Avoidable, Delayed or Undertransfusion (ADU)

11

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Definition:

- **Where the intended transfusion is carried out, and the blood/blood component itself is suitable for transfusion and compatible with the patient, but where the decision leading to the transfusion is flawed**
- **Where a transfusion of blood/blood component was clinically indicated but was not undertaken or was significantly delayed**
- **Avoidable use of emergency O RhD negative blood where group-specific or crossmatched blood was readily available for the patient**

DATA SUMMARY
Total number of cases: n=161

Implicated components		Mortality/morbidity	
Red cells	136	Deaths definitely due to transfusion	1
Fresh frozen plasma (FFP)	11	Deaths probably/likely due to transfusion	0
Platelets	11	Deaths possibly due to transfusion	4
Cryoprecipitate	0	Major morbidity	7
Granulocytes	0	Potential for major morbidity (Anti-D or K only)	0
Anti-D Ig	0		
Multiple components	3		
Unknown	0		

Gender		Age		Emergency vs. routine and core hours vs. out of core hours		Where transfusion took place	
Male	71	≥18 years	144	Emergency	31	Emergency Department	14
Female	90	16 years to <18 years	1	Urgent	57	Theatre	14
Not known	0	1 year to <16 years	9	Routine	66	ITU/NNU/HDU/Recovery	16
		>28 days to <1 year	1	Not known	7	Wards	76
		Birth to ≤28 days	6			Delivery Ward	3
		Not known	0	In core hours	65	Postnatal	1
				Out of core hours	44	Medical Assessment Unit	21
				Not known/Not applicable	52	Community	1
						Outpatient/day unit	5
						Hospice	0
						Antenatal Clinic	0
						Other	0
						Unknown	10

(ITU=Intensive therapy unit; NNU=Neonatal unit; HDU=High dependency unit)

What to report:

- Prescription of components that are not required or are inappropriate as a result of erroneous laboratory results, transcription errors or faulty clinical judgement
- Prescription for an inappropriate indication
- Prescription at a dose or rate inappropriate for the patient's needs, excluding those cases which result in transfusion-associated circulatory overload
- Failure to transfuse when indicated, undertransfusion and significant delays in transfusion, whether caused by the laboratory or the clinical area

Overview

A total of 161 reports were included in this analysis, 71 reports relate to male patients and 90 to females. The age range was 0 to 95 years (median age 68) with 17 of these patients less than 18 years of age. Five patients died, and 7 suffered major morbidity as a direct or partial result of delayed transfusion.

Delayed transfusions n=34

The transfusions were 'emergency' in 19 cases, 'urgent' in 12 and 'routine' in 2. In 1 the urgency was not stated. The most common elements identified were communication and logistic failures.

Haemovigilance schemes focus on adverse reactions and events in recipients following transfusion of blood and its components. However, patients may also suffer adverse consequences if transfusion does not take place in a timely manner or is inadequate. The UK National Patient Safety Agency (NPSA) was set up in 2001 to identify trends and patterns in patient safety problems through a National Reporting and Learning System (NRLS) [34]. Hospitals were encouraged to report any unintended or unexpected incident that could have or did lead to harm. This scheme issued national warnings and alerts from sentinel events. Between 2005 and 2010 reports were received of 11 deaths and 83 incidents in which patients were harmed as a result of delayed provision of blood in an emergency. A 'Rapid Response Report' followed in October 2010 [35] with immediate action by hospitals to be completed by April 2011, including review of major haemorrhage protocols (MHP) and reporting any incidents of death or harm to the NPSA and SHOT. SHOT has therefore included reports of delays from 2010.

Hospitals were advised to review their local practices for requesting and obtaining blood in an emergency. This should include training and regular drills similar to training for cardiac arrest calls. The protocol should be activated using an easily recognised trigger phrase, and a local team member nominated to co-ordinate communication. Hospital transfusion committees are recommended to review all incidents to ensure activation is appropriate and effective. Some of these issues are apparent in the cases reported below.

