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Comparative of The Allo-antibodies in Repeated Blood Transfusion Recipient Using Conventional Tube Method and GelMethod

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ABSTRACT

Repeated blood transfusion is important for patients as basic therapy, it is used to treat and prevent the complications of many diseases. The most serious complications are haemolytic transfusion reactions in which there is increased red cell destruction which caused by repeatedblood transfusion, allergic reactions and febrile reactions which are due to antigen antibody reaction. The aim of this study is to compare between the two different protocols; conventional tube method and ID cardmicrotyping system, to detect the frequencyof antibodies in repeated blood transfusion. This is an analyticalcomparative study in which193 patients with repeated blood transfusion were enrolled. Complete blood count was done using (Sysmex) 21.Then sickling test, hemoglobin electrophoresis at alkaline pH (8.4–8.6), and antibody screening with conventional tube andgel methods were done. The results were analyzed. Antibodies screening using conventional method showed that 3 patients were positive,190 patients were negative, while gel method showed that 5 patients were positive, while188 patients were negative with repeated transfusion.The study Concluded that thedifference the between two methods was present,conventional tube andgel method withdifferent P-value (0.22-0.41),respectively, it was insignificant. Gel method is more accurate and rapid, appropriate for detection of antibodies, and more accurate, to facilitate selection of blood, than conventional method. Antibody detection by gel method is more yielding compared with routine technique. The gel method is found to be a rapid, reliable procedure and more sensitive.

المستخلص

تكرار نقل الدم مهم للمرضي ويمثل علاج اساسى ،لكثير من الامراض. من اخطر المضاعفات شيوعا لعملية تكرار نقل الدم هو انحلال الدم لازدياد تحطيم الخلايا الحمراء الناتجة بواسطة تكرار نقل الدم والحساسية والحمي الناتجة من تفاعل المستضدات مع الاجسام المضادة. الهدف من هذه الدراسة هو مقارنة الاختلافات بين الطريقتين،طريقة الانابيب التقليدية و طريقة الجل الحديثة و تحديد تردد الاجسام المضادة للمرضى بعد تكرارنقل الدم .هذة درا سة تحليلة ومقارنة في 193 مريض من متكرري نقل الدم .أجريت لهم الصورة العامة للدم باستخدام جهاز(sysmex)21 وجهاز دحارالخلية المنجلية، الناقل الكهربائي في وسط قلوي (8.4–8.6). واختبارات الكشف عن الاجسام المضادة بطريقة الانابيب التقليدية و طريقة الجل الحديثة. حللت النتائج واظهرت في 3 مرضي أظهروا نتيجة ايجابية و 190 نتيجة سالبة بطريقة الكشف عن الاجسام المضادة بطريقة الانابيب التقليدية، بينما 5 مرضي نتيجة ايجابية بطريقة الجل الحديثةمن متكرري نقل الدم وتضمنت الدراسة وجودالاختلاف بين الطريقتين مع وحود

فروقات معنوية غيو محسوسة بين طريقة الانابيب التقليدية و طريقة الجل الحديثة (22,–41.) باالتتالي ، طريقة الجل الحديثة كانت اكثر دقة وسرعة ومناسبة لمعرفة الاجسام المضادة وتسهيل اختيار الدم . خلصت الدراسة الي ان معدل معرقة الاجسام المضادة قد حفزت بطريقة الجل الحديثةمقارنة بطريقة الانابيب التقليدية وبانها الطريقة الاسرع و الموثوق بها.

***KEYWORDS*:** Screening Test**,** alloantibodie**s,** gel method

INTRODUCTION

Transfusions are used in a variety of medical conditions to replace blood and blood components. Early transfusions used whole blood, but modern medical practice commonly uses only components of the blood, such as red blood cell, white blood cells, plasma, clotting factors, and platelets [(1)].

