Overview of the Haemolytic Transfusion Reaction (HTR) cases reported to SHOT

Dr Shruthi Narayan
Medical Director SHOT
Blood components issued in UK and percentage of SHOT reports submitted by UK country

- **Total components issued:** 189,894
  - Number of reports: 391
  - Reports per 10,000 component issued: 20.6

- **Total components issued:** 1,980,377
  - Number of reports: 3227
  - Reports per 10,000 component issued: 16.3

- **Total components issued:** 55,460
  - Number of reports: 223
  - Reports per 10,000 component issued: 40.2

- **Total components issued:** 108,794
  - Number of reports: 196
  - Reports per 10,000 component issued: 18.0

- **Percentage of SHOT reports:**
  - **80.0%**
  - **4.8%**
  - **9.7%**
  - **5.5%**
Number of reports submitted to SHOT, and per 10,000 components issued 2010-2018
Cumulative data for all SHOT categories 1996 to 2018; n=21474

UCR: Unclassifiable complications of transfusion
PTP: Post-transfusion purpura
TTI: Transfusion-transmitted infection
CS: Cell salvage
FAHR: Febrile, allergic and hypotensive reactions
TAD: Transfusion-associated dyspnoea
TRALI: Transfusion-related acute lung injury
TACO: Transfusion-associated circulatory overload
TAGvHD: Transfusion-associated graft-vs-host disease
Allo: Alloimmunisation
HTR: Haemolytic transfusion reactions
ADU: Over or undertransfusion and PCC
ADU: Delayed transfusion
ADU: Avoidable transfusion
HSE: Handling and storage errors
Anti-D: Anti-D immunoglobulin errors
IBCT: Incorrect blood component transfused

Cumulative to 2017
2018

Transfusion reactions which may not be preventable
Possibly or probably preventable by improved practice and monitoring

Adverse incidents due to mistakes

SHOT Serious Hazards of Transfusion
Summary data for 2018 all categories n=3326 (ranked by number)
## Deaths and major morbidity- 2018

<table>
<thead>
<tr>
<th>Death definitely related</th>
<th>Death probably related</th>
<th>Death possibly related</th>
<th>Major morbidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delayed transfusion</td>
<td>2</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Overtransfusion</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>FAHR</td>
<td></td>
<td></td>
<td>60</td>
</tr>
<tr>
<td>HTR</td>
<td>2</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>IBCT-WCT (clinical)</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>IBCT-WCT (laboratory)</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>IBCT-SRNM (laboratory)</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>UCT</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>TACO</td>
<td>2</td>
<td>3</td>
<td>36</td>
</tr>
<tr>
<td>TAD</td>
<td></td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>TRALI</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TTI</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>0</td>
<td>8</td>
<td>12</td>
</tr>
</tbody>
</table>
Transfusion related deaths 2010-2018, n= 156

- Delays: 39 (25.0%)
- Other: 18 (11.6%)
- HTR: 13 (8.3%)
- Febrile/allergic reactions: 5 (3.2%)
- Pulmonary complications: 81 (51.9%)

- TACO: 65 (41.7%)
- TAD: 10 (6.4%)
- TRALI: 6 (3.8%)
Haemolytic transfusion reactions

2009-2018
- Total SHOT reports: 29468
- HTR: 441

2014-2018
- Total SHOT reports: 15952
- HTR: 211

2018
- Total SHOT reports: 3326
- HTR: 35
Categorisation of reports analysed in 2018

- Incidents reported in 2018 in patients with sickle cell disease (SCD) and transfusion dependent thalassaemia (TDT) n=39.
- Most frequently reported incident was specific requirements not met (SRNM) n=16
- Haemolytic transfusion reactions (HTR) n=9 including hyperhaemolysis (n=3).
- There were no reported deaths directly related to complications of transfusion.
Haemolytic transfusion reactions

- **2009-2018**
  - Acute HTR: 129
  - DHTR: 312
    (cases ‘10 and ‘09 included alloimmunisation)

