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Prewarm Technique

Document Type: Procedure

I. PURPOSE AND OBJECTIVE:

When cold reacting antibodies are present in a patient's plasma they may interfere with ABO grouping tests, antibody screening, and compatibility testing. The prewarm technique is performed at temperatures as close to 37°C as possible, attempting to circumvent the reactivity of cold reacting antibodies which are usually considered clinically insignificant. Red cells and the patient's plasma are prewarmed to 37°C separately before they are combined. An antibody screen, panel, or reverse typing may then be performed as described in the following policy *Limited Use of the Prewarm Technique*.

II. POLICIES:

A. **Limited Use of the Prewarm Technique**
The prewarm technique has become controversial. It has been shown to result in decreased reactivity of some potentially clinically significant antibodies, and weak antibodies may not be detected. Therefore, the prewarm technique may be performed if specifically directed elsewhere in the Standard Operating Procedures or by the Medical Director or designee (MD). For example:

1. A prewarmed antibody screen or antibody panel may be performed only if directed by the MD. For example, the MD may direct a technologist to perform a prewarmed panel to circumvent the reactivity of a cold reacting antibody in order to aid in the identification of clinically significant antibodies.
2. A prewarmed reverse typing may be performed only if a cold reacting antibody is interfering in the tube reverse typing and the specificity cannot be determined by the tube panel.
3. **Prewarmed crossmatches are not allowed unless specified and approved by a Blood Bank Medical Director.**

B. **Group O Control**
A group O panel cell shall be used as a control when performing a prewarmed reverse. This control must be non-reactive in order to interpret the ABO as A, B, AB, or O.

III. SPECIMEN COLLECTION AND HANDLING:

The preferred sample is a 6 ml EDTA sample with affixed identifying label. Refer to Transfusion Medicine policy, Triaging and Identifying Acceptable Samples for Testing.

IV. REAGENTS:

A. Ortho 3% Surgiscreen Antibody screen cells comprised of three vials of human red blood cells

B. Anti-IgG Anti-Human globulin (AHG)

C. Ortho Affirmagen A1 cells and B cells

D. Ortho Coombs Control IgG Coated Reagent Red Blood Cells (Pooled cells)

V. EQUIPMENT:

A. Table top centrifuge

B. Lighted agglutination viewer

C. 37°C water bath

D. 37°C heat block

VI. SUPPLIES:

A. 10 x 75 mm or 12 x 75 mm test tubes

B. Disposable pipettes

C. 0.9% Normal Saline (prewarmed to 37°C)

VII. QUALITY CONTROL (QC):

A. Quality control is performed once per day on all lot numbers of reagents and cells currently used for testing. Refer to site specific Transfusion Medicine Quality Control procedures.

B. When performing a prewarm reverse typing, a group O Control must be used.

VIII. PROCEDURE:

A. Section I: Prewarmed Antibody Screen or Panel
A prewarmed antibody screen or panel shall be performed only if specifically directed by a Blood Bank Medical Director.

1. If not already available, warm a bottle of saline in the 37°C water bath for approximately 10-15 minutes.
2. Label test tubes as follows:
    a. Label a test tube for each reagent or donor test cell that will be used (for antibody screen or panel).
    b. Label a test tube in which to prepare an approximate 2% to 4% saline-suspension of the patient's red cells.
    c. Label a test tube for the patient's autocontrol.
    d. Label a test tube in which to prewarm the patient's plasma.
3. Make an approximate 2% to 4% saline-suspension of the patient's red cells using warm saline, in the correspondingly labeled tube.

