Hospital-based Haemovigilance Programme in Hong Kong

A decade of experience

Dr Rock LEUNG
Transfusion Safety Officer
Queen Mary Hospital, Hong Kong West Cluster
HOSPITAL TRANSFUSION SERVICE IN HK

Single supplier for the territory: HK Red Cross Blood Transfusion Service

Public hospitals run by Hospital Authority, subsided by government, segregated into seven Clusters according to geographical location.

- Red cells transfusion: 33/1000 population.
- Governance structures established in 90s.
- Well-established Quality & Safety framework.
- All Hospitals ACHS-accredited (transfusion safety criterion 1.5.5).
QUEEN MARY HOSPITAL

1700 Beds

Quaternary service

Liver transplant, heart lung transplant, haemopoietic stem cell transplant

Annual use of ~80000 blood components
TRANSFUSION SERVICE: OUR HISTORY

Before 1997:
- 1992: Hospital Blood Bank taken over by Division of Haematology
- 1993: QMH Blood Transfusion Committee
- 1993: T & S
- 1994: Electronic X-match

1997:
- 1993: T & S
- 1994: Electronic X-match

2001:

2002:
- 2002: Blood Bank accredited by College of American Pathologists – Laboratory Accreditation Program (CAP-LAP)

2006:
- 2006: Appointment of TSO

2007:
- 2008: HKWC haemovigilance programme
- 2009 - 2017: OTBTS / RBRS

Beyond 2017:
- ABO Incompatible Blood Transfusion Incident in QMH
HAEMOVIGILANCE (HV) PROGRAMME

- Reporting of Adverse Transfusion Reaction (ATR) & Transfusion Incidents (TI)
  - Corporate web-based system
  - ABO incompatible transfusion as sentinel event.
  - Filtered by designated persons

- Transfusion Safety Officer
  - Haematopathologist
  - Coordination of HV programme.
  - HV data analysis & reporting.

- Investigation of ATR & TI
  - Expert panel for ATR every three months
  - Investigation panel for Blood Bank-related TI.

- Communication
  - Half-yearly Transfusion Seminar.
  - Transfusion Tips.
Advance Incident Reporting System 3.0

Quick Link:
- I want to report
  - Clinical Near Miss
  - Clinical Incident
  - Others
    - Adverse Drug Reactions
    - Adverse Transfusion Reactions
    - Dangerous Drug Irregularity
    - Data Privacy
    - Equipment
    - Facility & Environment
    - Generic
    - Non-pharmaceutical
    - Radiation
  - IOD / Staff Incident such as Workplace Violence Incident

Related To
- Fall
- Medication
- Missing Patient
- Suicide
- Blood Transfusion
- Imaging & Radiation
- Facility & Environment
- Biomedical Equipment
- Non-Pharmaceutical Items
- Personal Data Privacy
- Generic
ONE PATIENT AT A TIME

PATIENT IDENTIFICATION

BLOOD SAMPLING

LABELLING

PACKING & DISPATCH

TIPS

ALWAYS FINISH the process IN THE PRESENCE OF the patient.

INADVERTENT DILUTION OF TYPE & SCREEN SPECIMEN

Proper specimen with separated serum showing yellowish color

Inadvertently diluted specimen showing unusually low haematocrit & clear supernatant

Common cause of inadvertent dilution of specimen is taking blood sample from / near drip site with IV fluid running

TIPS

- Diluted sample will affect blood grouping & antibody screening results
- Perform venipuncture at the proper site

\textit{We count on you to upkeep transfusion safety!}
Figure 2: Transfusion Seminar reporting on haemovigilance data
## TRANSFUSION INCIDENTS IN HKWC (2012 – 2017)

<table>
<thead>
<tr>
<th>Incident categories</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
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<tbody>
<tr>
<td>• Related to transfusion request</td>
<td>104</td>
<td>79</td>
<td>107</td>
<td>120</td>
<td>112</td>
<td>122</td>
</tr>
<tr>
<td>• Requisition of blood components for the wrong patient</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>• Related to blood bank procedure</td>
<td>7</td>
<td>4</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>• Related to collection &amp; transportation of blood/component</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>• Related to storage of blood/component</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>• Related to blood administration</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>• Blood clot in blood bags/abnormal appearance of Blood bag</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>• Notification of positive results from bacterial surveillance programme</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>• Others</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total (No. of TI / No. of T&amp;S &amp; components requests x 100%)</strong></td>
<td>121</td>
<td>97</td>
<td>117</td>
<td>134</td>
<td>131</td>
<td>146</td>
</tr>
<tr>
<td></td>
<td>(0.252%)</td>
<td>(0.203%)</td>
<td>(0.211%)</td>
<td>(0.245%)</td>
<td>(0.216%)</td>
<td>(0.268%)</td>
</tr>
</tbody>
</table>