Although the NPSA recommendation related only to emergency transfusion, SHOT will accept any report where the clinician noted 'delay', for example delay resulting from reluctance to transfuse overnight despite clear clinical indications for earlier transfusion. Emergencies are also associated with other SHOT-reportable adverse events such as sample mix-ups, poor labelling and ultimately, wrong components transfused including incompatible ABO red cells.

Reports to SHOT of delayed transfusion have increased each year, Figure 11.1 (ages ranged from birth to 86 years). These are seriously ill patients with a high mortality (21/69, 30.4%) and in some cases 10/69 (14.5%) this was related to the delayed transfusion. The majority of these events were emergencies. In 2 instances reported in 2013 the foundation year doctors did not recognise signs and symptoms of acute haemorrhage so that resuscitation and transfusion were delayed (Cases 2 and 6 below). Both these cases were compounded by serial handovers at weekends and no consistent consultant ownership or a lack of senior leadership.

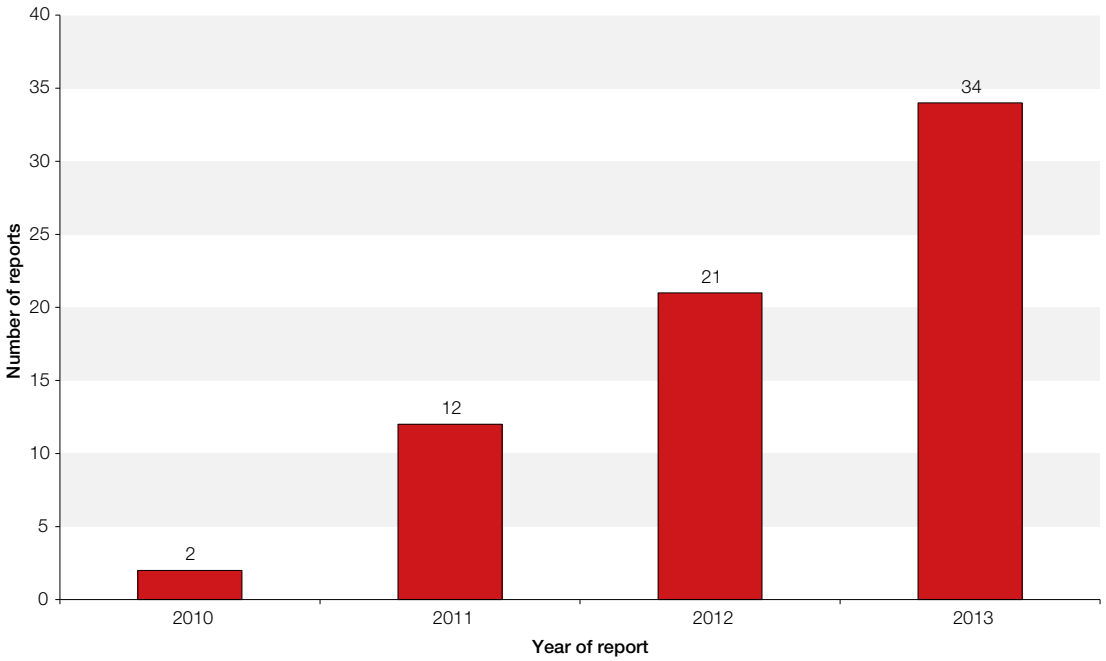

Figure 11.1: Number of reported delays by year, 2010 to 2013 n=69

Examples of the reasons or contributory factors to some of the delayed transfusions

