Great expectations: SHOT lessons from cases in obstetrics

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Medical Director

Wakefield October 2017
Yorkshire and the Humber RTC
SHOT Cases 2016 (n=3634 total reports made)
Overview of incidents in 2016

- Total reports: 3091
- Errors 87.0%
- Near miss: 1283
- RBRP: 227
- All errors: 1581
- Error reports: 1178 (74.5%)
- Pathological reactions: 385 (24.4%)
- Others (CS & UCT): 18 (1.1%)

Debbi Poles
Data analyst
### All incidents reported in 2016 n=3091

<table>
<thead>
<tr>
<th>Incident Type</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>NM: Near miss</td>
<td>1283</td>
</tr>
<tr>
<td>RBPP: Right blood right patient</td>
<td>227</td>
</tr>
<tr>
<td>UCT: Unclassifiable complications of transfusion</td>
<td>9</td>
</tr>
<tr>
<td>PTP: Post-transfusion purpura</td>
<td>0</td>
</tr>
<tr>
<td>TTI: Transfusion-transmitted infection</td>
<td>1</td>
</tr>
<tr>
<td>CS: Cell salvage</td>
<td>9</td>
</tr>
<tr>
<td>ATR: Acute transfusion reaction</td>
<td>253</td>
</tr>
<tr>
<td>TAD: Transfusion-associated dyspnoea</td>
<td>10</td>
</tr>
<tr>
<td>TRALI: Transfusion-related acute lung injury</td>
<td>0</td>
</tr>
<tr>
<td>TACO: Transfusion-associated circulatory overload</td>
<td>86</td>
</tr>
<tr>
<td>TA-GvHD: Transfusion-associated graft vs host disease</td>
<td>0</td>
</tr>
<tr>
<td>HTR: Haemolytic transfusion reaction</td>
<td>35</td>
</tr>
<tr>
<td>ADU: Over or undertransfusion and PCC</td>
<td>31</td>
</tr>
<tr>
<td>ADU: Delayed transfusion</td>
<td>101</td>
</tr>
<tr>
<td>ADU: Avoidable transfusion</td>
<td>114</td>
</tr>
<tr>
<td>HSE: Handling and storage errors</td>
<td>192</td>
</tr>
<tr>
<td>Anti-D: Anti-D immunoglobulin errors</td>
<td>409</td>
</tr>
<tr>
<td>IBCT: Incorrect blood component transfused</td>
<td>331</td>
</tr>
</tbody>
</table>

**Errors**

**Unpredictable**

**Possibly preventable**
Cumulative data for SHOT categories 1996-2016 n=18258

Failure to provide irradiated components: n=1310 patients since 1999
Clinical failures 76.8% in 2016
1 patient missed for 486 components
Review of obstetric cases reported 2014-2016

• Total reports 521, of which near miss = 342
• This is 65.6%, a much higher proportion than in total SHOT incidents: NM = 41.5% in 2016
• The majority are ‘wrong blood in tube’
• In 2014 24/65 (36.9%) WBIT were due to mislabelling of mother and cord samples
• The great majority of samples were taken by midwives
Midwives and doctors....

Oxford data 14,678 samples over 3 months
Population 670,000

<table>
<thead>
<tr>
<th>Staff group responsible</th>
<th>% Near miss SHOT</th>
<th>% Collections (Oxford)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other/unknown*</td>
<td>2.2</td>
<td>0</td>
</tr>
<tr>
<td>Medical student</td>
<td>0.2</td>
<td>0</td>
</tr>
<tr>
<td>Phlebotomist</td>
<td>6.6</td>
<td>19.2</td>
</tr>
<tr>
<td>Healthcare assistant</td>
<td>9.3</td>
<td>9.4</td>
</tr>
<tr>
<td>Nurse</td>
<td>19.2</td>
<td>38.6</td>
</tr>
<tr>
<td>Midwife</td>
<td>10.2</td>
<td>25.4</td>
</tr>
<tr>
<td>Doctor</td>
<td>20.4</td>
<td>28.7</td>
</tr>
</tbody>
</table>
Practices leading to near miss WBIT incidents n=629

