Original article:

A comparative study of blood cross match using newly introduced gel technique and conventional tube Method

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Abstract:

Introduction: A comparative study of blood cross match between gel card technique and conventional tube method was undertaken on approx 1000 sample conducted in Sanjay Gandhi Memorial Hospital ,Rewa associated with Shyam shah medical college Rewa .

Material & Methods: most commonly conventional tube method are used widly. Now new technique of cross matching is introduced . In this study Matrix gel card[16] method based on indirect coombs test for cross match and conventional tube method including saline tube method and indirect coombs tube method used.

Observation and result: one thousand sample is taken for the study and out of this 996 sample is compatible using indirect coombs gel card and indirect coombs tube test and 04 sample shows incompatibility of both test ,whereas in saline method without using coombs reagent shows 100% compatibility, if we use coombs indirect test, 04 sample shows false positive and 04 sample shows false negative of previously 100% compatible result. Sensitivity and specificity is 100% of gel card and indirect coombs tube test using AHG, whereas saline tube test specificity is 99.6% .And positive predictive value 100% for Gel card and indirect coombs test[5][6] using AHG and 99.6%for saline tube method if AHG not used.

Conclusion : Gel card used in blood cross match is easy to performed and recorded test and more sensitive and specific then convention saline method whereas indirect coombs tube test is sensitive and specific as Gel card but cannot record and more time consuming than saline and gel card method.

Keywords: Gel technique ; conventional tube methods

Introduction:

the current study was done in blood bank of Sanjay Gandhi memorial hospital ,Rewa, (M.P) , newly introduced a technique called Matrix Gel Card technique for blood cross matching. Previously conventional tube methods are used for blood cross match which is mainly saline tube method(Spin tube method) and indirect coombs tube method . gel technique is introduced by Lapierre, which based on controlled centrifugation of red cells though sephadex gel contained within microtu-be.gel techniques also used for various test like ABO and Rh typing, ide-ntification of all antibo-dies , indirect and direct antiglobulin test (IAT&DAT)Present study is carried out for com-parison between gel card and conventional tube test for sensitivity and specificity , time and cost efficieny .

Aims and objectives:

Comparative study between conventional cross match and matrix gel card technique on the basis of sensitivity and specificity.

Material and methods:

1000 randomly sample selected and collected from donors attending blood bank of Sanjay Gandhi memorial Hospital ,Rewa .Donors are healthy and >47 kg of weight with negative serology of HIV,HCV, HbsAg, VDLR and

Malaria. In present study first we done the blood grouping by using Antisera A,B,D of patient blood and donors blood bag. After matching of blood group we proceeds to cross matching of the donor and recipient blood by using two methods first is Conventional tube method with AHG (IAT) and without it. Second method is Matrix Gel Card method which is newly introduced in our blood bank. Method which is apply in Conventio-nal tube method first marking the patient and donor test tube with marker ,centrifuge the both blood sample and extract the serum of patient and donor red cells, mixing of serum of patient and red cells of donor in clean test tube and after this we add the Anti Human globulin (AHG, Coombs Reage-nt[5][6]) and incubate in 37^0C and then see the result if clumping present in test tube blood bag is incompatible. if not present blood is compa-tible for patient. Second method is Matrix Gel Card method in this method special machine used for centrifuge of Gel Card and also incubator for Gel card ,LISS, test tubes and micropipette first we clean and ready for conduc-ting the test Gel card technique**:** first prepare a 0.8% red cell suspe-nsion by adding 1ml diluents-2 in to clear test tube then add by micro pipette 10µl of packed red cells of donor to it. after this take a Matrix gel card open the foil of one micro tube gently and write the pati-ent id no. below particular micro tube then add 50µl of 0.8 donor red cell suspension to it after this add 25µl patient serum to it. Incubate the gel card in Matrix gel card incubator for 15 minutes at 37^0C. After incubation centrifuge the card in Mat-rix gel card centrifuge machine for 10 min-utes and then read the result.If gel card result shows RBCs are settled bottom of particular micro tube means No agglutination (Negative result) that means Donors blood is compatible to the recipient and suitable for trans-fusion. If RBCs are trapped betw-een upper and bottom of tube that means somet-hing is wrong and result are called Positive result, incompatible for recipient. Positive result are grade in to +4 to +1.(+4 means top of micro tube and +1 near to bottom of micro tube).

Observation and result:

	Method Used	Sample Size	Compatible		Incompatible	
			TN	FP	TP	FN
01	Conventional tube method without AHG	1000	992	04*	00	04**
02	Conventional tube method with AHG(IAT)	1000	996	0	04	00
03	Matrix Gel Card	1000	996	0	04	00

*,** Result obtained only if AHG used with Conventional method otherwise it shows 100% compatible result.