- Poor knowledge leading to failure of or inappropriate activation of the MHP
- Incorrect trigger phrase used to activate the MHP
- Failure by foundation year doctors to recognise clinical signs of haemorrhage and shock
- Poor continuity of patient care with no adequate consultant ownership or leadership
- Poor communication between teams and departments (including failure to inform the laboratory of the emergency)
- No contingency plan for major haemorrhage during fire alarms
- Refusal to transfuse overnight despite clinical need
- Mistakes and omissions in patient identification and sample labelling requiring repeat samples with the resultant delays
- Delays in samples reaching laboratory (e.g. inappropriate use of pneumatic tube system instead of hand delivery as is required by this hospital's emergency protocols)
- Delay due to presence of alloantibodies (some samples needed to be sent to Blood Service laboratories for crossmatch)
- Patient transferred from ED to ward with no wristband, unable to identify herself and with a new shift of nursing staff who could not identify her
- Unable to release electronically as quarantined by the system (mixed field result/uncrossmatched units placed in issue refrigerator)
- Delayed collection and delivery of components
- Lack of clear communication between teams and departments regarding the urgency of the situation
- Laboratory attempts to determine the urgency of the situation misinterpreted as refusal to provide emergency components
- Components not delivered to the correct location due to unclear instructions (by both internal and external sources)
- Failure to appreciate the extent of blood loss due to the patient being treated in different areas by different clinical teams

- Delay in patient assessment leading to a delay in treatment
- Failure to provide a comprehensive handover in both laboratory and clinical areas
- Equipment failures (e.g. printers, laboratory system upgrade)
- Emergency units not able to be issued without a patient identification (ID) number

Deaths n=5

These deaths were all linked to delays in transfusion, one was 'definitely' related, Case 1 below, and 4 'possibly' related.

Case 1: Death attributed to delayed transfusion in a child with sickle cell disease

A young child with sickle cell disease was admitted with a sickling crisis. His Hb was 57g/L on admission. This was rechecked later the same day when it was 50g/L. The Hb was not checked the following day (a Sunday). On Monday the Hb was 28g/L (reported at midday). It was stated in the report that there was a delay of more than 4 hours in requesting red cells and starting the transfusion – the child suffered cardiac arrest and died during the transfusion in the evening.

The clinician who reviewed the case attributed death to untreated anaemia.

Case 2: Death follows failure to recognise and act on shock 4 days after major surgery in a patient on anticoagulants

A 66 year old man had spinal surgery on a Thursday. He was at high risk of complications (ischaemic heart disease with previous coronary artery stenting, was on long-term warfarin for recurrent thromboembolic disease).

Surgery was uneventful and he was returned from a planned overnight stay in the high dependency unit to the ward on Friday on a heparin infusion. His warfarin was restarted on this day. On Saturday his Hb was stable and international normalised ratio (INR) was 1.1. He was apparently well until the middle of Sunday night when he developed hypotension and had a temporary loss of consciousness. The possibility of occult bleeding was raised early on Monday morning. He continued to have hypotension; later tachycardia and poor urine output were noted, but the suspected and then confirmed diagnosis of a large retroperitoneal bleed was made several hours later at 17:00. The resuscitation was slow (two units of blood between 14:00 and 17:00 on Monday) and he died later the same day.

The detailed root cause analysis (RCA) identified many areas of concern particularly the failure to recognise symptoms and signs of shock, poor anticoagulant management over the weekend during which time his heparin dose was excessive (there were no clinical notes made on Sunday) and poor leadership.

Case 3: Delayed provision of red cells as a result of poor labelling and communication confusion

An elderly man required an emergency transfusion during massive gastrointestinal haemorrhage (Hb fell from 88 to 47g/L) complicated by a warfarin-related high INR of 11.5. Group-specific red cells were issued but were unlabelled for the patient and could not be transfused. The samples were sent by the incorrect route (pneumatic tube rather than hand-delivered), there were communication failures between the clinical area and the laboratory. The patient arrested and died, and the delay in transfusion may have contributed (3 errors).

Case 4: Failure to prepare for predictable thrombocytopenia contributes to death

A 62 year old man died from haemorrhage and sepsis. He was receiving chemotherapy for malignant disease resulting in a falling platelet count. A group and screen sample was not sent in a timely manner despite the predictable fall in count so that platelets were not available and prophylaxis was not given when indicated at the threshold platelet count (<10x10^9/L) (2 errors).

Inadequate junior medical staffing levels and supervision were cited as contributory factors.

