Compatibility testing

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Goal of transfusion

Ensure maximum red cell survival

Prevent disease transmission
Why do we care?

Compatibility testing

- To avoid a hemolytic transfusion reaction
Safe Transfusion: Processes not just product.

Process

Product

Recruit
- Screen donor
- Collect & Prepare
- Inf Dis tests

Pre-tx testing

Medical Reason for Tx

Issue
- Administer (bedside)
- Monitor & Evaluate

Patient sample

1 3 2

A+
Intravascular Clumping of Donor RBC’s
Intravascular hemolysis of donor RBC’s
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Cross match

- Matching blood components between a Pt & pack cell
- is a direct compatibility test
- Red cells & Plasma are cross matched
- Major and Minor cross match
  - ‘Major’: the patient's serum & the donor's RBCs.
  - ‘Minor’: the patient's RBCs & the donor's serum.
Cross matching: approaches...

Extended (Full-Length) Cross-match

- Performed on Recipients

- Methods include IS, 37 and AHG phases

Abbreviated crossmatch:

- Immediate Spin Crossmatch.
Crossmatch/ Transfusion ratio

- Ratio of crossmatched units to actually transfused units for a patient

C:T >2.) indicates excessive crossmatch requests

Ordering guidelines available for different surgical procedures
Antibody Screen

• Screened for the presence of unexpected antibodies in plasma that could cause a transfusion reaction.

• Detect MOST antibodies, both clinically significant and insignificant

• Antibodies are a result of previous transfusion or pregnancy and are IgG in nature
Antibody Screen

Patient’s plasma is mixed with the red cells from each of the two samples represented on this screen

A “potentiator” is added to the plasma/red cell mixture to enhance reactivity and speed up the testing
Antibody Screen: Interpretation

- **Negative** (no unexpected antibodies were detected) if the patient’s plasma is nonreactive with the screening cells

- **Positive** if patient’s plasma is reactive with one or more of the screening cells; indicates an antibody is present and will need to be identified before transfusion can be safely accomplished
The Good News!!

Most patients don’t form red cell antibodies (even if they are multiply transfused or pregnant)

Only about 2-3% will be positive and require additional identification techniques.
Antibody Identification

When the screen is positive, the antibody(s) present must be identified.

The antibody identification may be performed serologically in the same way the screen is performed; just more red cell examples

An autocontrol is included in the antibody identification to determine if autoantibodies or alloantibodies are present
When an antibody is identified:

Clinical significance of antibody needs to be ascertained

If the antibody is of clinical significance in transfusion, donor units negative for the corresponding antigen must be selected for crossmatching
The final step: crossmatching

Testing patient’s (recipient’s) plasma with the red cells of the intended donor to determine compatibility.

- **Negative crossmatch**: indicates serologic compatibility with the donor red cells.
- **Positive crossmatch**: indicates serologic incompatibility with the donor red cells.
The final step: crossmatching

If the antibody screen is negative:
- An abbreviated “immediate spin” crossmatch is the only testing that is required; the only purpose of the IS crossmatch is to make sure an ABO mistake has not been made; it is the LAST CHANCE to blunt a possible fatal transfusion reaction due to an ABO error.
The final step: crossmatching

If the antibody screen is positive:

- Antibody identification is performed; antibody(s) are determined
- ABO compatible donor red cells negative for the corresponding antigen are chosen for the crossmatch
- The crossmatch is performed by the same serologic methods used to do the screen and the antibody identification (AHG crossmatch)
What is the difference between a Type & Screen and Type & Cross match?
The difference is...

Type & Screen
- ABO type and antibody screen/identification
- Valid for 3 months if no transfusion or pregnancy history
- Valid for 3 days if transfused or pregnant

Type & Cross (Crossmatch)
- ABO type
- Requested number of units crossmatched for patient and taken out of inventory
- Should only be ordered if you anticipate transfusion!
Plasma Products

- Test for ABO group
  
  no crossmatch required

  plasma or plasma product should be compatible with recipient ABO blood group.
Cross matching: Special Circumstances

Clinical urgency

Immediate
- Group O Rh neg
- Packed RBCs

Minutes
- ABO & Rh D type
- Group specific blood

Within an hour
- ABO & Rh D type
- Complete crossmatch

If units are issued without X match – take written consent of physician, complete X match after issue