Since blood transfusion was regarded as basic therapy to treat and prevent complications of many diseases, unfortunately some times can be complicated by the development of antibodies to RBCs,WBCs or platelets antigens, the most serious complications are hemolytic transfusion reactions in which there is increased red cell destruction which is produced by blood transfusion, allergic reactions, febrile reactions and post transfusion purpura, all of them are due to antigen antibody reaction. In parallel when we determine the ABO and RhD groups patients should be screened for unexpected allo-antibodies other than anti A anti B .This facilitates the selection of suitable blood for patients requiring transfusion[(2, 3)].When patients receive blood transfusion, their immune system will attack any donor red blood cells that contain antigens which differ from their self antigens. Therefore, ensuring that antigens of transfused red blood cells match these of the patient's, red blood cells are essential for safe blood transfusion[(4)].

Therefore improving selection of suitable blood for patients is important. Spin tube method was became traditional technique for compatibility testing and cross matching in transfusion medicine[(5)].

The ID-Micro Typing blood banking system represents a breakthrough in blood bank serological testing by using cards consisting of microtubes profiled with gel particles, diluents and appropriated antisera. The sample material was added to the reaction chamber, Gel technique is suitable to detect and prevent ABO, Rh blood groups, direct antiglobulin test, indirect antiglobulin test, cross matching, screening and identifications of antibodies [(5, 6)]. There are many studies done all over the world to receive safe blood transfusion and avoid the risk of complications and development.

The study objectives:

General objective:

To compare between the conventional tube method and the DiaMed-Immuno-Diffuison micro typing system, asscreening toolsfor detection of allo-antibodies.

Specific objectives:

1- To determine the presence of allo-antibodies in patients who received repeated blood transfusion by conventional and ID card method.
2- To identify different types of antibodies using the two methods.
3- To determine significant differences between the two methods as per P-value analysis.
4- To identify different types of antibodies using the two methods.

MATERIALS and METHODS

This is an analyticalcomparative study which was conducted to determine the alloantibodies in patients who received repeated blood transfusion using the two methods, the conventional tube and ID

card. The study was performed in Khartoum and Wad Madani Teaching Hospitals during January 2010 to August 2012.

One hundred and ninety three (193) patients were enrolled in this study, 36 of them were Thalassemia patients, 137 patients with sickle cell anemia and 20 patients with Hb C diseases, and both sexes and all age groups were included. Data were collected using designed questionnaire, and all patients or care takers were consented. Five ml of venous blood were collected from each patient with more than 4 times blood transfusion. These were divided into 2 portions, 2.5 ml were collected in EDTA anticoagulant for screening hematology tests and the other 2.5 ml were clotted and serum was used for allo- antibody screening.

Data were recorded and analyzed by the statistical package for the social sciences (SPSS) program.

Screening tests done includedcomplete blood count that was done by (Sysmex)21, haematological analyzer. Thesickling test and hemoglobin electrophoresis at alkaline pH (8.4–8.6), were performedto confirm the diagnosis of Hb condition studied. Antibody screening was conformed by conventional tube and ID card methods.

RESULTS

Three patients out of 193 were positive by the conventional method for allo-antibodies as shown in Table (1).

Table 1: Frequency of Repeated bloodtransfused according to hematological conditions studied

Hb disease	Frequency of Blood transfusion for Positive Patients				Total
	four	five	six	seven	
Thalassemia	-	1	-	-	1
Sickle cell anemia	-	1		1	2
Hb C disease	-	-	-	-	-
Total	-	2		1	3
					2%

Five patients were positive with ID card method as shown in Table (1).

Table 2: Frequency of Repeated blood transfused according to hematological conditions studied

Hb disease	Frequency of Blood transfusion for Positive Patients				Total
	four	five	six	seven	
Thalassemia	1	1	-	-	2
Sickle cell anemia	-	1	1	1	3
Hb C disease	-	-	-	-	-
Total	1	2	1	1	5
					3%

Allo- antibodies revealed by conventional method in thalassemia, were anti K (one patient), in sickle cell anemia anti c(one patient), another patient had anti e, as shown in Table (3).And by using ID card method in thalassemia, one patient had anti K, another patient had anti e, and in sickle cell anemia, one patient had anti E, another patient had anti c, a third patient had anti e, as shown in Table (4) and Figure 1.