- Patient not identified: 238
- Sample not labelled at bedside: 339
- Sample not labelled by person taking blood: 32
- Prelabelled bottle: 13
- Other: 7

Poor practice: 98.9%
SHOT reports 2014-2016 n=145

- Acute transfusion reactions: 36
- Handling errors: 26
- Delayed: 17
- Cell salvage: 16
- Specific requirements not met - Lab: 14
- Avoidable: 14
- TACO: 7
- Specific requirements not met - Clinical: 7
- Wrong component transfused - Clinical: 6
- Wrong component transfused - Lab: 1
- Haemolytic transfusion reaction: 1

38% of all CS
Delays and major obstetric haemorrhage

- 6/16 major haemorrhage protocols with delay in 2016
  - 2 cases failed to trigger porters
  - 1 unable to access emergency O D-negs
  - 3 poor communication

- A death due to delay in 2015
  - 2 other cases of major morbidity

- 2 with major morbidity in 2014
MOH and death

• A 37 year old lady with twin pregnancy admitted at 32/40 with APH
• Delivered by CS complicated by major haemorrhage
• Cardiac arrest and death
• Delay in activation of MHP
• Need for earlier involvement of consultants
Failure to replace blood volume after post partum haemorrhage

• A woman in her mid-thirties had a ventouse-assisted vaginal delivery for fetal distress at term
• It was then complicated by massive haemorrhage from cervical lacerations
• The major haemorrhage protocol was activated, six units of blood were delivered within 5 minutes and one was started immediately
• She was transferred from the delivery room to theatre and the bleeding was controlled within 30 min and the emergency team stood down
• The blood loss was unclear with losses recorded in both the delivery suite and theatre. A second unit was commenced
• About 2 hours later, she suffered cardiac arrest from which she could not be resuscitated despite transfusion of 12 units of blood and 3 units of Fresh Frozen Plasma (FFP)
• The coroner confirmed cause of death to be cerebral hypoxia secondary to haemorrhage
• Human Factors: Two teams, two locations, shift changes
Poor planning and communication breakdown

- Planned caesarian hysterectomy for morbidly adherent placenta (patient age 40 yrs), admitted -4d
- Blood bank warned early morning then code blue; in theatre from 09:00 to 23:00
- Requested 8 FFP, supplied with 4
- Total blood loss >20 L; 26 RBC, 18 FFP, 1Pl, 3 Cryo
- Hb 33g/L, no RBC despite request for 6 units 30 min before
- Anaesthetist was challenged several times by lab staff
Outcome

- Acute renal failure
- Admission to ICU
- Ischaemic leg (prophylactic iliac balloon insertion pre-operation)
Review

- Clinicians talking to different laboratory staff
- Lab staff not invited to planning meeting so did not understand the bleeding risk
- Two different MH protocols, obstetric one was 6 RBC to 4 FFP, anaesthetist expected more (calculated on 15mL/kg, overweight)
- No SOP for managing patient with antibodies so lab staff attempted to crossmatch, leading to delay, lab staff did not tell clinical staff this
- Lab staff had no opportunity to discuss concessionary release
Specific requirements missed (Lab)

- Failure to provide PI-FFP n=3
- Failure to provide CMV-screened n=2
  - Transfusion of K+ units n=6
    - 4 resulted in development of anti-K
    - 2 outcome not known
- Failure to provide appropriate phenotype for sickle cell patient n=1
- Inappropriate use of electronic issue in a woman with positive antibody screen n=1
What’s the problem with anti-K?

