‘Go with the Flow’

- Lessons from SHOT
Haemorrhage cases

Tony Davies
Patient Blood Management Practitioner
SHOT / NHSBT Patient Blood Management Team
SHOT Aims

• Improving patient safety by
  – Raising standards of hospital transfusion practice
  – Informing policy with UK Blood Services
  – Aiding production of clinical guidelines
  – Educating users on transfusion hazards and their prevention
## Haemovigilance in the UK

<table>
<thead>
<tr>
<th>MHRA</th>
<th>SHOT</th>
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<tbody>
<tr>
<td>Medicines &amp; Healthcare Products Regulatory Agency</td>
<td>Serious Hazards of Transfusion</td>
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</table>
| • 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 |  |
Cumulative Reports 1996-2012

CS: Cell salvage and autologous transfusion
TTT: Transfusion-transmitted infection
PTP: Post-transfusion purpura
UCT: Unclassifiable complications of transfusion
ATR: Acute transfusion reaction
TAD: Transfusion-associated dyspnoea
HTR: Haemolytic transfusion reaction
ALLO: Alloimmunisation
TA-GvHD: Transfusion-associated graft vs host disease
TRALI: Transfusion-related acute lung injury
TACO: Transfusion-associated circulatory overload
Anti-D: Anti-D errors
HSE: Handling & storage errors
ADU: Avoidable, delayed or undertransfusion
IBCT: Incorrect blood component transfused

Pathological reactions which may not be preventable
Probably or possibly preventable by improved practice and monitoring
Adverse events caused by error
### Deaths and major morbidity

<table>
<thead>
<tr>
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<th>2011</th>
<th>2012</th>
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<tr>
<td>Deaths</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Major morbidity</td>
<td>117</td>
<td>134</td>
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#### Deaths in 2012

- Transfusion-associated graft versus host disease: 1
- Haemolytic transfusion reactions: 2
- Transfusion-associated circulatory overload: 6
For action by Trusts by April 2011
Critical points in the transfusion process

- Decision to transfuse
- Prescription/request
- Sampling for pre-transfusion testing
- Laboratory testing
- Collection of blood from storage site
- Bedside administration
Key points from NPSA RRR

- Local protocols with a trigger phrase
- Dedicated communicator / coordinator
- Early / easy release of components by lab
- Adequate support (eg porters / transport)
- All cases reviewed by Hospital Transfusion Committee and delays or problems investigated locally / reported externally
MAKE A PHONE CALL

to the Blood Bank
or
on-call Haematology BMS

Tell them...

- Situation
- Patient Details
  - Name
  - Sex
  - ID number
- What blood component is required, how much and how soon.

TAKE SAMPLES

Label them properly and ensure they get to the lab.

- Grouping sample
- FBC
- Coagulation screen
Transfusion Management of Massive Haemorrhage in Adults

**Insert local arrangements:**
- Activation Tel Number(s)
- *Time to receive at this clinical area:
- Group specific red cells
- XM red cells

**Haemorrhage Control**
- Direct pressure / Tourniquet if appropriate
- Stabilise fractures
- Surgical intervention – consider damage control surgery
- Interventional radiology
- Endoscopic techniques

**Haemostatic Drugs**
- Vit K and Prothrombin complex concentrate for warfarinised patients and
- Other haemostatic agents and reversal of new anticoagulants: discuss with Consultant Haematologist

**Cell salvage if available and appropriate**
- Consider ratios of other components: 1 unit of red cells = c.250 mls salvaged blood

**ABG – Arterial Blood Gas**
- FFP – Fresh Frozen plasma
- PT – Prothrombin Time

**APTT – Activated partial thromboplastin time**
- MHP – Massive Haemorrhage Pack
- TEG/ROTEM – Thromboelastography

**MHP 1**
- Red cells 4 units
- FFP 4 units
- Platelets 1 dose (ATD) and subsequently request Cryoprecipitate 2 packs if fibrinogen <1.5g/l or according to TEG / ROTEM <2g/l for obstetric haemorrhage

**MHP 2**
- Red cells 4 units
- FFP 4 units
- Platelets 1 dose (ATD) and subsequently request Cryoprecipitate 2 packs if fibrinogen <1.5g/l or according to TEG / ROTEM <2g/l for obstetric haemorrhage

**Thromboprophylaxis should be considered when patient stable**

**STOP THE BLEEDING**

**Regional Audit**
**July-Sept 2012**

**Dr Kate Pendry**
**Dr Elizabeth Jones**
Presentation of bleed (N=211)

- Gastrointestinal bleed 66
- Obstetric haemorrhage 48
- Vascular bleed / surgery 45
- Trauma (blunt) 12
- Trauma (penetrating) 11
- Other speciality 29
Components used for adults