Table 3: Frequency ofAllo –antibodies detected by conventional method according to hematological conditions studied

Patients	Allo –antibodies				Total	P-value
	Anti-E	Anti-e	Anti-c	Anti-k		
Thalassemia	-	-	-	1 33.3%	1 33.3%	
Sickle cell anemia	-	1 33.3%	1 33.3%	-	2 66.7%	0.22
Hb C disease	-	-	-	-	-	
Total	-	1 33.3%	1 33.3%	1 33.3%	3 100%	

P-value = 0.22 < 0.05 no significant

Table 4: Frequency ofAllo –antibodies detected by ID Card Method according to hematological conditions studied

Patients	Allo –antibodies				Total	P-value
	Anti-E	Anti-e	Anti-c	Anti-k		
Thalassemia	-	1 20%	-	1 20%	2 40%	
Sickle cell anemia	1 20%	1 20%	1 20%	-	3 60%	0.41
Hb C disease	-	-	-	-	-	
Total	1 20%	2 40%	1 20%	1 20%	5 100%	

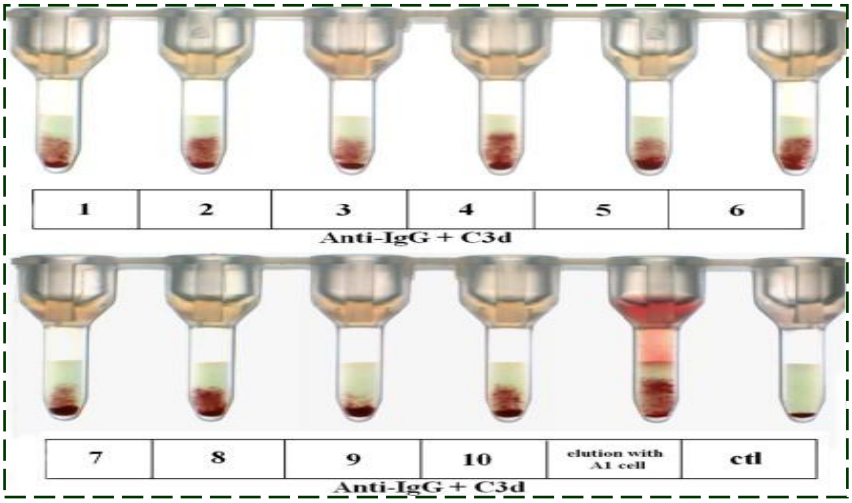

Figure1: Identification test with ID Card method

DISCUSSION

In this analytical comparative study,we observed that the presence of irregular antibody was found to be 5(2.6 %) 2 (1.0%),3(1.6%) and 0(0.0%) that 40% thalassemia ,60 % sickle cell anemia and 0.0% Hb C diseases with ID card method . in an American study it was found to be 39.39% in sickle cell anemia and 12.9% Brazil study[7 ,8],22.06%,13.7 % Saudi study,[9, 10] , 19.5% Egypt study [11], While the presence of irregular antibody was found to be 3(1.5%) 1 (2.0%),2(1.5%), 0(0%) that 33.3% thalassemia,66.7% sickle cell anemia and 0% Hb C diseases with conventional method, in Saudi study it was found to be 22,06% [9], 2.8% Iran study [12],28.4% Egypt study [13] and 6.1%Uganda study[14].

The most common allo-antibodies was detected in Rh 80.% anti E 20%, anti e 40%, anti c 20% and kell 20 % blood group system by gel method with P-value(0.22 < 0.05) .While detected of Rh 66.7 % anti e 33.3 %, anti c 33.3 % and kell 33.3 % blood group system with P-value(0.41< 0.05) by conventional method. These results agreed with other studies, in Saudi anti E18.6%, anti c 6.9% and anti Kell 23.6% blood group system [10], anti Kell 23.6 and anti E 23.6 blood group system in Egypt [11] and anti E14.6%, anti C8.9%, anti c 4.9% and kell 26% blood group system in Uganda [14].The difference between two methods with P-value (0.19 < 0.05) no significant.

CONCLUSIONS

Irregular antibodies were found in patients with repeated transfusions with different specificities. ID card method is more sensitive than conventional method. Finally gel system is appropriate for detection of antibodies, and more accurate, to facilitate selection of safe blood.

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