HEALTH HOLDING

HAFER ALBATIN HEALTH CLUSTER MATERNITY AND CHILDREN HOSPITAL

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| **Department:** | Laboratory and Blood Bank | | |
| **Document:** | Internal Policy and Procedure | | |
| **Title:** | Cross Matching Techniques | | |
| **Applies To:** | All Blood Bank Staff | | |
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## 1. PURPOSE:

1.1 The cross-match compatibility test is used to detect the presence of blood group antibodies in an intended recipient 's plasma directed towards antigens present on donor red blood cells.

## 2. DEFINITONS:

2.1 **The cross match** is an in vitro procedure to determine serologic compatibility between donors' red cell suspension and recipients' serum/plasma without agglutination and or hemolysis in the various phases.

## 3. POLICY:

3.1 In this test, the donor red blood cells are combined with patient serum/plasma to allow antigen-antibody interaction.
3.2 Pre-transfusion testing is performed on a specimen collected from the recipient with every admission and within three days of the scheduled transfusion time.
3.3 Patient history of ABO/Rh., antibodies or severe reactions must be reviewed before issuing blood.
3.4 When there is no history for the patient in the transfusion services records or computer system, two determinations of the patients ABO/RhD must be made on two specimens collected during the current admission.
3.5 Immediate spin (IS) cross match is acceptable for patient with no clinically significant antibodies.
3.6 Patient with currently detectable clinically significant antibodies must receive full cross match compatible antigen-negative units .

## 4. PROCEDURE:

4.1 **Immediate spin cross match** is acceptable for patient with no clinically significant antibodies (not detected in current antibody detection tests and there is no record of previous detection of such antibodies) or upon request by doctors in emergency situations. Is not for neonates (less than 4 months of age).

4.2 **Specimen:**

4.2.1 Patient's sample:

4.2.1.1 For adult patients: Properly labeled EDTA blood (4 ml) from patient. Clotted sample is accepted in emergency cross match.

4.2.1.2 For infant and pediatric cases: Properly labelled EDTA blood (2 ml).

4.2.1.3 Maternal sample and history: As neonates' blood may contain maternal antibodies, blood bank may ask for maternal sample for group and screen.

4.2.1.4 Sample age:

4.2.1.4.1 Pre-transfusion testing is performed on a specimen collected from the recipient with every admission and within three days of the scheduled transfusion time.

4.2.1.4.2 If the patient was transfused within the previous 3 months (with component containing allogenic RBC), has been pregnant within the preceding 3 months or if the history is uncertain or unavailable, the pre-transfusion

sample used for testing must be no more than three days old at the time of intended transfusion. Day zero is the day of draw.

4.2.1.4.3 Note: If the patient was not transfused within the previous 3 months and not pregnant, no limit exists to the length of time that a pre-transfusion sample is valid for cross match.

4.2.1.4.4 In recently transfused patients, the pre-transfusion sample used for testing must be no more than 24 hours old at the time of intended transfusion.

4.2.2 Donor cells from segment originally attached to the unit being crossmatched.

4.3 **Tube method:**

4.3.1 Materials:

4.3.1.1 Glass test tubes.
4.3.1.2 Disposable Pasteur pipettes.
4.3.1.3 Saline (0.9%)
4.3.1.4 Anti-human globulin (AHG; coombs reagent)
4.3.1.5 IgG sensitized RBCs (Coombs control cells; CCC)
4.3.1.6 Automatic cell washer.
4.3.1.7 Microscope, glass slides, cover slides.
4.3.1.8 Dry bath or water bath
4.3.1.9 22% bovine albumin

4.3.2 Procedure:

4.3.2.1 Immediate spin crossmatch (I.S.):

4.3.2.1.1 Place 2 drops of the patient plasma/serum in a properly labelled test tube (one tube for each unit to be crossmatched)
4.3.2.1.2 Add one drop of 2-5 % saline suspension of donor red cells, and mix.
4.3.2.1.3 Centrifuge immediately (for 20 seconds at 1000 g), examine for hemolysis (if serum is used), resuspend gently, read macroscopically for agglutination and record the results (in I.S. column).

