INTRODUCTION OF THE MMA TEST – A PILOT STUDY

Debbie McLinden

Senior Biomedical Scientist – SLS

South African Blood Transfusion Congress,
Sun City

30 August 2017

MMA???

Accessed online on 10/08/2016 from www.mutantmma.com

MMA???

Accessed online on 10/08/2016 from www.bleacherreport.com

MMA =

MONOCYTE

MONOLAYER

ASSAY

THE MONOCYTE MONOLAYER ASSAY

- In vitro assay
- Considered to be representative of in vivo survival of sensitized red blood cells
- Therefore, may be used as a predictor of:
  - The clinical severity of red cell alloantibodies
  - The severity of haemolytic disease of the newborn

INTRODUCTION INTO SANBS

- The MMA test was first put into use in the early 1970's – but not ever used in SANBS
- Implementation in SANBS Reference Lab will provide an additional tool to patients' treating physicians regarding the suitability of transfusing their patients with incompatible blood

SANBS APPLICATIONS FOR MMA

- Determining the possible clinical significance of alloantibodies to red blood cell antigens of high frequency where the patient may require transfusion and antigen negative blood is unavailable
- Post transfusion monitoring of cases in which patients with alloantibodies to high frequency antigens have been transfused with incompatible blood due to the lack of compatible or antigen negative blood

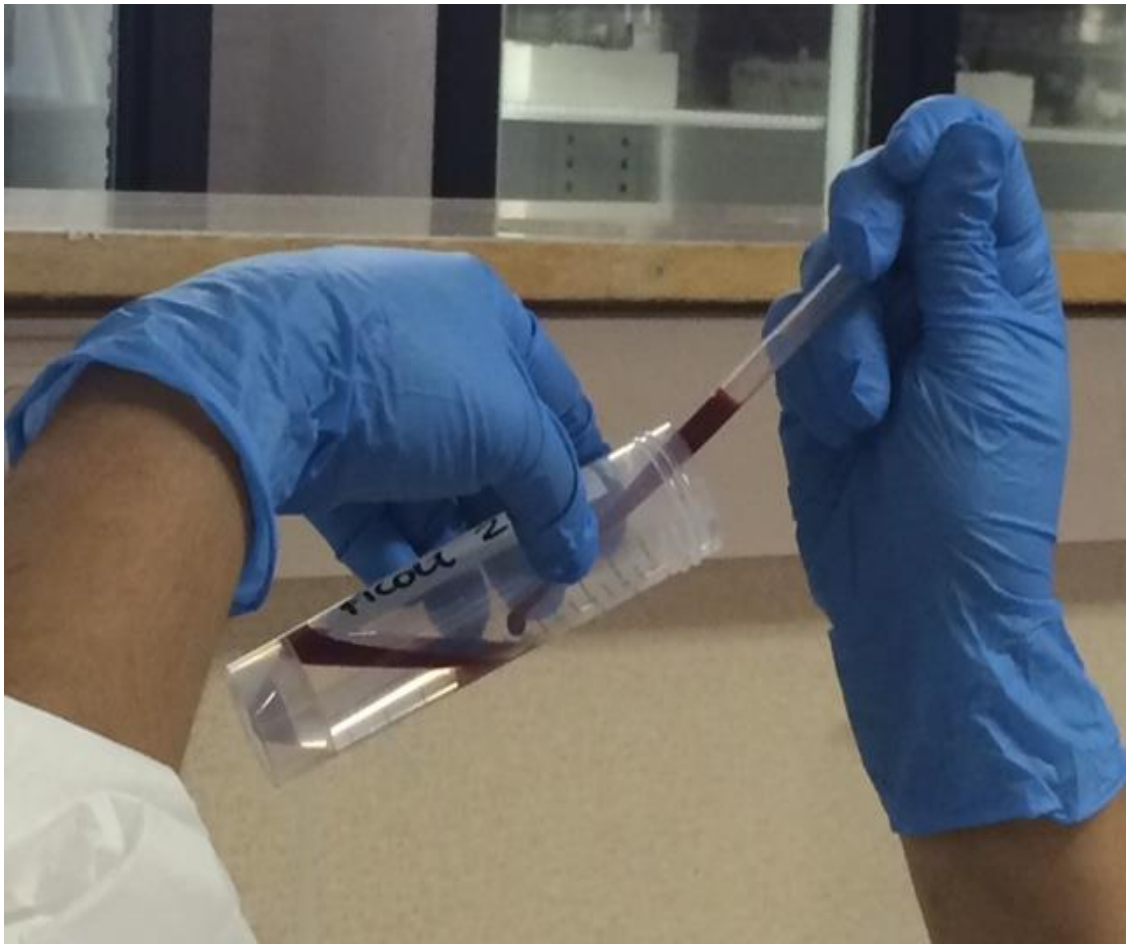
SANBS APPLICATIONS FOR MMA

- On request or in studies for determining the possible clinical significance of alloantibodies in haemolytic disease of the foetus and newborn (HDFN) cases
- MMA testing may be applicable when the following antibodies are identified and antigen negative blood is not available: anti-hr^B, -hr^S, -Yt^a, -Lu^b, -Ge:2, -Ge:3, -Lan, -Gy^a, -Hy, -Jo^a, -Jr^a, -LW, -At^a, -In^b, -Mi^a and –Cs^a