- 27% cases used O Negative (range 1 - 4 units)
- 50% cases used 0 - 4 units red cells
- 30% cases used 5 – 8 units red cells
- 20% cases used 9 – 40 units red cells

• Wastage - at least 50% was judged to be avoidable:
  - 80 red cells   170 FFP   20 platelets
Failure to monitor transfusion requirements during a GI haemorrhage

- An elderly patient was admitted to the MAU with a haematemesis and an initial Hb of 106 g/L
- She had further episodes of vomiting blood
- Five units of red cells were transfused before a repeat Hb was performed, which was 204 g/L
- The patient was recognised to have circulatory overload and died shortly thereafter
Failure to monitor transfusion requirements during a GI haemorrhage

• An elderly patient with a severe GI bleed had repeat Hbs of 61 and 64 g/L.

• Six units of red cells were transfused prior to rechecking the Hb, which was 171 g/L.

• The patient developed circulatory overload and required venesecting 2 units.
Lack of knowledge around major haemorrhage protocol (1)

- A middle-aged male was admitted to A&E with a massive haematemesis and received 2 litres of colloid
- No Incident Communication Coordinator had been identified in the ED and the transfusion laboratory had not been contacted
- The clinical staff in the ED were unsure of how to access the 2 emergency O RhD negative units kept in the laboratory
Lack of knowledge around major haemorrhage protocol (2)

- A further 2 units of red cells were then requested and issued as group specific.

- The clinicians also requested FFP and cryoprecipitate but were refused on the basis that a coagulation screen should have been interpreted by a haematologist prior to issue.

- The patient subsequently arrested and died, having received 10.5 L of colloid and 4 units of red cells.
Delay in obtaining units following major haemorrhage protocol being initiated

- A child involved in a road traffic accident (RTA) was found to be asystolic at the scene and cardiopulmonary resuscitation (CPR) was commenced.

- The ambulance staff had alerted the ED to major blood loss and had requested blood to be available on arrival.

- There was a delay issuing emergency O Negs as there was no unique patient ID number available on arrival in the ED.
Failure to replace blood volume after post partum haemorrhage

• A young woman suffered massive haemorrhage following a ventouse-assisted delivery

• The MH protocol was activated, six units of blood were delivered within 5 minutes and one was commenced

• She was transferred to theatre - the blood loss was unclear with losses recorded in both the delivery suite and theatre. A second unit was started after an hour

• After 2 hours, she suffered cardiac arrest from which she could not be resuscitated despite transfusion of 12 units of blood and 3 units of FFP – too little, too late
Late request for blood to cover surgery leads to inappropriate use of emergency O RhD negative blood

- An elderly lady was admitted on the morning of surgery for major abdominal surgery and a sample was sent for grouping with request for a crossmatch.
- She was taken to theatre without waiting for results.
- The antibody screen was positive - the BMS phoned theatre, but surgery was already underway.
- Four units of O RhD negative emergency blood were taken from the theatre fridge and transfused.
- The antibody was anti-E and fortunately the O RhD negative units used were compatible.
Delay in patient transfusion during surgery caused by IT malfunction

- A 75 year old man was bleeding in theatre during repair of AAA
- 6 units of group-specific blood were issued to the theatre refrigerator using the electronic blood tracking system
- The units were retrospectively cross matched, but the laboratory computer sent a message to the theatre refrigerator to quarantine the blood, - theatre staff were denied access to the refrigerator
- Eventually the refrigerator was unlocked and the blood obtained after a 25 minute delay
Obstetric major haemorrhage with delay in transfusion caused by a fire alarm

- A 40 year old woman was bleeding excessively during elective caesarean section when the fire alarm sounded
- The obstetrician and theatre staff were aware of the alarm, but surgical management of the bleeding continued
- They telephoned the blood bank, but there was no answer, so the general manager (outside the building with evacuated staff) was contacted and located transfusion staff who were cleared to return to the laboratory
- Major haemorrhage pack was issued after a delay
Misidentification during multiple trauma

- Multiple RTA involving 5 victims
- 2-year old female allocated ‘Unknown Female 1’
- Child’s mother allocated ‘Unknown Female 2’
- Theatre nurse volunteered to help ED teams
- Nurse administered blood for ‘Unknown Female 2’ to the child, as she interpreted the ‘2’ as the age of the patient
- The child died of her injuries soon afterwards
Overestimation of blood loss from acute GI bleed

• A patient was admitted to the ED with a GI bleed. Hb on admission was 121 g/L

• 2 units of emergency blood were given, followed by 6 units of crossmatched blood over the next 12 hours.