Table no. 01 shows 1000 random blood sample is cross matched by using conventional tube method with and without using AHG(IAT) and Matrix Gel Card . Result are observed in conventional tube method without AH-G ,1000 sample shows 100% compatibility but in the table 04 sample shows false positive(FP) and 04 sample shows False Neg-gtive(FN) if we Add AHG (IAT) this is calculated after compare the result of conventional tube meth-od with AHG and Matrix Gel card method which shows 996(99.6) sample compatible and 04 (0.4%) True Positive(TP)

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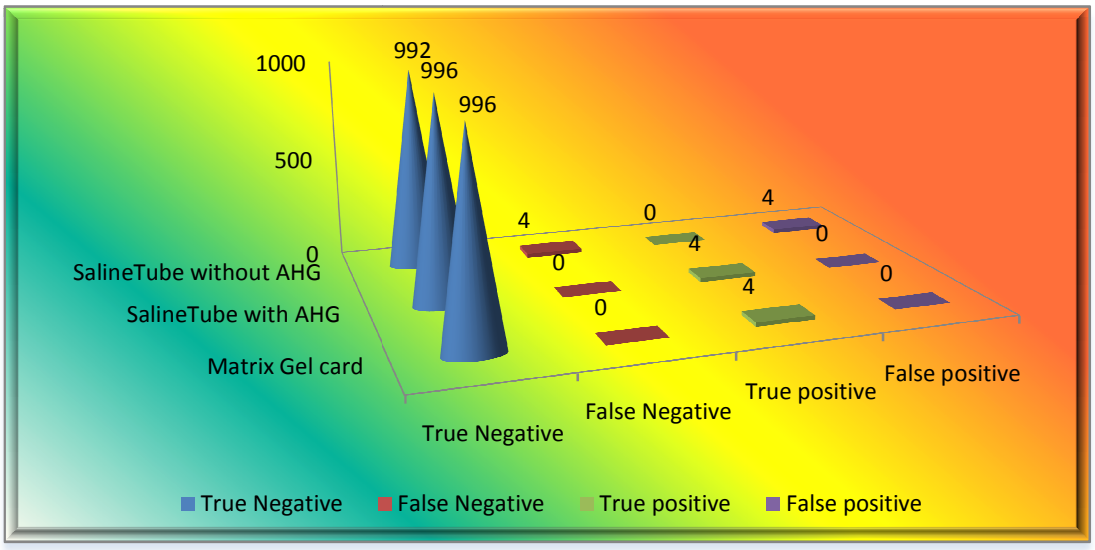

Graph No.01

Observation and result plotted in graph

Discussion:

In India and other country the gel test performed in various institutions and hospitals for blood cross match it is first introduced by **Lapierre et al.[11]** he gives the idea of six micro tube embe-dded in plastic card. Microt-ubes filled with specif-ic gel medium which allows to testing ,easy reading , recording, handling and disposal . In our present study 0.4% sample shows incomp-atibility (agglutination) by gel card method and also convent-ional tube method using IAT(AHG). Where as conventional tube method (Spin tube) without IAT shows 100% compatibility which is not correct because 04 sample shows False Negative and 04 sample shows False Positive if we subjected to IAT.The specificity and sensitivity is 100% of both gel card and conventional tube method with IAT(AHG) ,where as specificity of conventional tube (Spin tube) without IAT is 99.6%.**Swarup et al[15]** concluded that gel card method is better than conventional spin tube method because of its simplicity, stability of results, dispensation of controls, absence of wash phase with comparable sensitivity and specificity which is agreement with this stu-dy.**Rumsey DH et al[18]**proposed that the gel test at least as sensitive as an LISS IAT tube test with a better balance of sensitivity and specificity.**Bromillow et al**[2][3] proposed that The number of non-specific antibodies and false-positive screens were reduced using the gel test system. Antibody titers perform-ed using the gel system were more sensitive than with our tube IAT method. The gel system was easy to use and gave reliable, reproducible results. My study agree-ment with result but my result obtained with tube IAT same as gel card method .**Noveretti MCZ et al.**[14] result shows that gel test is more sensitive than tube test for identifying potentially clinically significant antibo-dies. **Cat et al**[4] testing efficiency was improved following introduction of the gel test into routine use.

Kaur et al[8] study shows that DiaMed gel card system easy to use and his finding suggest it proved to be more sensitive than the conventional tube agglutination technique. **Nathlang et al** [17]study proposed that the gel test equal or better than conventional test tube method and simple to performed and less exposure of blood bank person

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to blood specially area with HIV infection is prevalent. My study agree with above both prior study and its result. **Jai prakash et al** [7]concluded that gel test is better alternative to the conventional tube test for both DAT and IAT.Over all, prior study which is mention above are correlate with my present study with maximum findings.

Conclusion

Gel card is more sensitive and more specific than conventional tube methods and also less time consuming but more costly than conventional tube methods. As per result we concluded and advice for use of gel card in vari-ous blood banking services as routine test in cross matching for prior blood transfusion because of high sensit-ivity and specificity than conventional tube methods.

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