TEST PROCEDURE

- Identify the patient's alloantibody
- Select antigen positive RBC to be used in the test – prior to an incompatible transfusion, this will be a sample of the donor RBC
- Obtain 3 – 4 ACD tubes of whole blood from a healthy, willing monocyte donor
- Centrifuge ACD tubes at 150g for 10 minutes, remove the platelet rich plasma and resuspend in PBS

TEST PROCEDURE



Layer remaining red cell/white cell/PBS mixture onto a solution of Ficoll

TEST PROCEDURE

TEST PROCEDURE

- The monocytes are transferred into a clean test tube and washed
- Sensitized cells are prepared
  - Patient serum (known antibody specificity) and donor RBC (ag+)
- Sensitized and unsensitized cells are washed and tested

TEST PROCEDURE

Monocytes are placed on a glass chamber slide, incubated and the supernatant removed – adherent monocytes remain on the slide

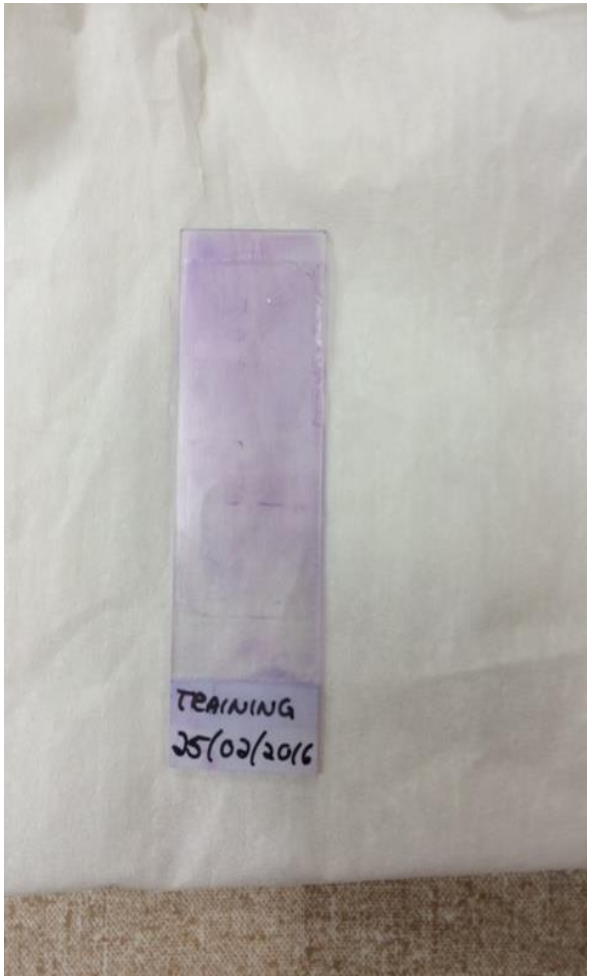
TEST PROCEDURE

Antibody-sensitized and unsensitised red blood cells added to the chambers and incubated with the monocyte layer

TEST PROCEDURE

The supernatant is removed with a pipette and the chambers separated from the slide

TEST PROCEDURE



- Unattached RBC are removed by washing and the slide is stained
- Slide is read microscopically
- Percentage of monocytes with adherent and/or phagocytosed RBC is determined.

INTERPRETATION OF RESULTS

Accessed online on 10/08/2016 at www.ucdmc.ucdavis.edu

INTERPRETATION OF RESULTS

- %R of ≤ 5% = Incompatible blood could be given with little risk
- %R between 5.1 - 20% = 33% of patients may have clinical signs of a reaction
- %R of > 20% = 64% of patients may have clinical signs of a reaction

INTERPRETATION OF RESULTS

IMPORTANT:

Although values of ≤ 5% have been associated with only a low risk of an acute haemolytic transfusion reaction, it must be noted that this value does not necessarily guarantee the normal, long-term in-vivo survival of the transfused RBC

SANBS MMA PILOT STUDY

- Challenge: no prior SANBS experience meant that external training would be required
- Training provided at the American Red Cross, Southern California Region
- ARC protocol brought back to SANBS for implementation
- SANBS Immunohaematology Reference Lab staff trained

SANBS MMA PILOT STUDY

- Series of 3 pilot tests were performed to confirm test performance in our laboratory
- Clinically significant antibodies used
  - 2 X anti-D and 1 x anti-K
  - %R >20% anticipated
- Actual results:
  - 56%, 69% and 44% respectively

SANBS MMA PILOT STUDY

- The MMA pilot study indicates that the ARC protocol can be successfully implemented in our laboratory
- Full test validation to be completed and documented
- Full rollout of the MMA in the Immunohaematology Laboratory is anticipated later this year

CONCLUSION

HOWEVER

- The decision to transfuse incompatible blood cannot be based solely on the MMA result – assess clinical need
- Assists the treating physician to make a more informed decision regarding patient treatment

REFERENCES

- Evaluating the Clinical Significance of Blood Group Alloantibodies that are causing Problems in Pretransfusion Testing, Garratty G. Vox Sanguinis 1998; 74 (Suppl. 2): 285 – 290
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- Monocyte Monolayer Assay; Special Immunohaematology Laboratory, American Red Cross Services, Southern California Region, Pomona, CA