- Characterised by fetal anaemia rather than jaundice
- Antibody should be titrated
- Most, 80%, relate to previous transfusions
- Only 9% of population are K+
- Test father, if K positive, refer to fetal medicine centre
- If heterozygous or unknown, do cffDNA testing from maternal blood
Algorithm from BSH Guidelines
Transfus Med 2016, 26: 246-263
Specific requirements missed (Clin)

- 5 cases of communication confusion about pregnancy so CMV-screened units not issued
- 1 patient with major obstetric haemorrhage did not receive irradiated red cells (PH Hodgkin lymphoma)
- 1 patient with SCD where the laboratory was not informed
Laboratory error and poor communication

Wrong component transfused

Mother: anti-D and anti-C detected at 17 weeks gestation
Advised close follow-up with titres
Monitored in tertiary centre
Laboratory error and poor communication

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Baby: induced delivery at 36 weeks in local centre: hyperbilirubinaemia, Group O D-pos
NICU staff were not aware of this baby prior to delivery; not discussed in obstetric high risk meeting
Laboratory error and poor communication

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Monitored in tertiary centre

Given the WRONG BLOOD
O D-pos (incompatible with maternal antibodies), should be O D-neg

Baby: induced delivery at 36 weeks in local centre: hyperbilirubinaemia, Group O D-pos
NICU staff were not aware of this baby prior to delivery; not discussed in obstetric high risk meeting

Policies not followed:
Day 3: Verbal requests for urgent blood for exchange
2 BMS did not look at maternal results so provided wrong group

The baby required repeat exchange transfusion with O D-negative on day 6
What went wrong…. 

• Day 3 – clinician alerted laboratory, BMS did not review maternal details and issued O+ red cells (baby’s group) 
• All requests were by telephone, handover not effective and no follow up request form received by laboratory 
• On several occasions BMS did not check mothers blood group and antibody results and issued O+ red cells without crossmatching against the mother’s sample 
• Multiple other human factors contributed 

• Kleihauer test was inappropriate due to the mother having immune anti-D and laboratory staff should not have issued anti-D Ig
Anti-D immunoglobulin errors 2016

- Omission or late administration of anti-D Ig
- Anti-D Ig given to a D-positive woman
- Anti-D Ig given to a woman with immune anti-D
- Anti-D Ig given to the mother of a D-negative infant
- Anti-D Ig given to the wrong woman
- Wrong dose of anti-D Ig given
- Anti-D Ig handling and storage errors

Late or missed 81.4%

Total in 5 years 1182

409 anti-D Ig-related incidents reported in 2016
2 women known to have developed immune anti-D
We do not know how many of these women are sensitised because they are not followed up.

New study of women found to have a new anti-D in pregnancy from 2012.
Anti-D immunisation study – more questions than answers
Immune anti-D discovered in pregnancy

• Total 42 with no previous pregnancy (NPP)
• Total 115 who had a previous pregnancy (PP)
  – 18/50 (36%) PP women found to be immunised at booking apparently had ideal management in the previous pregnancy
• Still worth giving anti-D Ig >72h and up to 10 days after a sensitising event (PSE)
Risk factors for sensitisation

- 14/61 (23%) weight >80kg
- 16/83 (19%) did not receive antenatal prophylaxis
- 19/28 (68%) PSE correctly managed
- 9/58 (16%) gestation beyond 40 weeks
  - National data: 17.5% pregnancies extend >40 w
- Postpartum prophylaxis correct in 62/102, missed in 8 and no information in 27
More questions than answers

• Should obese women receive increased dose?
• Should extra dose be given if pregnancy >40 weeks?
• Do twin pregnancies have increased risk?
• Is anti-D Ig required for medical termination without instrumentation?
Communication
Additional Information

Following documents available on website www.shotuk.org

- Teaching slide set
- SHOT cases
- SHOT reporting definitions
- Clinical lessons
- Laboratory lessons
- SHOT Bites

Also available:
- Previous SHOT reports
- SHOT summaries
Acknowledgements

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