Pretransfusion Compatibility Testing by Conventional Tube and Gel Method A Comparative Study at Tertiary Care Center

Gautam Chauhan¹, Bharti Parghi²

¹Associate professor, GMERS Medical College, Gandhinagar - 382 012, Gujarat, India
²Assistant professor, Government Medical College, Bhavnagar. Gujarat -364001, India

DOI: 10.21276/sjams.2019.7.7.67 | Received: 16.07.2019 | Accepted: 27.07.2019 | Published: 30.07.2019

*Corresponding author: Dr. Bharti Parghi

**Abstract**

**Introduction:** pre-transfusion compatibility testing is critical in transfusion medicine so as to prevent immune reaction which might be fatal sometime. The traditional tube method is gold standard however newly introduce matrix gel card has improve the quality of testing and give end point stable result. **Aim:** This study done to compare newly introduce matrix gel card method in our blood bank to conventional tube method. **Material and method:** Total 1200 random sample taken for compatibility testing by commonly use test tube method and then matrix gel card method based on indirect Coomb’s test. **Result:** Our study show 100% compatibility by saline based CTT, while 05 (0.4%) samples were incompatible by CTT with anti-human globulin (AHG) and matrix gel card. So 05 sample show false positive and 05 sample show false negative of previous 100% compatible by CTT without AHG. Sensitivity and specificity is 100% of matrix gel card and indirect Coomb’s tube test using AHG, whereas saline tube test specificity is 99.5%. **Conclusion:** Matrix gel card method is simple, easy to perform and gives more stable end point result that can be recorded and photocopied. It is more sensitive and specific than Conventional saline method though CTT with AHG is sensitive and specific as Gel card but result cannot record and require more time than saline and gel card method.

**Keywords:** Compatibility testing; Matrix Gel method, Conventional tube method.

**INTRODUCTION**

In transfusion medicine it is difficult to establish uniform serological testing for consistence accurate and reliable identification of antibody which can easily adept and apply for clinically. Pre-transfusion compatibility testing is a crucial part of the entire transfusion medicine to enhance patient’s safety [1]. Pre-transfusion testing is done to prevent transfusion mediated immune hemolytic reaction [2] which may be life threaten sometime. The traditional serological technique by CTT method consider gold standard however it affected by many factor like serum: Cell ionic Strength and pH more ever it is time. and labor-intensive, require experience, well trained staff to perform and interpret result [3-4]. Compatibility testing and cross matching requires potentiation with bovine albumin, enzyme technique and use of anti-human globulin (AHG) i.e. indirect antiglobulin test (IAT) [5]. Lapierre et al in 1988, the gel test has revolutionized Pretransfusion testing and become a widely-used serological testing method in Immunohaematology laboratories worldwide.

The introduction of newer techniques such as column agglutination technique (CAT), has improve the quality of testing and the reproducibility of results. CAT has been shown to be more sensitive than CTT for blood grouping and cross matching [6].

The present study was done at a tertiary care Center sir T hospital Bhavnagar in India to evaluate the matrix gel card technique and compare the matrix gel card method to conventional tube method for Pretransfusion compatibility testing.

**MATERIAL METHOD**

The prospective study conducted in blood bank of sir T hospital Bhavnagar total 1200 random sample were tested for pretransfusion compatibility testing. First blood grouping of patient and donor done by forward and reverse method by using antisera A, B, and D of (tulip diagnostic) for forward grouping and inhouse (blood bank) prepared pooled cells for reverse
grouping. Then cross matching is done by both methods. First by CTT (Conventional tube test) with and without AHG (IAT) then CAT (column agglutination test) by MATRIX GEL card. For CTT in major cross match patient ‘s serum taken in test tube to this donor red cell of 2-5% suspension added ,mix it, centrifuge for 5 minute (spin method) at 1000 rpm for 1 min. after adding IAT reagent (tulip diagnostic) absence of hemolysis or agglutination is indicate negative result compatible. All negative results are microscopically confirmed. Minor cross match of same patient done using donor serum and 2-5 % red cell suspension of patient cell rest of procedure same as above.

Matrix gel card incorporate with polyspecific antihuman globulin (AHG) was used for evaluation of gel technique as per the manufacturer’s instructions. Label the Matrix gel card with patient ‘s ID BBR number and Donor bag BB number. Remove aluminium foil carefully. Prepare 0.8% of red blood cell suspension in matrix TM diluents of both patient and donor red cell. Pipette 50 microliters of 0.8% donor red cell in appropriate micro tube of gel card, to this add 25 micro liter of patient serum. For minor cross match of same patient done using donor serum and 2-5 % red cell suspension of patient cell rest of procedure same as above.

Result shows that gel test is more sensitive than tube test for identifying potentially clinically significant antibody. At last but not least aspect of gel card system is cost, which is found to be 40-45% higher than the CTT. However this cost not include the expenditure on more man power require for manual CTT Baijai et al.[3] propose that automation in immunohematology require initially large investment, the cost per test than gradually decrease as number of sample increase.

Conclusion
The results of testing by CAT are comparable to CTT, The gel system is simple to perform, gave reliable, reproducible, stable end point result which can be preserved and photocopied for future record.
Moreover gel card are easy to dispose by incineration. Blood bank personnel less likely to expose the blood sample so it will decrease chance of exposure to transfusion transmitted disease. Apart from cost factor of gel card system other drawback are inability to test hemolysed/lipemic or icteric sample and require large sample load. So it must apply in blood bank of tertiary care center, where men power is difficult to manage and work load is high due to drainage from surrounding large number of health center. Finally from our study and from various references we conclude and advice to use gel card system in blood bank for all routine blood grouping and cross matching as it has high sensitivity and specificity than conventional test tube method.

REFERENCES
1. South SF, Casina TS, Li L. Exponential error reduction in pretransfusion testing with automation. Transfusion. 2012 Aug;52(8):815-7S.