia, PA: F. A. Davi Company; 1987. p. 17-126.
14. Kendal AG. Thalassaemias. Int Med 1983;1:1169-72.
15. Todd D. Thalassemias and hemoglobin pathies. 3rd series. J Med Part 1980;1:1406-10.
16. Acquaye J, Ganeshahuru K, Omer A. Beta thalassemia in Saudi Arabia Saudi. Med J 1987;3:238-89.
17. Bennett J, Plum F. Cecil Text Book of Medicin. 20th ed. Philadelphia, PA: W. B. Saunder Company; 1996. p. 872-9.
18. Ganong WF. Review of Medical Physiology. 22nd ed. New York: McGraw-Hill Medical; 2005.
19. Quadri MI, Islam S. Hematological disease in eastern region of Saudi Arabia. Saudi Med J 2000;21:666-71.
20. Miniero R, Rocha V, Saracco P, Locatelli F, Brichard B, Nagler A, *et al*. Cord blood transplantation (CBT) in hemoglobinopathies. Eurocord. Bone Maroow Transplant 1998;1:S78-9.
21. Origa R, Bina P, Agus A, Croba G, Defraia E, Dessi C, *et al*. Combined therapy with deferiprone and desferrioxamine in thalassemia major. Hematological 2005;90:1309-14.

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