SHOT: the first 15 years

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University College London Hospitals
and University College London,
London, UK

Annual SHOT Symposium, 12th July 2017
Celebrating 20 years of UK haemovigilance
In the beginning.....1994

Dr Angela Robinson
Medical Director
NBS England

Prof John Cash
Medical Director
SNBTS
“Right blood, right patient, right time”

1. Prescription/blood sample from patient
2. Hospital blood bank
3. Collection from hospital storage site
4. Administration of blood to the patient

SHOT

- Serious
- Hazards
- Of
- Transfusion

Dr Lorna Williamson OBE
Medical Director, NHSBT 2007-2017
Professor Sir John Lilleyman
Chair, Inaugural SHOT Steering Group meeting
Royal College of Pathologists, December 1995
SHOT – Organisation

Steering group
• Strategic direction and “ownership”
• Royal Colleges and professional bodies plus
• Affiliated to the Royal College of Pathologists November 1997

Standing Working Group
→ Working Expert Group
• Operational aspects

Funding
• UK Blood Transfusion Services
• British Society for Haematology grant
• British Blood Transfusion Society grant
Reporting to SHOT – key considerations

- **Type of events to be reported** – “serious”
  - core categories: IBCT, acute severe transfusion reactions, delayed haemolysis, post-transfusion purpura, TRALI, TA-GvHD, TTI
  - expanded to include emerging sources of harm/potential harm: Anti-D, Near Miss, TACO, TAD, autologous transfusion, paediatrics, undertransfusion, changes to IBCT chapter sections and to acute and delayed reactions

- **Major morbidity** – clearly defined from outset, further categories added

- **Imputability** – i.e. the likelihood that a serious adverse incident in a recipient can be attributed to the blood component transfused:
  - 0=excluded/unlikely, 1=possible, 2=likely/probable, 3=certain

- **Scope** – all labile blood components, autologous transfusion including cell salvage, anti-D, SD-FFP, MB-FFP and MB-cryoprecipitate

- **Voluntary or statutory** – initially voluntary, subsequently ‘required’
A SHOT in the arm for safer blood transfusion

A new surveillance system for transfusion hazards

The first SHOT report 1996-97
169 initial reports (141 completed) from 94 of 424 hospitals

<table>
<thead>
<tr>
<th>Error Type</th>
<th>Count (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorrect blood/component transfused</td>
<td>81 (47%)</td>
</tr>
<tr>
<td>Collection and/or administration</td>
<td>34 (54%)</td>
</tr>
<tr>
<td>Laboratory error</td>
<td>21 (33%)</td>
</tr>
<tr>
<td>Sampling and/or request</td>
<td>8 (13%)</td>
</tr>
<tr>
<td>Delayed transfusion reaction</td>
<td>27 (16%)</td>
</tr>
<tr>
<td>Acute transfusion reaction</td>
<td>27 (16%)</td>
</tr>
<tr>
<td>Graft versus host disease</td>
<td>4 (2%)</td>
</tr>
<tr>
<td>Acute lung injury</td>
<td>11 (7%)</td>
</tr>
<tr>
<td>Post transfusion purpura</td>
<td>11 (7%)</td>
</tr>
<tr>
<td>Transfusion transmitted infections</td>
<td>*8 (5%)</td>
</tr>
</tbody>
</table>

169 cases where initial reports received

Distribution of errors in completed reports (n=63)
SHOT first annual report 19th March 1998
The Guardian...

Human error is blamed for half of all blood transfusion problems

Sarah Hall
The Guardian (1959-2003); Mar 19, 1998;
p. 8

Human error is blamed for half of all blood transfusion problems

Sarah Hall

HOSPITALS were urged yesterday to tighten their procedures after a report revealed that patients being given the wrong blood accounted for almost half of all transfusion complications.

One person died after being given blood from a wrongly-labeled bottle and nine suffered serious side effects after being given blood from the wrong group.

In total, 81 of the 179 reported problems (47 percent) were caused by such mishandling and could have been prevented, the first annual report by Serious Hazards of Transfusion (SHOT) said.

A scheme, representing all professional groups involved in blood transfusion found, infections, reactions to transfusion and immune problems accounted for the remaining problems. But since only 22 percent of the 424 eligible UK hospitals responded to the survey, the figure could be up to five times as high, admitted Dr Hannah Cohen, chairwoman of SHOT’s steering group.

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Health
Blood transfusion errors rise

She told BBC News Online blood was still "extremely safe" as there were more than 3.5 million blood components transfused last year and only 197 reports of problems.

But she said: "We do want to make some recommendations to improve the safety of blood.

"One of the things we are still seeing is blood intended for one patient being given to another patient because of failure to identify patient and blood correctly."

She said there was a need, in the short term, to improve staff training. But in the long term the focus should be on hospitals computerising records.