Case 5: More haste less speed – wrong date of birth

A 66 year old man with a ruptured aortic aneurysm had delayed provision of major haemorrhage packs as the ambulance staff transferring him from one hospital to another gave the wrong date of birth to the emergency department. This was entered into the Trust information technology (IT) system. In addition, the blood sample was delayed reaching the laboratory and had not been marked as urgent (2 errors).

Major morbidity n=7

Seven cases of delayed transfusion were associated with major morbidity.

Case 6: A woman with pneumonia developed gastrointestinal bleeding with failure to recognise signs of bleeding and role of medication

A 44 year old woman was admitted with bacterial pneumonia. In addition to antibiotics, on the following day, Tuesday, she was prescribed a nonsteroidal anti-inflammatory agent (NSAID) for pain. On the third day of admission (Wednesday) she had a large haematemesis – Hb was 94g/L having been 124g/L on admission. Endoscopy took place on Friday and showed 3 gastric ulcers which were not actively bleeding, but she had a tachycardia of 116bpm. She was prescribed intravenous (IV) omeprazole but had no cannula for some hours at the weekend. No medical notes were recorded for the weekend which was interpreted in the RCA as a failure to review the patient.

Late on Sunday night she had repeated further episodes of haematemesis with melaena, Hb was 73g/L, blood pressure (BP) 88/55mmHg. The NSAID was stopped. She received one unit of blood; 2 hours later Hb was 52g/L, pulse rate 132 and she was distressed. The major haemorrhage protocol was then activated. She suffered a cardiac arrest with at least 15 minutes without an output with successful resuscitation but suffered hypoxic brain injury.

The root causes were identified as a failure to recognise haemodynamic compromise with delay in activation of the MHP, and a lack of awareness of adverse effects of NSAIDS during acute illness. There should be a clearly defined escalation policy to ensure the delivery of basic and essential medical and nursing care at night and the hospital should ensure that trainee medical staff on duty at night are competent to deal with all relevant acute medical conditions.

Delayed transfusion associated with cardiac arrest

In 3 cases the delay resulted in cardiac arrest from which the patients recovered, one only partially (Case 6 above). One patient who arrested had delayed admission following collapse at home. Admission to the ED was delayed for 3 hours while the ambulances were ‘stacking’. A further delay of 2 hours occurred in assessment in the ED. A Hb done 2 hours after admission was 38g/L and the patient then suffered a cardiac arrest with evidence of gastrointestinal bleeding (melaena). The MHP was then activated and she was successfully resuscitated. If the blood sample had been taken in a timely manner the use of emergency O RhD negative units might have been avoided. Over-capacity in the emergency department was identified as a contributory factor to the delayed admission and assessment.

In a further 2 cases the patients were already in cardiac arrest when the blood was urgently requested. Delay in one of these cases resulted from an incorrect trigger phrase for the MHP (Case 7 below) In another case a patient with alloantibodies bled unexpectedly after surgery and poor planning meant that appropriate units were not available on standby.

There were 2 additional cases in this group. In the first, the clinical staff were unable to access the remaining crossmatched units in the electronic satellite refrigerator. The blood had inadvertently been fated as used when the transfusion administration record was returned to the laboratory. The patient had to be managed with colloid infusion until the transfusion laboratory could reissue the units. In the final case, the patient arrested due to hypoglycaemia (originally thought to be due to a transfusion reaction) These cases are a reminder that poor management of transfusion is often one factor amongst many contributing to deterioration in seriously ill patients.

Case 7: Confusion about the trigger phrase for massive haemorrhage leads to the wrong emergency team being alerted and a delay in receipt of components

A patient was admitted to a maternity hospital with pulseless electrical activity due to hypovolaemia from a ruptured uterus. The MHP was triggered by the clinical staff at 23:40 using an incorrect trigger phrase. This was not recognised by the hospital switchboard who consequently activated only the cardiac arrest team in error.

The caller from the clinical area did not realise he had not been connected to the transfusion laboratory to discuss the requirements for the patient. At 00:55 the clinical area called the transfusion laboratory to ask where the platelets were. The laboratory had not been advised of the activation of the MHP, but was able to prepare and rapidly issue appropriate components. Three emergency O RhD negative units were transfused before group specific blood became available. The patient required admission to ITU.