4. Add 1 drop of each reagent donor test cell to the correspondingly labeled test tubes, and one drop of the patient's cell suspension to the tube labeled for autocontrol.
5. To the tube labeled for the patient's plasma, add a sufficient volume of plasma for the antibody screen or panel that will be performed. Note that 3 drops of plasma are required for each cell that will be tested.
6. Place each tube (containing the drop of test cells and the drop of the patient's cell suspension) and the tube containing the patient's plasma in the 37°C heat block. Allow all tubes to incubate (separately) at 37°C for 10 minutes.
7. After the 10 minute incubation, transfer 3 drops of the patient's prewarmed plasma to each of the tubes containing the test cells. Mix each tube gently, removing the tubes from the heat block for the shortest time as necessary to mix.
8. Incubate the tubes (containing the combined plasma and test cells) at 37°C for 60 minutes.
9. Without removing the tubes from the heat block, fill each tube with prewarmed (37°C) saline. Centrifuge and wash a total of four times with 37°C saline, obtaining a dry cell button.
10. Add two (2) drops Anti-IgG AHG to each tube (dry cell button) and agitate gently to mix.
11. Centrifuge tubes according to calibrated time and gently resuspend the cell button.
12. Read, grade, and record the AHG test results. Document that the prewarm technique was used, with the MD's approval. If used at the testing facility, record results on Special Studies Worksheet or on a copy of the antigram.
13. Add IgG coated check cells to all AHG phase results that are negative and agitate gently to mix. Refer to the Quality Control section.
14. Centrifuge tubes according to calibrated time and gently resuspend the cell button.
15. Read, grade, and record coated check cell results. If there is no agglutination, the testing is invalid and should be repeated.
16. Interpret the results. If necessary, refer to the Transfusion Medicine Policy, Antibody Screening

B. Section II: Prewarmed Reverse Typing

A prewarmed reverse typing may be performed if a cold reacting antibody is interfering in the tube reverse typing and the specificity cannot be determined by the tube panel. For patient's that have a cold reacting antibody that has been identified, such as Anti-M and Anti-P_1, A_1 and B cells that lack the corresponding antigen should be used.

1. Label test tubes as follows:
    a. Label a test tube in which to prewarm the patient's plasma.
    b. Label 3 test tubes: for the reverse A_1 and B cell and for the group O control. Refer to the above policy Group O Control.
2. Add 1 drop of each reverse A_1, B, and O control cell to the correspondingly labeled test tubes.
3. Add at least 6 drops of the patient's plasma to the tube that was labeled for the patient's plasma.
4. Place the tubes containing the reverse A_1, B, and O control cells and the tube with the patient's plasma in the 37°C heat block. Allow all tubes to incubate (separately) at 37°C for 10 minutes.
5. After the 10 minute incubation, transfer 2 drops of the patient's prewarmed plasma to each of the tubes containing the reverse A_1, B, and O control cells. Mix each tube gently.

6. Agitate all tubes to mix and centrifuge tubes according to calibrated time.
7. Read and record test results; add the ABORh canned message in the Blood Bank computer system to the ABORh test. If necessary, refer to Transfusion Medicine Policy, *Reading, Grading, and Recording Test Reactions*.
   Refer to the Special Studies Computer Documentation Manual *Adding the ABORh Canned Message to Document ABORh Discrepancies"*
8. Interpret the results according to the chart in the Interpretation section of this document.

IX. INTERPRETATIONS:

A. After performing a prewarmed reverse typing, the ABO group shall be interpreted as follows

If ABO graded reactions are:				And the Group O Control is:	Then interpret the ABO as
Forward		Reverse			
Anti-A	Anti-B	A1 Cells	B Cells		
3 - 4+	0	0	2 - 4+ or hemolyzed	Non-reactive	A
0	3 - 4+	2 - 4+ or hemolyzed	0	Non-reactive	B
3 - 4+	3 - 4+	0	0	Non-reactive	AB
0	0	2 - 4+ or hemolyzed	2 - 4+ or hemolyzed	Non-reactive	O
Any	Any	Any	Any	Reactive (any strength)	GND
If an ABO discrepancy remains unresolved after completion of the investigation, then a supervisor, MT Lead, or employee with appropriate computer access will interpret the ABO test as GND (Group Not Determined).					GND

The group O control must be non-reactive in order to interpret the ABO as A, B, AB, or O. If reactivity is observed with the group O control, then:

1. A cold reacting antibody may still be reactive, despite using a prewarmed technique.
2. The ABO shall be interpreted as GND (Group Not Determined).
3. The discrepancy remains unresolved. Group O RBCs must be used if transfusion is necessary.

X. NOTES:

A. Weak examples of Anti-A and Anti-B may not be detected by the prewarmed reverse technique.

XI. REFERENCES:

1. AABB Technical Manual, current edition.

2. AABB Standards for Blood Banks and Transfusion Services, current edition.

Attachments

No Attachments

Approval Signatures

Step Description	Approver	Date
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Applicability

Dearborn, Farmington Hills, Grosse Pointe, Royal Oak, Taylor, Trenton, Troy, Wayne