4.3.2.2 Coombs (AHG) Crossmatch:

4.3.2.2.1 Incubate at 37°C for 30-60 minutes. (If albumin is used, add 2 drops of 22% bovine albumin and mix, and then incubate at 37°C for 15-30 minutes).
4.3.2.2.2 Centrifuge (for 20 seconds at 1000 g), examine for hemolysis (if serum is used), resuspend gently and observe for agglutination, record results (in 37°C column).
4.3.2.2.3 Wash 3- 4 times with saline and decant after the last wash.
4.3.2.2.4 Add 2 drops of AHG, and mix.
4.3.2.2.5 Centrifuge (for 20 seconds at 1000 g), resuspend gently, examine for agglutination and record the results (in AHG column).
4.3.2.2.6 To all negative tests, and one drop of CCC, centrifuge and examine for agglutination. If no agglutination, repeat the test.

4.3.2.3 Interpretation:

4.3.2.3.1 Agglutination in any phase of the cross match indicates incompatibility.
4.3.2.3.2 Also, hemolysis after immediate spin or 37°C incubation indicates incompatibility if serum is used.
4.3.2.3.3 Negative reaction indicates that the donor and recipient are compatible.

4.3.2.4 Reporting Results:

4.3.2.4.1 Enter the unit types, numbers, volume, record reaction results, antibody screening, expired date of the unit and blood group in the blood transfusion requests and crossmatching register.
4.3.2.4.2 Labelling of blood or blood components with the recipient's Identification: A blood container shall have an attached label or tag indicating:
4.3.2.4.2.1 The intended recipient's two independent identifiers; patient name and ID number and patient's ABO/ Rh D.
4.3.2.4.2.2 Donation identification number.
4.3.2.4.2.3 Interpretation of compatibility tests.
4.3.2.4.3 Place the labelled unit in the refrigerator for crossmatched units.

4.3.2.4.4 Blood bank technician/ specialist keeps requests of cross matched units, requests for blood issued, requests without cross match, cancelled cross match forms and operation theatre (OT) schedule paper in their specified files.

4.3.2.5 Procedure notes:

4.3.2.5.1 Cross match specimen may be the first and only opportunity that a laboratory has to determine a patient's ABO and Rh status. The risk of "Wrong Blood in Tube (WBIT)" is about 1 in 2000 specimens.

4.3.2.5.2 Compatible crossmatch will not:

4.3.2.5.2.1 Guarantee normal survival of transfused cells.

4.3.2.5.2.2 Prevent immunization of the recipient

4.3.2.5.2.3 Detect all unexpected antibodies in recipient serum.

4.3.2.5.3 Since all donors are routinely screened for irregular antibodies, minor cross match is no longer routinely performed with plasma or platelet transfusion.

4.4 **Using gel micro typing system** (See chapter of "Column Technology & the Gel Microtyping System" (LB-IPP-206) and follow the manufacturer's directions).

## 5. MATERIALS AND EQUIPMENT:

5.1 As mentioned in 4.3.1.
5.2 Blood transfusion request form

## 6. RESPONSIBILITIES:

6.1 Blood bank staff members like technician/ specialist have to follow the detailed procedures.

## 7. APPENDICES:

N/A

## 8. REFERENCES:


8.1 The Unified Practical Procedure Manual for Blood Banks in The Arab Countries, 1434-2013.
8.2 The Standard Policy for Blood Banks in The Kingdom of Saudi Arabia, 1st edition, 1435-2014.
8.3 National Standards for Clinical laboratories and Blood Banks, 1st edition, 2015.
8.4 AABB Technical manual, 18th edition, 2014.
8.5 AABB Standards for Blood Banks and Transfusion Services, 30th edition, 2016.
8.6 Mollison's Blood Transfusion in Clinical Medicine; 12th edition, 2014.

## 9. APPROVALS:

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