Near-misses in sample collection and in blood component transfusion. An incidence study using an electronic transfusion safety system

Dr. José-Luis Bueno
Hematology and Hemotherapy Department
Hospital Universitario Puerta de Hierro Majadahonda
(Madrid)
Conflict of Interest Disclosure

I hereby declare the following potential conflicts of interest concerning my presentation:

• **Grifols**
  – Consultancy
  – Honoraria

• **Janssen**
  – Consultancy
  – Honoraria

• **PRoPosit**
  – CEO
  – Medical Director

• **Sanofi**
  – Consultancy
  – Honoraria
  – Medical writing
  – Advisory Committees

• **Onega+**
  – Consultancy
ANNUAL SHOT REPORT 2016 SUMMARY

**87% ERRORS**
- **TOTAL REPORTS 3091**
- Critical points where positive patient identification is essential
  - All samples must be labelled at the bedside from the wristband details. Unlabelled blood samples MUST NOT leave the SAMPLE CIRCLE. Unlabelled blood samples outside the circle should be disposed of.

**MHRA: 98% SAE reports due to ERROR**

**Key SHOT Message**
ABO-incompatible transfusions are the tip of the iceberg; they most commonly result from failure to identify the patient at the time of blood sampling (wrong blood in tube) or administration to the wrong patient.

3 ABO-incompatible transfusions
264 ABO near miss
Reducing adverse events in blood transfusion

Dorothy Stainsby, Joan Russell, Hannah Cohen and John Lilleyman

1 Serious Hazards of Transfusion, Manchester Blood Centre, Manchester, UK, and 2 National Health Service National Patient Safety Agency, 46 Maple Street, London W12 5HD, UK
• SHOT 1996-2003
• Risk of an error occurring during transfusion of a blood component 1:16,500
• Risk of an ABO incompatible transfusion 1:100,000
• Risk of a death as result of an incorrect blood component transfusion 1:1,500,000
Transfusion with unknown donor and recipient ABO typing, in caucasian matches in around 63%
1 ABO Hemolytic Transfusion reaction

2 asintomatic ABO errors
Near-misses
Puerta de Hierro-Majadahonda Hospital. Transfusions 2008-2017

- **RBCs**
- **Plasma units**
- **Platelet units**

![Graph showing transfusion data from 2008 to 2017 for RBCs, Plasma units, and Platelet units.](image-url)

- **Yearly transfusion counts**
  - 2008: RBCs 10,136, Plasma 4,138, Platelet 1,346
  - 2009: RBCs 12,172, Plasma 4,543, Platelet 1,906
  - 2010: RBCs 13,897, Plasma 4,141, Platelet 2,718
  - 2011: RBCs 15,081, Plasma 4,466, Platelet 2,962
  - 2012: RBCs 14,610, Plasma 4,693, Platelet 2,798
  - 2013: RBCs 12,914, Plasma 3,348, Platelet 2,259
  - 2014: RBCs 13,160, Plasma 3,556, Platelet 3,211
  - 2015: RBCs 13,690, Plasma 3,494, Platelet 2,943
  - 2016: RBCs 14,436, Plasma 3,647, Platelet 2,798
  - 2017: RBCs 13,461, Plasma 2,516, Platelet 2,929

**Overall totals**
- **RBCs**: 108,811
- **Plasma units**: 18,906
- **Platelet units**: 12,914
Blood sample verification. Before 2013

ABO Rh checking against previous record

Second blood sample collection in new patient
Blood sample verification. Before 2013

Second blood sample collection in new patient
Bed-side verification. Before 2013

“Wet test” blood group checking in the bedside
Bed-side verification. Before 2013

“Wet test” blood group checking in the bedside
Acute transfusion reactions & Haemovigilance
Puerta de Hierro Hospital Madrid; Spain
2010- to October 2015

135 events/ 123,941 transfusions

10.9 events/ 10,000 transfusions
Haemovigilance Report 2010-2012
1 ABO error per 11,000 units transfused

<table>
<thead>
<tr>
<th>Category</th>
<th>RBC</th>
<th>%</th>
<th>PLT</th>
<th>%</th>
<th>FFP</th>
<th>%</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTR (ABO)</td>
<td>4</td>
<td>0,9</td>
<td>0</td>
<td>0,0</td>
<td>0</td>
<td>0,0</td>
<td>4</td>
</tr>
<tr>
<td>Febrile or hypotensive non hemolytic</td>
<td>37</td>
<td>8,5</td>
<td>4</td>
<td>4,7</td>
<td>1</td>
<td>0,8</td>
<td>42</td>
</tr>
<tr>
<td>Allergic</td>
<td>5</td>
<td>1,1</td>
<td>3</td>
<td>3,5</td>
<td>25</td>
<td>18,8</td>
<td>33</td>
</tr>
<tr>
<td>TRALI/TACO</td>
<td>0</td>
<td>0,0</td>
<td>0</td>
<td>0,0</td>
<td>0</td>
<td>0,0</td>
<td>0</td>
</tr>
<tr>
<td>Bacterial Contamination</td>
<td>1</td>
<td>0,2</td>
<td>0</td>
<td>0,0</td>
<td>0</td>
<td>0,0</td>
<td>1</td>
</tr>
<tr>
<td>Near miss</td>
<td>1</td>
<td>0,2</td>
<td>0</td>
<td>0,0</td>
<td>0</td>
<td>0,0</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>11,9</td>
<td>7</td>
<td>8,3</td>
<td>26</td>
<td>19,5</td>
<td>81</td>
</tr>
</tbody>
</table>

