International Journal of Advance Research in Science and Engineering
Volume No.07, Special Issue No.03, April 2018
www.ijarse.com
IJARSE
ISSN: 2319-8354

GEL CARD AND SALINE TUBE TECHNIQUES FOR BLOOD CROSS MATCHING: A COMPARATIVE ASSESSMENT

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ABSTRACT

Gel card technique is considered the latest methods used to test the blood cross matching. In blood bank is widely used in proportion to their high sensitivity and accurate results. The aim of this research is to compare the accuracy and sensitivity of gel card technique (LISS/COOMBS ID- CARD) and saline tube methodfor blood crossmatch at NIMS hospital blood bank. The methods to be employed include gel card technique for coombs test, Indirect Antiglobulin Test (IAT), saline tube method, test for IgM and IgG Antibodies.The expected results of this research are to determine the compatibility test between the gel card technique and saline tube methods, to evaluate the performance suitability and adoptability of cross matching, and finally to determine the efficiency of saline tube method in detecting cold antibodies.

Keywords: Gel Card, Saline Tube, Blood Crossmatching, Antiglobulin, Blood Transfusion

I. INTRODUCTION

Since the discovery of the ABO system and red cell agglutination by Landsteiner in 1901 and development of the antiglobulin test by Coombs in 1945, the immunohematologists are trying to establish and improve various serological investigations in human blood [1].

Before a blood transfusion, there are a series of actions pulled out to ensure proper blood for the patient. Basically these procedures try to establish the compatibility between donor and recipient ABO and Rh systems and to rule out the existence of antibodies in the recipient's serum that could react with transfused red cells. To establish the ABO and Rh compatibility between donor and recipient, both the recipient and the blood to be transfused are typed to rule out the existence of antibodies (other than anti-A or antiB) [2].

The crossmatch shall include the antiglobulin test. When no clinically significant antibodies are detected in current antibody screening tests and there is no record of previous detection of such antibodies, then only a method to detect

ABO incompatibility, such as an immediate-spin or computer crossmatch, is required. It is very rare for the antiglobulin phase of the crossmatch to detect a clinically significant unexpected antibody if the patient's antibody detection test is negative [3].

Crossmatch is done to ensure that particular unit of blood may be safely transfused to a patient. Normally group specific blood, ABO and Rh (D). The purpose of cross match is to select blood components that will have acceptable survival when transfused and will not cause harm to the recepient. Compatibility (pre transfusion) testing is done to ensure safe transfusion therapy. (Sara, 2003).The pretransfusion compatibility testing is performed to select red blood cell (RBC) units for transfusion to decrease the incidence of immune-mediated hemolytic reactions [4].

Gel card is more sensitive and more specific than conventional tube methods and also less time consuming but more costly than conventional tube methods[5]. The gel card technique performed in blood bank for blood cross matching. The advantages of gel card as easy reading the results, easily recording for a long time, handling and disposal [6].

Cross matching of blood is routinely done using tube method. This method involves washing steps and takes 60 min (1hour). In gel card technique washing steps are not required and the time taken is only 30 min [7]. The gel test is a reliable and advantageous technique and is appropriate for routine use for detection and identification of alloantibodies in blood bank service [8].

The gel card technique is now considered better and has been introduced as a replacement to conventional tube technique on an automation platform. Though Conventional tube technique(CTT) is still considered gold standard in pretransfusion testing, it still has various disadvantages and depends on accurate hand to eye work of the laboratory personnel. The column agglutination technique (CAT), although being costly affair, still has several advantages over the tube technique. Therefore, it is highly recommended to be used routinely in the pretransfusion testing [9].

The conventional manual tube technique is still considered as a gold standard for pretransfusion compatibility testing. However, there is a need to minimize the disadvantages associated with manual tube technique [10]. Conventional tube technique (CTT) has been the mainstay for antibody detection in pretransfusion testing for over 30 years. Although this technique is believed to be the gold standard, it has got its own limitations [11].

Therefore, this paper aimed at comparing the accuracy and sensitivity of gel card technique (LISS/COOMBS ID-CARD) and saline tube method . This can be achieved with the following objectives:

i. To assess the compatibility test by gel card and saline tube method with coombs and without coombs.
ii. To assess the performance suitability and adoptability of cross matching test.
iii. To know the efficiency of spin tube method to detect cold antibodies.

II. MATERIALS AND METHODS

All samples to crossmatch by the following techniques

1. ABO and Rh (D) Grouping

ABO and Rh Grouping of the patient and donor must be tested with anti-A, anti-B, anti-AB and serum is tested with A, B and O red cells, for techniques and interpretation .Any discrepancy in the ABO tests should be resolved before giving blood[12].

2. Gel card technique for Coombs' test

The microtubes of the ID-Card "LISS/Coombs" contain polyspecific AHG, to be used for cross matching , patient serum and donor red cells are added to the microtubules.The card is incubated at 37℃for 15 minutes and the centrifuged for 10 minutes Washing and check cells are not required[13].

3. Saline Tube Method:

Saline tube technique is done both for IgM and IgG antibodies. Patient serum or plasma and reagent red cells are combined, then centrifuged, and observed for agglutination.

-37℃ Incubation

The tubes are incubated at 37°C for 30-60 minutes, depending on the enhancement media used. After the incubation period, the tubes are centrifuged and observed for agglutination. The cells are washed 3-4 times to remove any unbound antibody. This is an important step in the tube method. Improper washing may lead to false-negative results.

-Indirect antiglobulin test or Anti-human globulin (AHG)

AHG is then added, the tubes are centrifuged, and are observed for agglutination. Check cells are added to all negative tubes. Check cells are cells coated with IgG and should react positively with the AHG in the tube. If check cells are negative, the procedure was not performed correctly and should be repeated[12].

III. CONCLUSION

Duringthe previous studies,the procedures used for both techniques shows that gel card is easier to use and the factors effecting the results is less. The time consuming in the two methods also put the gel card first method in

favor.The advantages of gel card as easy reading of microtube, easily recording for a long time, handling and disposal Therefore, this research is trying to compare the two techniques and assess their sensitivity and accuracy.

ACKNOWLEDGEMENTS

I extend my sincere thankfulness to Prof. (Dr.) Kalpana Sankala my guide for valuable information and guidance provided to me in carrying out this research work. Thanks to Dr, Abubakar Mohammed for his unlimited cooperation.

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