• The FBC was not re-checked until all 8 units had been transfused, and the Hb was 185 g/L
Lack of correct final identity check leads to a Haemolytic Transfusion Reaction

- A patient with a haematemesis needed urgent transfusion, but the wristband was covered with blood and could not be read by a scanner

- A compatibility form filed in the patient’s notes, which belonged to another patient (who also had blood available), was used to provide identifiers for collecting blood

- The O RhD Positive patient was transfused with >50 mL of A RhD positive red cells before the error was noticed

- The patient was admitted to ITU with intravascular haemolysis and renal impairment.
Communication failure results in inappropriate transport of red cell units

- Request from ED for 4 units of blood which was placed in the laboratory fridge ready for collection.
- 2 hours later, the ED called asking if blood was ready, as the patient was being transferred - but the BMS found that it had already been removed.
- The receiving hospital contacted the lab to inform them that 1 unit had arrived with the patient, in a supermarket carrier bag.
Excessive transfusion follows misinterpretation of verbal instructions

- A 48 year old male patient in ED with a GI bleed.
- Five units of blood ordered and a verbal order for 2 units was given by the doctor, who then wrote them up on a prescription chart.
- Staff nurse asked the doctor if he wanted the blood given through the rapid infuser, and he confirmed that “all the blood can go through this”.
- All five units were transfused instead of the intended 2 units.
Unlabelled components transfused to wrong patient in error

- **Platelets for a patient on ITU were delivered to the ED by taxi from BTS**
- **The ED had also requested platelets for a different patient.**
- **ED took delivery of the platelets, assumed they were for their patient, and transfused them despite there being no documentation or label with any patient details.**
Blood gas analyser Hb used as trigger for emergency transfusion

- An Hb of 50 g/L was obtained from an ED blood gas machine on a female patient who was asymptomatic and not actively bleeding
- Two units of O RhD negative red cells were requested as an emergency
- One unit of O neg had already been transfused when the laboratory result became available which was 89 g/L
- The second unit of O neg was wasted due to inappropriate storage (on the patient’s bed)
Bypassing electronic safety systems leads to transfusion of incorrect units

- **During a massive trauma incident involving an ‘unknown male’ with a secure emergency ID number and validated blood group....**
- **A nurse accessed the blood issue fridge by pressing the ‘emergency override’ button and removed 4 units available for a different ‘unknown male’ from an earlier incident**
- **All four units were taken to the ED and transfused to the incorrect patient without any identification checks being made at the bedside**
Over-transfusion of a child due to inappropriate prescription and failure to monitor

- 1 yr old child, weighing 10kg, post gastrostomy
- ED after episode of vomiting blood – pale, but alert - Hb 98 g/L - misdiagnosed as acute arterial bleed, activated MH pathway and asked for O negs
- Prescribed blood in UNITS rather than mL
- Given 3 O negs over one hour, then a 4th on way to theatre (1122mL in total)
- No evidence at all of fresh bleeding – Hb now 270 g/L
- Only managed to venesect 40ml – admitted to PICU
In brief....

- *Delay in provision of blood to an off-site obstetric haemorrhage as the courier had not been trained.*

- *Adult with Hb of 47 g/L in ED. Nurse was sent for the emergency O Neg, but returned with a paedipack, which was administered after checking at the bedside by two senior doctors.*

- *More than one case of having to resort to using O Negs during an obstetric haemorrhage as a medic had labelled crossmatch sample with another patient’s details.*
Summary of key issues noted in SHOT case reports

- Failure to initiate / stand down MH protocol
- Continuity of care
  - Completely appropriate intensive resus in the ED continued without review or senior overview when patient is transferred between clinical areas
  - Lessons from military with consultant led care
- Inappropriate use of MH protocol
  - Activation of MH protocol to provide routine blood cover in theatre cases when no pre-op G&S or crossmatch performed
Key Learning Points

- Continue to sample, monitor and observe during a transfusion
- Appropriate assessment and prescription
- Good patient ID at all stages
- Communication with laboratory
- Early/easy release of components by laboratory
- Clear instructions / easy to follow protocol
- Do your own job well
Thanks to

- Paula Bolton-Maggs, SHOT Medical Director and the SHOT team

- You for listening, and reporting!

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