Units transfused:
- 4358
- 8478
- 13300
- 65366

By 10,000:
- 11,0
- 8,3
- 19,5
- 12,4
ERRORS

Near-misses
Blood sample verification

Blood-Bank verification

Bed-side patient and blood component checking
<table>
<thead>
<tr>
<th>DATE</th>
<th>TIME</th>
<th>USER</th>
<th>WARD</th>
<th>PATIENT</th>
<th>BLOOD COMPT.</th>
<th>CORRECT?</th>
</tr>
</thead>
<tbody>
<tr>
<td>15/12/16</td>
<td>15:45:09</td>
<td>21688</td>
<td>21688</td>
<td>15/12/16</td>
<td>15:45:09</td>
<td>21688</td>
</tr>
<tr>
<td>15/12/16</td>
<td>15:53:35</td>
<td>21688</td>
<td>21688</td>
<td>15/12/16</td>
<td>15:53:35</td>
<td>21688</td>
</tr>
<tr>
<td>15/12/16</td>
<td>16:03:27</td>
<td>21688</td>
<td>21688</td>
<td>15/12/16</td>
<td>16:03:27</td>
<td>21688</td>
</tr>
<tr>
<td>15/12/16</td>
<td>16:04:32</td>
<td>21688</td>
<td>21688</td>
<td>15/12/16</td>
<td>16:04:32</td>
<td>21688</td>
</tr>
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<td>16:04:32</td>
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<td>15/12/16</td>
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<td>21688</td>
<td>15/12/16</td>
<td>16:04:32</td>
<td>21688</td>
</tr>
</tbody>
</table>

Grisode web-based software
Objective

Define the incidence of near-misses in the sample collection and in the blood components transfusion using our electronic safety system
Methods

• Observational, retrospective, one-center study
• *Near-misses* incidence in sample collection and blood components transfusion
• Years 2014-2017
• Analysis by year, time, nurse shift, ward, operator
### Near-misses in SC & BCT 2014-2017

<table>
<thead>
<tr>
<th></th>
<th>Number of checkings performed</th>
<th>Missmatches (Near-misses)</th>
<th>Near-misses percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood sample collections</td>
<td>55.636</td>
<td>1.995</td>
<td>3,59%</td>
</tr>
<tr>
<td>Beginning of transfusions</td>
<td>81.168*</td>
<td>548</td>
<td>0,67%</td>
</tr>
</tbody>
</table>
Blood sample collection
Blood sample collection near-misses, per year

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>3.05%</td>
</tr>
<tr>
<td>2014</td>
<td>2.21%</td>
</tr>
<tr>
<td>2015</td>
<td>2.58%</td>
</tr>
<tr>
<td>2016</td>
<td>2.53%</td>
</tr>
<tr>
<td>2017</td>
<td>6.88%</td>
</tr>
<tr>
<td>2018</td>
<td>8.09%</td>
</tr>
</tbody>
</table>
# Blood sample collection near-misses per ward 2014-2017

<table>
<thead>
<tr>
<th>Ward</th>
<th>Checkings</th>
<th>Miss-matches</th>
<th>Miss-matches %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0001-</td>
<td>713</td>
<td>22</td>
<td>3.09%</td>
</tr>
<tr>
<td>0002-</td>
<td>1041</td>
<td>72</td>
<td>6.92%</td>
</tr>
<tr>
<td>0003-</td>
<td>41</td>
<td>4</td>
<td>9.76%</td>
</tr>
<tr>
<td>0004-</td>
<td>1006</td>
<td>37</td>
<td>3.68%</td>
</tr>
<tr>
<td>0005-</td>
<td>1709</td>
<td>70</td>
<td>4.10%</td>
</tr>
<tr>
<td>0006-</td>
<td>5311</td>
<td>59</td>
<td>1.11%</td>
</tr>
<tr>
<td>0010-</td>
<td>11380</td>
<td>446</td>
<td>3.92%</td>
</tr>
<tr>
<td>0011-</td>
<td>1109</td>
<td>66</td>
<td>5.95%</td>
</tr>
<tr>
<td>0012-</td>
<td>1279</td>
<td>60</td>
<td>4.69%</td>
</tr>
<tr>
<td>0013-</td>
<td>338</td>
<td>49</td>
<td>14.50%</td>
</tr>
<tr>
<td>0014-</td>
<td>388</td>
<td>18</td>
<td>4.64%</td>
</tr>
<tr>
<td>HDD Qx</td>
<td>8340</td>
<td>61</td>
<td>0.73%</td>
</tr>
</tbody>
</table>
Blood sample collection near-misses per hour and nurse shift 2014-2017

Sample collections per hour, number

Miss-matches percent per hour
Beginning of transfusion
Beginning of transfusion near-misses, per year

- 2013: 2.74%
- 2014: 0.70%
- 2015: 0.64%
- 2016: 0.40%
- 2017: 0.89%
Acute transfusion reactions
2010-2017

Pasive Hemovigilance

Retrospective Active HV

Active & Quarantine H

Transfusional Safety System


AHTR-ABO (ERRORS)  ATR-NON ABO  FEBRILE  DIGESTIVE  ALLERGIC  PULMONARY  BACT SEPSIS
Conclusions

• Electronic Transfusion safety systems are able to reduce errors

• Also, knowing real near-misses events rates

• Knowing who, when and where these rates are high
Future strategies to *improve* transfusional safety

- Directed training and re-training follow-up
- Prohibiting transfusion to no well trained staff
- Rescheduling not urgent transfusion out of *dangerous* shifts
People only see the surface

Just because you can't see it, doesn't mean it doesn't exist.
Thanks....