GUIDELINES FOR PRETRANSFUSION TESTING: PART I

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26-03-2009 WIV congress
INTRODUCTION

1. PURPOSE OF GUIDELINES: PROVIDE SAFE TRANFUSION PRACTICE

- technical/clerical errors
- non-validated techniques – equipment
- non-compliance with procedures

may lead to HEMOLYTIC TRANSFUSION REACTION

2. BASIS

-experts from transfusion services and recommendations from haemovigilance reports
- UK: Guidelines BCSH
- USA: Guidelines AABB
- Nederland: CBO, Richtlijn bloedtransfusie
- Belgium: HGR: 8085, haemovigilance reports, nomenclature Art 24
3. ELEMENTS IN PRETRANSFUSION TESTING

-I. SAMPLE LABELLING

-II. ABO/Rh D GROUPING

-III. ANTIBODY SCREENING

-IV. ANTIBODY IDENTIFICATION

-V. SELECTION OF RED CELL PRODUCTS FOR TRANSFUSION (in case of positive antibody identification)

-VI. CROSSMATCH

-VII. TYPE AND SCREEN
4. QUALITY ASSURANCE IN PRETRANSFUSION PROCEDURES

• LAB: QUALITY MANAGEMENT SYSTEM
  - procedures
  - participation in external/internal QC
  - reagents – equipment – techniques
  - staff training and proficiency
  - information system / automated equipment: validation

• HTC: HOSPITAL TRANSFUSION COMMITTEE
  - policies, procedures for administration of blood
    (request forms, taking - labelling samples, storage – administration of blood)
  - report transfusion incidents
ELEMENTS IN PRETRANSFUSION TESTING
I. SAMPLE LABELLING

-request form–sample: minimum patient identification items
  surname
  name
  date of birth
  unique hospital number

-patient identity
  direct inquiry: asking the patient to state his/her name
  inspection of wrist band / identification label

-labelling immediately after / at the moment the blood sample is drawn

-unlabelled samples shall be discarded
**ELEMENTS IN PRETRANSFUSION TESTING**

**II. ABO AND Rh D GROUPING**

- **most important serological test**

- **ABO grouping**
  - cell grouping: monoclonal anti-A, anti-B reagents
  - reverse grouping: A1 and B reagent red cells

- **D grouping**
  - cell grouping: monoclonal; not detect category D VI

  *(exception: NEONATES: detection of weak/partial D VI)*

- **manual**: 2 determinations – 2 technologists - 2 techniques
- **automation**: 1 determination - 1 technologist - 1 technique

**FINAL blood group**: determined on 2 separate independent samples

**BLOOD GROUP CARD** *(except Neonates: > 4 (6)M)*
ELEMENTS IN PRETRANSFUSION TESTING

III. ANTIBODY SCREENING

- **REAGENT RED CELLS**
  3 group O screening cells with specific antigen composition
  
  \((C,c,D,E,e/K,k/Fya,b/Jka,b/SsMN/Le,b/P1 (18 Ag)\)
  
  (homozygous Fya,b/Jka,b/Ss) (R1R1,R2R2)

- **TECHNIQUES**
  - IAT 37°C (reference method) : LISS-IAT 37°C
    reference method for detecting clinically significant red cell antibodies
  - sensitivity : column agglutination – solid phase technique higher than tube technique
  - specificity : tube technique is higher than column agglutination/solid phase technique

- **ENZYME 37°C (not recommended)**
ELEMENTS IN PRETRANSFUSION TESTING

IV. ANTIBODY IDENTIFICATION (1)

- **REAGENT RED CELLS**: at least 10 cells of group O
  - these cells must fulfill specific criteria of antigen composition to detect all clinically significant antibodies

- **AUTOCONTROL**

- **ASSIGNING SPECIFICITY**
  - reactive with at least 2 ex. of reagent red cells carrying the antigen
  - non reactive with at least 2 ex. of reagent red cells lacking the antigen

- **CHECKING PATIENT ON ABSENCE OF THE CORRESPONDING ANTIGEN**

- **EXCLUDE UNDERLYING ANTIBODIES** (second panel)
TECHNIQUES

-IAT 37 °C
   best method for detection of clinically significant antibodies

-ENZYME 37°C
   helpfull in antibody identification in case of:
      mixture of antibodies
      weak reactive antibodies in IAT
## ELEMENTS IN PRETRANSFUSION TESTING

