SHOT and Surgery

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SHOT / NHSBT PBMP Team
What is SHOT?

- Serious Hazards of Transfusion is the independent, professionally-led UK haemovigilance scheme (Est 1996)

- Collect data on serious adverse reactions and events

- Data reviewed by transfusion experts to produce Annual SHOT Report www.shotuk.org

- Participation is professionally mandated
  - a requirement of quality, inspection and accreditation organisations

- Small core team based in Manchester
Haemovigilance definition

- Surveillance procedures from the collection of blood and its components to the follow up of the recipients
- To collect and assess information on unexpected and undesirable effects resulting from the therapeutic use of labile blood components
- ...and aim to prevent their occurrence or recurrence
# Haemovigilance in the UK

<table>
<thead>
<tr>
<th><strong>MHRA</strong></th>
<th><strong>SHOT</strong></th>
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<tbody>
<tr>
<td><strong>Medicines &amp; Healthcare products Regulatory Agency</strong></td>
<td><strong>Serious Hazards of Transfusion</strong></td>
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| • Competent Authority’ for the BSQR 2005  
  – QMS in blood establishments and hospital blood banks. | • Confidential enquiry |
| • Competent Authority for the Medicines Act 1968 | • Serious adverse reactions/events AND near misses all of which occur in BOTH a laboratory and CLINICAL environment. |
| • Competent Authority for the Medical Devices Regulations 2008 | • **PROFESSIONALLY MANDATED** reporting |
| • **STATUTORY** reporting |  |
SHOT aims

- IMPROVE
- EDUCATE
- INFLUENCE
- INFORM
- STIMULATE RESEARCH
Cumulative SHOT reports 1996-2014

- UCT: Unclassifiable complications of transfusion
- PTP: Post-transfusion purpura
- TTI: Transfusion-transmitted infection
- TAD: Transfusion-associated dyspnoea
- CS: Cell salvage
- ATR: Acute transfusion reaction
- AGVHD: Transfusion-associated graft vs host disease
- TRALI: Transfusion-related acute lung injury
- Allo: Alloimmunisation
- TACO: Transfusion-associated circulatory overload
- HTR: Haemolytic transfusion reaction

- ADU: Avoidable, delayed or undertransfusion
- HSE: Handling and storage errors
- Anti-D: Anti-D immunoglobulin errors
- IBCT: Incorrect blood component transfused

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

Adverse incidents due to mistakes
Critical points in the transfusion process

Critical points: Positive patient identification essential

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

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
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<tr>
<td>IBCT-WCT</td>
<td>incorrect blood component transfused-wrong component transfused</td>
</tr>
<tr>
<td>IBCT-SRNM</td>
<td>incorrect blood component transfused-specific requirements not met</td>
</tr>
<tr>
<td>HSE</td>
<td>handling and storage errors</td>
</tr>
<tr>
<td>ADU</td>
<td>avoidable, delayed or undertransfusion</td>
</tr>
<tr>
<td>RBRP</td>
<td>right blood right patient</td>
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</table>
Errors in Haematology

![Bar chart showing the number of reports in different categories for different years: 2010, 2011, 2012, 2013. The categories are IBCT-SRN, IBCT-WCT, HSE, ADU, and RBRP. The chart indicates that IBCT-SRN had the highest number of reports in 2010, while IBCT-WCT had the highest number in 2011, and ADU had the highest number in 2012 and 2013.]}
Errors in Trauma & Orthopaedics

[Bar chart showing the number of reports for different categories (IBCT-SRNM, IBCT-WCT, HSE, ADU, RBRP) across years 2010, 2011, 2012, and 2013.]
Errors in General Surgery

![Bar chart showing the number of reports in different categories across different years (2010, 2011, 2012, 2013)].

- IBCT-SRNM
- IBCT-WCT
- HSE
- ADU
- RBRP

**Categories**

- IBCT-SRNM
- IBCT-WCT
- HSE
- ADU
- RBRP

**Years**

- 2010
- 2011
- 2012
- 2013

**Number of reports**
Lack of Knowledge & Experience
Misunderstanding and lack of knowledge leads to excessive pre-operative platelet transfusion

- An 81 year old man was pre-operatively transfused with four ATDs of platelets within a four hour period.
- The patient developed cardiac failure, the operation was cancelled, and medical intervention was necessary.
- In fact the orthopaedic SpR had written in the notes "Arrange four units of platelets".
- The SHO assumed this meant to order and transfuse four units of platelets prior to surgery.
- When ordering, the SHO was advised by a BMS to seek a haematology opinion as the order appeared inappropriate. .......this advice was not sought.
Junior doctor unfamiliar with paediatric prescribing protocols

- A 2 year old girl was admitted with peritonism, possibly due to ruptured appendix (later found to be a ruptured kidney tumour)

- Hb was 6.7g/dl and the surgical team decided to transfuse, writing a dose of 15ml/kg in the notes

- The PRHO wrote up 2 units and she was given 2 adult bags over 6 hours

- Hb was 18.6g/dl post transfusion
Emergency blood given in haste by a junior doctor

- A 28 year old man required a repair to an arterial laceration in the anticubital fossa

- Surgical HO demanded 2 units of 0 neg emergency blood

- In fact the patient’s group was known and 4 units had been crossmatched and were already available in the same refrigerator
A case of TACO after use of FFP to reverse warfarinisation