The clinical staff were reminded of the importance of using the correct trigger phrase to activate the massive haemorrhage protocol to ensure the correct teams are alerted. The switchboard staff were given examples of other phrases that clinical staff may inadvertently use to try to ensure there was no delay/confusion in the future. The patient was admitted to intensive care in the short term but she made a full recovery.

Learning point

- All staff members involved in transfusion must be trained to know the correct trigger phrase for the massive haemorrhage protocol. Drills should be regularly run in high risk areas such as obstetrics and vascular surgery

Case 8: Delayed transfusion as patient is transferred three times

A patient with acute myeloid leukaemia was admitted with a Hb of 40g/L, but the unit of blood prescribed in the emergency department was not administered for 28 hours because the ward and the tertiary hospital to which he was transferred assumed that it had been given.

This case shows a failure of communication and raises questions about consultant ownership when patients are transferred between teams.

Avoidable transfusions n=120

The following section describes the errors associated with avoidable transfusion. These are similar each year.

Sample errors n=21

Table 11.1: Causes of full blood count sample errors n=21

Error	Number of cases
Dilute	8
Inadequate	4
Clotted	7
Wrong blood in tube	1
Pre-dialysis sample	1
Total	**21**

Case 9: Poor sample-taking leads to unnecessary hospital admission and transfusion

An elderly woman was reviewed at home because of a swollen leg. The general practitioner (GP) took a full blood count sample. However, having no sample tube with him, the GP walked 10 minutes from the patient's house to the surgery with the blood still in the syringe and then decanted the sample into a tube, labelled it with the patient's details and sent it to the laboratory. The sample is likely to have clotted in the syringe and given an erroneous result.

The laboratory phoned the out-of-hours medical service to report the Hb 76g/L. The out-of-hours medical service contacted the patient and arranged for immediate admission to the medical assessment unit (MAU).

On admission samples were taken for group and antibody screen, crossmatch and repeat full blood count and 2 units of red cells were subsequently issued and prescribed. The patient had no symptoms of anaemia.

The hospital full blood count sample result was Hb of 114g/L, authorised at 06:38. However, blood was issued at 07:14 and the 1st unit was started at 09:55, before the result, which had been accessible for more than 3 hours, was checked by the staff on the ward. The transfusion was stopped at 11:20 (after 100mL had been given) when the doctor realised the Hb result from the GP was probably spurious.

This root cause error in blood sampling led to an elderly patient having a needless admission to hospital at night and exposure to a blood component she did not need. However, there was a series of errors. First the GP should know that a delay between blood sampling and decanting into the anticoagulant tube is likely to produce an unreliable result. Secondly the patient, who had no symptoms of anaemia, should have been assessed by a doctor before being admitted to hospital. Thirdly, the patient should have been fully assessed in hospital prior to the transfusion to ensure that transfusion was indicated, in particular, the repeat Hb result should have been reviewed before transfusion started. Emergency admission to hospital at night is very distressing and disruptive for the patient.

Potentially avoidable use of emergency O RhD negative red cells n=10

Emergency O RhD negative red cell units are a precious resource reserved for emergency use. Whilst most of the situations here may have required immediate treatment with blood components, better preparation and communication with laboratory staff could have resulted in more appropriate crossmatched blood. In 5/10 cases crossmatched blood was already available in the laboratory.

In 2 further cases the patients had known alloantibodies and in 1 of these cases emergency blood was transfused in a non-emergency situation.

In 3 instances, there were problems with the samples. In 1 of these the non-availability of a suitable patient sample meant that emergency O RhD negative blood was used, in a second case there was a valid sample for electronic issue, but this was disregarded and a mismatch between a request form and sample resulted in sample rejection and emergency O RhD negative red cells had to be used in the interim.

In the third case (Case 13 cross-referenced below) lack of training in use of a point of care testing device led to a patient receiving emergency O RhD negative red cell components.