### V. SELECTION OF RED CELLS FOR TRANSFUSION (1)

<table>
<thead>
<tr>
<th>Specificity</th>
<th>Clinical Significance</th>
<th>Selection of units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rh antibodies</td>
<td>YES</td>
<td>Antigen negative</td>
</tr>
<tr>
<td>Kell antibodies</td>
<td>YES</td>
<td>Antigen negative</td>
</tr>
<tr>
<td>Duffy antibodies</td>
<td>YES</td>
<td>Antigen negative</td>
</tr>
<tr>
<td>Kidd antibodies</td>
<td>YES</td>
<td>Antigen negative</td>
</tr>
<tr>
<td>Anti-S, s</td>
<td>YES</td>
<td>Antigen negative</td>
</tr>
<tr>
<td>Anti-M (37°C)</td>
<td>Sometimes</td>
<td>Antigen negative</td>
</tr>
<tr>
<td>Anti-M</td>
<td>Rarely</td>
<td>IAT XM compatible 37°C</td>
</tr>
</tbody>
</table>
### V. SELECTION OF RED CELLS FOR TRANSFUSION (2)

<table>
<thead>
<tr>
<th>Specificity</th>
<th>Clinical Significance</th>
<th>Selection of units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-Le a, Le b, ant Le a+b</td>
<td>Rarely</td>
<td>IAT XM compatible 37°C</td>
</tr>
<tr>
<td>Anti-A1, P1, N</td>
<td>Rarely</td>
<td>IAT XM compatible 37°C</td>
</tr>
<tr>
<td>Anti-Lu a</td>
<td>Rarely</td>
<td>IAT XM compatible 37°C</td>
</tr>
<tr>
<td>Anti-Lu b</td>
<td>Yes</td>
<td>Ag negative</td>
</tr>
<tr>
<td>HTLA</td>
<td>Unlikely</td>
<td>ask advice transf. centre</td>
</tr>
<tr>
<td>Antibodies low/frequency antigens</td>
<td>Depends on specificity</td>
<td>ask advice transf. centre</td>
</tr>
</tbody>
</table>
- ABO /Rh D group of patient: determined twice before selecting the units (same isogroup) for crossmatch

- ABO, Rh D of selected units are compared with blood group of patient (iso group or compatible)

- TECHNIQUE: IAT 37° C (irregular antibodies)
  TUBE SALINE (ELECTRONIC CROSSMATCH)

- validity: 72 h
  - standardisation for all specimens for pretransfusion
  - only obligatory for patients with Transfus/Pregnancy<3 M
  - arbitrary safe interval related to the production of unexpected antibodies
-NEONATUS

Group O
Rh D dependent on Rh D of neonatus
In case of maternal antibody: selected unit is negative for corresponding antigen

Sample of the mother (neonatus) until 4 months of age

Technique: IAT

-CROSSMATCH for WOMEN < 45 year

Compatible for Rh D antigen and K antigen (other Rh antigens)
ELEMENTS IN PRETRANSFUSION TESTING
VII. TYPE AND SCREEN (1)

NOT FOR

- Intrauterine transfusions (IUT)
- Neonatus until 3 (4-6) months of age
- Patients with alloantibodies (autoantibodies)
- Organ transplantation (until 3 months after)
- Allogeneic stem cell transplantation
- ABO and Rh D type of patient are performed
  2 determinations are determined, one on a current sample

- Antibody screening is performed and is negative

- Validity is 72 h

- Lab must assure validity ABO / Rh D group on donor unit

- Computerized matching with
  donorunitnumber, component name, ABO group – Rh D type, confirmed
  ABO donor unit group – recipient ABO group, antibody screen result
-DAT is not required as a part of pretransfusion testing.

-DAT or AUTOCONTROL: required in case of antibody identification

-POLYSPECIFIC ANTISERA: Screening

-MONOSPECIFIC ANTISERA: Identification and ELUTION

-CLINIC: AIHA, HDN, HEMOLYTIC TRANSFUSION REACTION
VIII. REFERENCES


3. UK (Red Book) : Guidelines for the Blood Transfusion Services


10. Netherlands : CBO Richtlijn Bloedtransfusie


12. Belgium : Guidelines for the transfusion of red cells, HGR 8085