Others = Mi typing result discrepant from label from HKBTS/blood fridge alarm activation
BLOOD BANK PROCESS

1. Testing – T&S
2. Blood Issue
3. Blood Return
BLOOD BANK PROCESS

1. Testing – T&S

2. Blood Issue

3. Blood Return

Process involved in BB incidents

1. Wrong number issued
2. Wrong type issued
3. ABO matching in BMT setting
4. ABO in Neonates
5. Mixing up of issue report

1. Re-issue of unit deemed unfit
BLOOD BANK PROCESS

1. Testing – T&S
   - Request downloaded to Lab IT system.
   - Standard T&S remark format to facilitate checking of transfusion rules in BMT.
   - IT-assisted ABO decision for neonatal transfusion.
   - Blood Bank Renovation (like pharmacy).

2. Blood Issue

3. Blood Return
   - New format of return form to facilitate decision making.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
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<td>FNHTR#</td>
<td>8</td>
<td>5</td>
<td>17</td>
<td>6</td>
<td>6</td>
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<td>7</td>
<td>14</td>
<td>17</td>
<td>14</td>
<td>7</td>
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<tr>
<td>Minor allergic</td>
<td>14</td>
<td>24</td>
<td>13</td>
<td>13</td>
<td>9</td>
<td>16</td>
<td>12</td>
<td>11</td>
<td>5</td>
<td>10</td>
<td>10</td>
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<tr>
<td>Anaphylaxis</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>8</td>
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<tr>
<td>TRALI#</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
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<tr>
<td>TACO#</td>
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<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Hypotension reaction</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
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<tr>
<td>Delayed HTR*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Transfusion-transmitted infection</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Unclassifiable</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
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<td>1</td>
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<td>1</td>
</tr>
<tr>
<td>Others@</td>
<td>3*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total reported</strong></td>
<td>37</td>
<td>44</td>
<td>44</td>
<td>30</td>
<td>23</td>
<td>37</td>
<td>27</td>
<td>44</td>
<td>42</td>
<td>39</td>
<td>33</td>
</tr>
<tr>
<td><strong>Not related to transfusion</strong></td>
<td>7</td>
<td>12</td>
<td>10</td>
<td>7</td>
<td>5</td>
<td>8</td>
<td>5</td>
<td>8</td>
<td>13</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>(18%)</td>
<td>(27%)</td>
<td>(22%)</td>
<td>(23%)</td>
<td>(22%)</td>
<td>(23%)</td>
<td>(18%)</td>
<td>(18%)</td>
<td>(31%)</td>
<td>(31%)</td>
<td>(12%)</td>
</tr>
<tr>
<td><strong>Total ATR</strong></td>
<td>30</td>
<td>32</td>
<td>34</td>
<td>23</td>
<td>18</td>
<td>27</td>
<td>22</td>
<td>36</td>
<td>29</td>
<td>27</td>
<td>29</td>
</tr>
</tbody>
</table>
Ten-year cumulative incidence of ATR is 1 in 17137 blood components issued for major ATR, and 1 in 4034 for minor ATR.

Anaphylaxis is the most common major ATR
IMPROVEMENT

First local reported case of TRALI in 2007
- Use of male-derived plasma containing components since 2008.

BB-related TI
- Improvement of Blood Bank Laboratory Information System to mitigate risk of wrong blood issues.

