About the diagnosis of acute transfusion-related reaction during cardiopulmonary bypass

M Erpicum, F Blaffart, JO Defraigne, C Gérard, R Larbuisson
University Hospital of Liège, Belgium
Acute transfusion-related reactions

Serious adverse or unexpected reactions occurring in a patient within minutes or hours after transfusion
Acute transfusion-related reactions

**Immune**
- Febrile reaction
- Allergic/Anaphylactic reaction
- Lung injury (TRALI)
- Hemolysis

**Non Immune**
- Hemolysis
- Bacterial infection
- Hypothermia
- Metabolic reaction
- Citrate toxicity
- Circulatory overload (TACO)

- **RBC**
- **FFP**
- **PTS**
Transfusion-related reactions

National hemovigilance system

(European directive 2002/98/CE)

Symptoms - Clinical signs

Hemovigilance procedure

Detection

Corrective measures

Reporting

Preventive measures
Rate of transfusion-related reactions

National
Underestimation

International
Denominators variability
Product quality variability
Definitions variability
Transfusion practices variability
Rate of transfusion-related reactions

Fresh frozen plasma  6/100.000

Red blood cells  17/100.000

Platelets  33/100.000

AFMPS, Annual report of hemovigilance, Belgium 2010
Detection of acute transfusion-related reactions

Symptoms - Clinical signs

Chills
Rigors
Urticaria
Chest/Abdominal pain
Nausea/Vomiting
Malaise/Blackout
Dyspnea

Flush
Rash
Jaundice

Tachycardia
Arhythmia
Hyper/Hypotension
Shock
Fever
Hemoglobinuria
Hemoglobinemia
Oliguria, anuria

Uncontrolled bleeding
<table>
<thead>
<tr>
<th>Condition</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vasomotor instability</td>
<td>↓ BP</td>
</tr>
<tr>
<td>Fever-Chills-Rigidity</td>
<td>↑ VO₂, ↑ pCO₂, ↑ lactates</td>
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<tr>
<td>Erythema-Flushing-Urticaria</td>
<td></td>
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<tr>
<td>Thrombin – Plts activation</td>
<td>↓↑ ACT</td>
</tr>
<tr>
<td>CIVD/ DIC</td>
<td>Uncontrolled bleeding</td>
</tr>
<tr>
<td>Hemolysis</td>
<td>Hb₉ria, ↓ Hb, ↑ MetHb, ↑ K⁺</td>
</tr>
<tr>
<td>Pulmonary oedema</td>
<td>Difficult weaning from CPB</td>
</tr>
</tbody>
</table>
Conclusions
1. Avoid transfusion

2. Delay transfusion => after wean off CPB

3. In case of transfusion
   
   Check identity of patient vs patient identity on blood product label

   During CPB:

   Urine output – Urine color
   Hb - Met Hb values
   Blood pressure
     K^+
     VO_2
   pCO_2, lactates

   Before, during and after transfusion
Any suspicious change?
Transfusion effectiveness?
Uncontrolled bleeding?
Difficult to wean off CPB?
Maybe nothing…

Maybe another thing…

Maybe something.
1. Avoid transfusion

2. Delay transfusion => after wean off CPB

3. In case of transfusion
   Check identity of patient vs patient identity on blood product label

4. In any suspicion of a transfusion-related reaction:
   - Stop transfusion
   - Notify physician and blood bank
   - Residual blood product(s) to blood bank
   - Collect blood sample
The risk of a severe transfusion reaction is low. Detection is difficult in the setting of CPB.

BUT

Detection and report are essential measures in a hemovigilance goal.
Better informed patients, nurses, physicians and laboratory personnel resulting in quality patient care

Thank you for your attention