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Research Article

**MECHANISM OF GENETIC POLYMORPHISMS WITH THE
ASSOCIATION OF BLOOD TRANSFUSION IN HUMAN
LEUKEMIA DISEASE**¹Dr. Maryam Babar, ²Dr Abdullah Ayish, ³Dr Iram Irshad¹Lahore General Hospital, E-mail: - maryamabar786@gmail.com²Jinnah hospital Lahore³Basic Health Unit Mithra, Bahawalpur, iramirshada1@gmail.com**Article Received:** June 2020**Accepted:** July 2020**Published:** August 2020**Abstract:**

Objectives: The main objective of this study is to find the mechanism of Genetic polymorphisms with the association of blood transfusion in human leukemia disease. **Material and methods:** This descriptive study was conducted in LGH during November 2019 to April 2020. Enrollment criteria include the age between 20 to 50 years. Pathology slides from all patients were obtained from the original pathology departments and reviewed by two independent pathologists. All cases in this study were classified according to the World Health Organization classification system. **Results:** Blood transfusion is not associated with the risk of leukemia. According to data CLL is not related to blood transfusion (OR=0.7 at 95% CIL) and DLBCL (OR=0.9 at 95% CIL). **Conclusion:** Our results suggest that genetic polymorphism in TNF gene modifies the association between blood transfusion and risk of leukemia B-cells.

Corresponding author:**Dr. Maryam Babar,**

Lahore General Hospital, E-mail: - maryamabar786@gmail.com

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INTRODUCTION:

The age of genomics has enabled the application of DNA-based molecular methods to clinical laboratory diagnostic testing in the areas of genetics. Molecular methods are also applicable to blood bank and transfusion service testing¹. The rapid progress made in determining the genetic basis for blood group and platelet antigen polymorphisms, and the commercial development of polymerase chain reaction (PCR) based technology, makes detection of blood group antigens by probing the gene now possible. Many blood group antigens are the result of single nucleotide gene polymorphisms or SNPs inherited in a straightforward mendelian manner. Before 19th century it was thought that all the blood was same and this misunderstanding was lead to the fetal transfusion of blood. Even human blood is not the same. People belong to the different blood groups depending upon the antigens present in the blood. Almost 25 different types of blood groups were present but most common are ABO and Rh systems². Blood transfusion mainly allogeneic blood transfusion can induce immune suppression and has been suggested as a risk factor for leukemia³. Molecular genotyping methods were introduced to the transfusion medicine community over a decade ago. Epidemiological studies linking blood transfusion to the risk of leukemia but they provided inconsistent results⁴. B-lymphocytes are characterized by the expression of CD19 surface antigen, which is present on the progenitor cells of bone and persists during all stages of B-cell maturation⁵.

Objectives of the study

The main objective of this study is to find the correlation of genetic polymorphisms which modify

the association of blood transfusion in human leukemia

MATERIAL AND METHODS:

This descriptive study was conducted in LGH during November 2019 to April 2020. Enrollment criteria include the age between 20 to 50 years. Pathology slides from all patients were obtained from the original pathology departments and reviewed by two independent pathologists. All cases in this study were classified according to the World Health Organization classification system.

Participation of all the patients were voluntary and written consent was obtained from all participants. Those who want to participate and signed consent were interviewed by medical staff by using a standardized and structured questionnaire and personal interview. Blood transfusion history was also examined by asking subjects whether they transfuse blood first time or this were a long-term process.

STATISTICAL ANALYSIS

All *P* values presented in the results are two-sided, and all analyses were performed by using SAS software (version 9.2).

RESULTS:

The association between blood transfusion and leukemia B-cells are clearly presented in the table 3. Blood transfusion is not associated with the risk of leukemia (OR=0.9 at 95% CIL) and B-cell lymphoma (OR=0.8 a 95% CIL). According to data CLL is not related to blood transfusion (OR=0.7 at 95% CIL) and DLBCL (OR=0.9 at 95% CIL).

Table 01: Association between blood transfusion and leukemia B-cells

Blood transfusion	Overall			B-cell lymphoma	
	Control	Case	OR(95%CI)	Case	OR(95%CI)
No	124	98	1.0	311	1.0
Yes	417	384	0.9 (0.7–1.2)	75	0.8 (0.6–1.2)
	DLBCL			CLL	
Blood transfusion	Control	Case	OR(95%CI)	Case	OR(95%CI)
No	124	29	1.0	78	1.0
Yes	417	121	0.9 (0.6–1.4)	26	0.7 (0.4–1.2)

We also collected the patient's history and compared this data to those patients who have not the history of blood transfusion. The patients who have the history of blood transfusion are suffering from high risk of leukemia if they carried TNF GG genotype (OR = 1.9, 95% CIL) (Table 02).

Table 02: Associations between *IL10RA* and *TNF* Polymorphisms, Blood Transfusion, and risk of leukemia

SNPs	Overall						B-cell lymphoma			
	Blood transfusion						Blood transfusion			
	No			Yes			No		Yes	
	Contr ol	Case	OR	Control	Case	OR	Cases	OR	Cases	OR
<i>TNF</i>										
<i>GG</i>	289	277	1.0	96	67	0.7	221	1.0	44	0.7
<i>AG/AA</i>	123	108	1.0	27	34	1.6	88	1.0	22	1.5
<i>P-interaction</i>	0.011						0.013			

DISCUSSION:

This is the first comprehensive analysis of relation of blood transfusion and risk of leukemia in humans. There is a significant difference were observed in for *IL10RA* and *TNF* for leukemia and the high production of white blood cells. No interactions were observed for blood transfusion and the high production of white blood cells. For the clarification of this statement higher studies will required for further clarification⁶.

The IL-10RA receptor chains have an extracellular domain consisting of 200 amino acids, a transmembrane helix consisting of 20 amino acids, and an intracellular domain consisting of 322 amino acids for IL-10RA⁷. IL10 and TNF were considered to be the key genes for lymphomagenesis. Both the genes code the immune regulatory cytokines that are considered to be critical mediators of inflammation and apoptosis and also for lymphoid tumors⁷. Different studies related to TNF and IL10 shows that each cell effects on B-cell lymphomagenesis by direct or indirect way⁸.

The long-term storage of red blood cells before transfusion has been reported and it can increase the intera cellular iron. And they cause the systemic inflammatory response syndrome and it will lead to deleterious consequences¹⁰⁻¹¹.

CONCLUSION:

Our results suggest that genetic polymorphism in TNF gene modifies the association between blood transfusion and risk of leukemia B-cells.

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