- A 61-year-old male patient with an INR of 6.0 required Warfarin reversal prior to elective surgery
- He was given Vitamin K 5 mg and four bags of FFP over 160 minutes
- Without any further INR being performed he then received another three bags over 45 minutes, at which point he became unwell with rigors, chills, wheeze and a temperature of 38.3°C
- His oxygen saturation on air was 80%. He was managed with diuretics and oxygen
- The planned surgery was performed the following day
Confusion regarding components results in unwanted red cell transfusion and delayed surgery

- A 77 year old man had prophylactic platelets written up prior to spinal decompression surgery
- Night nurses erroneously collected red cells which were also available for the same patient as they were cross-matched for the morning list
- Two units of red cells were transfused over 30 minutes each, and no platelets
- In the nursing notes the transfusions were documented as platelets, and it seemed that the staff were unfamiliar with the different types of blood component
- The surgery had to be delayed in the morning when the day staff discovered the error
Special requirements not met

- Five infants aged between 10 days and 4 months, with a confirmed or suspected diagnosis of Di George Syndrome, received non-irradiated blood during cardiac surgery.

- In 4 cases, the request did not specify irradiated components, though the diagnosis was written on the request form.

- In the fifth case, the diagnosis was made in theatre, irradiated components were requested, but the previously ordered, non-irradiated blood was transfused.
Leaking FFP bag fixed with sticky tape

- A 43 year old male patient was undergoing emergency laparotomy for internal bleeding.

- During administration of FFP, an operating department practitioner observed leakage from pack.
  - The cause was unclear, possibly a faulty port or a spiked bag.

- He applied surgical 'Sleek' tape to the pack to prevent further leakage, and the transfusion continued.
Abnormal Results
Danger of poorly documented telephoned results

• Routine blood tests were performed on a 64 year old male patient on ICU following an emergency laparotomy during which 3 units of packed cells had been given.

• Biochemistry results were phoned to ICU, and an albumin of 6 g/l reported, but a nurse documented this result as a Hb of 6 g/dl (60g/L in new units).

• Four units of blood were then transfused on the basis of this result.

• In fact the pre transfusion (pre-operative) Hb had been 104 g/l, and post transfusion it was 176g/l.
A 76 year old female patient was admitted with a dislocated knee. FBC was processed by POCT equipment and produced a platelet count of 67 x 10^9/l. The accompanying Hb was 240 g/l. The anaesthetic SHO ordered some platelets, but did not discuss the peculiar results with the haematology team. The duty BMS did not query the request in the light of Trust protocols for platelet transfusion. The SHO prescribed the platelets to run over 2 hours. A normal count was later obtained from the main laboratory.
Haemoglobin of 30g/l not queried by medical staff

- A 74 year old male patient in recovery post hip replacement was drowsy, hypotensive and tachycardic.
- A haemoglobin estimation from a blood gas analyser was 30 g/L.
- A FBC sample was sent to the laboratory, but in the interim 1 unit of uncrossmatched group O D negative blood was commenced.
- The Hb result from the laboratory was 112g/L and recovery staff advised medical staff to discontinue the transfusion.
- The patient suffered no apparent ill effects as a result of the over-transfusion or uncrossmatched unit, but TACO remains the biggest cause of mortality in SHOT cases.
Collection and Administration
Red cells administered by doctors in theatre without checking

- A 69 year old man was in theatre undergoing emergency repair of an abdominal aortic aneurysm
- A junior doctor collected an incorrect unit of group A D-positive blood from the theatre fridge
- The identity of the unconscious patient, who was group O D-positive, was not checked against the unit of blood and it was administered by an anaesthetist.
- The patient developed renal failure post operatively which resolved, and which may in part have been due to the incompatible transfusion
After ‘losing’ the flying squad blood, units crossmatched for another patient are transfused

- During a massive obstetric haemorrhage emergency O neg blood was collected from a satellite fridge and taken to theatre, but "lost"
- An anaesthetist went back to the satellite fridge and collected 2 more units of red cells which were in fact crossmatched for another patient
- These were transfused before it was realised that they were not the emergency O neg units
- The patient was B D-positive and received O D-positive blood with no clinical consequences.
Autologous Blood
High volume of salvaged blood re-infused

- A 58 year old female patient underwent bilateral knee replacement and blood was salvaged bilaterally from drains postoperatively on HDU
- The policy from the manufacturer of the device and the hospital policy stated that a maximum of 1000ml could be re-infused
- The HDU nurses re-infused 2280mls as they were unfamiliar with the process
- There was no adverse reaction
Hypotensive reaction may have been caused by incorrect washing

- An 82 year old male patient had intraoperative cell salvage performed whilst undergoing vascular surgery.
- He received the first unit of salvaged blood (484ml) with no adverse reaction.
- After a few ml of the second unit had been reinfused, the patient became hypotensive, and the transfusion was stopped and vasoconstrictors given.
- The unit was then restarted, with the same effects.
- The cell salvage team concluded that under-collection may have led to incomplete washing.
Conclusions

These cases illustrate SHOT findings across the board, not just in surgery...

- Poor communication
- Lack of basic transfusion knowledge
- Failure to follow protocols
- Failure to identify the patient
Key Finding (1)

Failure of bedside checking procedures which would have prevented ALL the clinical cases of wrong blood administration

• Training and competency assessment
Key Finding (2)

Prominence of knowledge gaps and lack of education and training in junior doctors

- Professional responsibility
- Medical education
Thanks to:

- SHOT Writing Group & Steering Group
- SHOT office staff
- Reporters
- **YOU** for listening