Classification of ATR
- Reporting system aligned with ISBT, with severity & imputability grading has to be ente
Figure 3: Alert signals generated from Blood Bank Laboratory Information System (LIS) to safeguard the correct number & type of blood components issued
# Adverse Transfusion Reaction – Categories Mapping by ISBT Definition

<table>
<thead>
<tr>
<th>Current AIR3 group</th>
<th>Previous AIR3 type</th>
<th>Revised ATR categories n AIR3 (ISBT classification)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adverse Transfusion Reaction - Major</td>
<td>Acute haemolysis - ABO mismatch</td>
<td>Acute haemolytic transfusion reaction (AHTR)</td>
</tr>
<tr>
<td></td>
<td>Acute haemolysis - other cause</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Anaplylactic reaction</td>
<td>Anaplylactic reaction</td>
</tr>
<tr>
<td></td>
<td>Circulatory overload</td>
<td>Transfusion associated circulatory overload (TACO)</td>
</tr>
<tr>
<td></td>
<td>Transfusion related acute lung injury</td>
<td>Transfusion related acute lung injury (TRALI)</td>
</tr>
<tr>
<td></td>
<td>Septic reaction</td>
<td>Septic reaction due to bacterial contamination of component</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>Hypotensive transfusion reaction</td>
</tr>
<tr>
<td>Adverse Transfusion Reaction - Minor</td>
<td>Febrile non-haemolytic transfusion reaction</td>
<td>Febrile non-haemolytic transfusion reaction (FNHTR)</td>
</tr>
<tr>
<td></td>
<td>Minor allergic reaction</td>
<td>Non-severe allergic reaction</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td></td>
</tr>
<tr>
<td>Adverse Transfusion Reaction - Delayed</td>
<td>Delayed haemolysis</td>
<td>Delayed haemolytic transfusion reaction (DHTR)</td>
</tr>
<tr>
<td></td>
<td>Post-transfusion hepatitis/ infection</td>
<td>Transfusion- transmitted infections: Virus or other agents</td>
</tr>
<tr>
<td></td>
<td>Post-transfusion purpura</td>
<td>Post-transfusion purpura (PTP)</td>
</tr>
<tr>
<td></td>
<td>Transfusion associated graft-versus-host disease</td>
<td>Transfusion associated graft-versus-host disease (TA-GVHD)</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>Delayed serologic reaction (DSTR)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transfusion associated haemosiderosis</td>
</tr>
<tr>
<td>Adverse Transfusion Reaction - Others</td>
<td>Unclassifiable Complication of Transfusion (UCT)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transfusion associated hyperkalemia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unrelated to transfusion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td></td>
</tr>
</tbody>
</table>

3rd July, 2018
### Actual Impact on Patient

**Severity Index (Potential impact on patient)**

<table>
<thead>
<tr>
<th>AIRS</th>
<th>ISBT</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Near miss</td>
</tr>
<tr>
<td>1</td>
<td>Grade 1 (Non-Severe)</td>
</tr>
<tr>
<td>2</td>
<td>Grade 2 (Severe)</td>
</tr>
<tr>
<td>3</td>
<td>Grade 3 (Life-threatening)</td>
</tr>
<tr>
<td>4, 5</td>
<td>Grade 4 (Death)</td>
</tr>
<tr>
<td>N</td>
<td>N (Not applicable)</td>
</tr>
<tr>
<td>X</td>
<td>X (Not Known in the system)</td>
</tr>
</tbody>
</table>

**Significant morbidity**

Significant changes in vital signs. Required transfer to a higher care level / emergency treatment / surgical intervention.

2 = Minor injury

- **Near miss**
- **Grade 1 (Non-Severe):**
  - the recipient may have required medical intervention (e.g. symptomatic treatment) but lack of such would not result in permanent damage or impairment of a body function.
- **Grade 2 (Severe):**
  - the recipient required in-patient hospitalization or prolongation of hospitalization directly attributable to the event; and/or
  - the adverse event resulted in persistent or significant disability or incapacity; or
  - the adverse event necessitated medical or surgical intervention to preclude permanent damage or impairment of a body function.
- **Grade 3 (Life-threatening):**
  - the recipient required major intervention following the transfusion (vasopressors, intubation, transfer to intensive care) to prevent death
- **Grade 4 (Death):**
  - the recipient died following an adverse transfusion reaction

**Grade 4 should be used only if death is possibly, probably or definitely related to transfusion. If the patient died of another cause, the severity of the reaction should be graded as 1, 2 or 3.**

Severity grading suggested by ISBT does not include N and X, they are included here for internal record

(Reference: PROPOSED STANDARD DEFINITIONS FOR SURVEILLANCE OF NON INFECTIOUS ADVERSE TRANSFUSION REACTIONS, TRALI correction 2013)
FUTURE

Hospital-based to territory-wide
More systematic
More sharing
More expertise
• More TSO
• Transfusion nurse
More local & international networking