- **2014-2018**
  - Acute HTR: 79
  - DHTR: 132

- **2018**
  - Acute HTR: 7
  - DHTR: 28
Haemolytic transfusion reactions reported to SHOT between 2009-2018

- Acute HTR: 29%
- Delayed HTR: 71%

[Diagram showing the distribution of acute and delayed haemolytic transfusion reactions]
Antibodies implicated in HTR

48 cases reported to SHOT in the last 10 years (2009-2018)

46/48 (96%) cases were in patients with sickle cell disease

In 2018, 5 cases of HHR reported (3 sickle patients, 1 post allogenic stem cell transplant, 1 patient with Rosai-Dorfman syndrome)

Hyperhaemolysis
Hyperhaemolysis remains a cause of transfusion-related mortality and major morbidity.

Patients with haemoglobinopathies should be monitored for signs and symptoms of haemolysis following transfusions and diagnosis of hyperhaemolysis considered early. It is important that patients are educated about signs and symptoms they might develop when discharged home so they can present early should any of these occur.

Hyperhaemolysis can also occur in non-haemoglobinopathy patients therefore it is important that all clinicians involved in the transfusion process have an awareness of the signs and symptoms of hyperhaemolysis and that any suspected cases are followed up and investigated.
Cumulative data for adverse events in transfusion for patients with haemoglobin disorders 2010 to 2018

Sickle cell disease n=228
Cumulative data for adverse events in transfusion for patients with haemoglobin disorders 2010 to 2018

Thalassaemia n=52

HTR=haemolytic transfusion reaction; SRNM=specific requirements not met; FAHR=febrile, allergic and hypotensive reaction; ADU=avoidable, delayed and under or overtransfusion; IBCT=incorrect blood component transfused; TACO=transfusion-associated circulatory overload;
2018 Recommendations

Each transfusion for a patient with sickle cell disease (SCD) should be clearly indicated in line with British Society for Haematology (BSH) guidance (BSH Davis et al. 2016) and must be authorised by the haematology team.

All hospital transfusion laboratories should have a robust system to ensure that a haemoglobinopathy diagnosis is highlighted on the blood request form so that mandatory specific requirements are not missed. This is imperative to reduce the risk of alloimmunisation, which can have serious implications for these patients.

Any history of red cell antibodies must be sought out. In England this should include accessing Specialist Services electronic reporting using Sunquest’s Integrated Clinical Environment (Sp-ICE) to check for any historical antibodies. The presence of currently undetectable historical antibodies increases the risk of delayed haemolytic transfusion reactions according to many studies (Narbey et al. 2017).
Transfusion process (nine steps)

1. REQUEST
2. SAMPLE TAKING
3. SAMPLE RECEIPT
4. TESTING
5. COMPONENT SELECTION
6. COMPONENT LABELLING
7. COMPONENT COLLECTION
8. PRESCRIPTION
9. ADMINISTRATION

Note: Once a decision to transfuse is made, the authorisation or prescription may be written at variable times during this sequence, but must be checked at the final stage.
All NHS organisations must move away from a blame culture towards a just and learning culture.

All clinical and laboratory staff should be encouraged to become familiar with human factors and ergonomics concepts.

All transfusion decisions must be made after carefully assessing the risks and benefits of transfusion therapy. Collaboration and coordination among staff are vital.
Everyone can make a difference and everyday is a chance to do so!

We are what we repeatedly do. Excellence, then, is not an act, but a habit.

Delivering Results

Make a Difference
Annual SHOT Symposium 2020
Tuesday 7th July 2020
The Lowry Theatre, Salford Quays, Manchester

For further details regarding the Symposium, please visit
https://www.shotuk.org/annual-shot-symposium
Acknowledgements

• The SHOT team
• The Working Expert Group
• The Steering Group
• MHRA haemovigilance team
• The vigilant reporters and hospital staff who share their incidents
• The UK Forum for funding

For further information visit: www.shotuk.org

To access the full report please visit: https://www.shotuk.org/shot-reports/report-summary-and-supplement-2018/

Educational videos: https://www.shotuk.org/resources/current-resources/videos/