Barcode tracking system

Blood is given a barcode when it is collected, and this provides the National Blood Service with a means of tracking it through the system.
Comparison of initial reports
1996 - 2001
Working with the UK transfusion services – successful initiatives

• Transfusion-associated graft versus host disease (TA-GvHD) eliminated by leucodepletion despite missed irradiation

• Transfusion-related acute lung injury (TRALI) much reduced by moving to male donors for platelets and FFP

• Bacterial infections in platelets reduced by new techniques at collection
Cases of TA-GvHD (n=13) reported to SHOT

Omission of irradiation in 780 patients at risk

Introduction of leucodepletion

TRALI: transfusion related acute lung injury

• Leading cause of transfusion-related mortality and major morbidity 1996-2003
• Caused by HLA/HNA antibodies – main source is donor plasma:
  o A donor with a history of transfusion
    (excluded since April 2004 unless transfused pre 1980 only)
  o A female donor with a history of pregnancy
    (antibodies in 10-15%)
## TRALI – relative risk from different components 1996-2003

<table>
<thead>
<tr>
<th></th>
<th>Red cells</th>
<th>Cryo</th>
<th>FFP</th>
<th>Platelets</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRALI cases</td>
<td>33</td>
<td>2</td>
<td>31</td>
<td>27</td>
</tr>
<tr>
<td>Components issued</td>
<td>18,370,000</td>
<td>634,000</td>
<td>2,515,000</td>
<td>1,842,000</td>
</tr>
<tr>
<td>Risk/ component issued</td>
<td>1:556,000</td>
<td>1:317,000</td>
<td>1:81,000</td>
<td>1:68,000</td>
</tr>
<tr>
<td>Relative risk compared to red cells</td>
<td><strong>1</strong></td>
<td><strong>2</strong></td>
<td><strong>7</strong></td>
<td><strong>8</strong></td>
</tr>
</tbody>
</table>
Intervention to reduce the risk of TRALI
‘Please- no more new questions for donors!!’

Decision ‘Male FFP as far as possible’.

October 2003

- Male donations marked M - to FFP
- Female donations marked F- to ’plasma discard’
- Did NOT swap out female FFP stocks
- April 2004-previously transfused donors excluded (vCJD)
Decision to use male donors for FFP

Transfusion transmitted infection (TTI)

Bacterial TTI

Viral and parasitic TTI
• Initial notification via SABRE (MHRA)
• Box ticked to share notification with SHOT
• Jan 2010: new SHOT web-based reporting system (www.e-dendrite.com)
• SHOT office decides on category and gives access to appropriate e-Questionnaire
• Additional information as required by direct liaison with reporter
• Anonymised data to database
• Analysis by SHOT team and Working Expert Group (WEG) / Writing Group
Clinical incidents of wrong component transfused 1996/97 - 2011

Number of clinical IBCT reports

Year of report


45 | 71 | 369 | 223 | 223 | 72 | 68 | 48 | 50 | 28 | 24 | 47 | 44 | 19 | 35

NPSA SPN 14
Laboratory errors

GUIDELINES

UK Transfusion Laboratory Collaborative: Recommended minimum standards for hospital transfusion laboratories

B. Chaffee, J. Jones, C. Milkins, C. Taylor, D. Asher, H. Glencross, M. Murphy & H. Cohen on behalf of the UK Transfusion Laboratory Collaborative, c/o SHOT Office, Manchester, UK

- Recommended minimum standards for hospital transfusion laboratories 2009
- Address staffing, technology, training and competence
Changing pattern of harm
SHOT 2010-2011

- Transfusion-associated cardiac overload (TACO)*,
- Inappropriate and unnecessary (I&U), or
- Under/delayed transfusions

responsible for the majority of cases of preventable deaths and major morbidity

*BCSH Guideline on the Administration of Blood Components Addendum August 2012: Avoidance of Transfusion Associated Circulatory Overload (TACO) and Problems Associated with Over-transfusion.
BLOOD SAFETY POLICY?
PRIORITISATION OF RESOURCES?

Recommendations
Decision-making pathways
SHOT

Recommendations
Recommendation 1997-1998

- Need for a national body with relevant expertise and resource to advise government of priorities for improvement in blood safety

MSBTO: Advisory Committee for the Microbiological Safety of Blood, Tissues and Organs
SaBTO: Advisory Committee on Safety of Blood, Tissues and Organs
Recommendations 2001

• More transfusion consultant time needed in hospital trusts

• Transfusion practitioners in all trusts

• Appropriate use of blood components
  • Requirements of ‘Better Blood Transfusion’ 2
  • National Blood Transfusion Committee formed 2001
Recommendations 2001-2002

- An ongoing programme of education and training to all staff involved in transfusion (reiterated in subsequent years)
  
  - SHOT, NPSA and NBTC collaboration to reduce ABO incompatible transfusion, 2004
  
  - Statutory training, BSQR, November 2005
  
  - Training and competency mandated by NPSA SPN14 November 2006 (endorsed by SHOT)
Deaths definitely attributed to transfusion
1996/97-2011
Deaths and major morbidity: percentage of total reports 1996/97-2011

Year of report

- 1996/97: 35.9%
- 1997/98: 27.1%
- 1998/99: 15.0%
- 1999/00: 12.5%
- 2000/01: 8.5%
- 2001/02: 7.9%
- 2002/03: 11.1%
- 2003/04: 5.2%
- 2004/05: 5.1%
- 2005/06: 2.8%
- 2006/07: 12.5%
- 2007/08: 4.4%
- 2008/09: 5.9%
- 2009/10: 7.1%
- 2010/11: 6.6%

Total no. of reports analysed
Deaths & major morbidity
Dr Daffyd Thomas
Chair, SHOT SG 2012-

Dr Paula Bolton-Maggs
SHOT Medical Director 2011-
NOTHING great WAS EVER achieved WITHOUT enthusiasm
Ralph Emerson
Acknowledgements

- SHOT Founder members
- SHOT Steering Group
- SHOT Standing Working Group/Working Expert Group
- National Medical Co-ordinators/Medical Directors & TTI Co-ordinators
- SHOT Office Staff in Manchester
- NHSBT for hosting SHOT
- UK Forum for funding
- All Royal Colleges and Professional Bodies for support
- Hospital transfusion teams for reporting!