Failure to review results n=11 and failure to follow instructions n=4

Failure to review prior to transfusion n=11. In one case a patient with a preoperative Hb 202g/L bled 1500mL during surgery. Two units were prescribed and one was given. The patient had polycythaemia and a Hb 173g/L 20 hours post transfusion.

Failure to follow instructions n=4. Three patients were transfused despite clear instructions that transfusion was not necessary. There was an additional case of communication failure during handover.

Haematinic deficiency n=9

There were 8 cases with iron deficiency anaemia and one patient with an asymptomatic macrocytic anaemia (B12 deficiency).

Table 11.2: Red cell transfusions in patients with haematinic deficiency n=9

Number	Deficiency	Indication for transfusion	Symptoms Y/N	Hb pre transfusion	No. of red cell units given	Hb post transfusion
8	Iron	Iron deficiency anaemia	N	76g/L (MCV 63.9fL)	2	Unknown
		Anaemia	N	Hb 67g/L	600mL	Hb 93g/L
		Menorrhagia (lethargy)	N	Hb 46g/L (MCV 60fL)	3	Hb 102g/L
		'felt unwell'	N	Hb 58g/L	3	Hb 76g/L
		Shortness of breath on exertion	Y	Hb 65g/L	3	Hb 125g/L
		Menorrhagia (lethargy)	N	Hb 50g/L	3	Hb 88g/L
		Menorrhagia (acute blood loss)	N	unknown	3	Unknown
		? gastrointestinal (GI) bleed (iron tablets)	N	Hb 83g/L	3	Hb129g/L
I	B12	Admitted via GP B12 <30pg/mL Known macrocytic anaemia	N	Hb 58g/L	3	Unknown

The majority of these patients were transfused in acute settings, either in the ED (1), MAU (6) with a further 2 on the ward.

Case 10: Inappropriate transfusion of red cells to an asymptomatic iron deficient patient

A 78 year old man felt unwell and had a Hb 58g/L. He was otherwise asymptomatic and was known to have iron deficiency anaemia. The attending doctor authorised a 3 unit red cell transfusion. The post-transfusion Hb was 76g/L.

The error was detected by the anaemia nurse specialist. The patient should have been put onto the hospital's iron deficiency anaemia pathway and immediate management discussed with the consultant haematologist.

Learning point

- Transfusion is not the most appropriate management for iron deficiency anaemia especially if the patient is asymptomatic. These patients should be discussed with a consultant haematologist before arranging transfusion

Erroneous results n=20

Cause unknown n=8

The cause of the wrong blood results contributing to unnecessary transfusion could not be established in 8 patients.

Failure to consult correct/most recent results n=12

In 5 cases the result from a previous admission was viewed and acted on, and in a further 3 cases, transfusion was based on earlier results (recognised as likely to be wrong) instead of waiting for the results of the repeat sample.

In four additional cases, the results of another patient were used as the basis for transfusion.

Case 11: Error when consulting patient blood results puts a woman at risk of TACO

A woman attended the delivery suite in early labour. One month prior to this the Hb was 97g/L and she was taking iron tablets. She was discharged home and advised to return when labour was established. The midwife took a repeat full blood count to check the response to oral iron.

The midwife accessed results and noted that the Hb was 74g/L, printed this out not noticing it was from a previous admission. She discussed this wrong result with the consultant who advised proactive management when in labour. The midwife filed the incorrect result in the patient's notes and documented the consultant instructions.

The woman returned to the delivery suite in advanced labour 4 hours later. Based on the earlier wrong result a 4 unit crossmatch for immediate transfusion was requested – 'each unit over 2 hrs and for rapid transfusion if there was excessive bleeding' (the actual blood loss was 300mL in total). During the second unit, the patient became hypertensive and there was a concern that she was developing pregnancy-induced hypertension (and at risk for transfusion-associated circulatory overload (TACO)). A repeat Hb taken at this time was 110g/L and the transfusion was stopped. The correct Hb result from earlier in the day was 108g/L not 74g/L.

Learning point

- Care must be taken when reviewing patient blood results to ensure that the correct record is viewed

Prescription errors n=13

Ambiguous prescribing or misinterpretation of other instructions can result in unnecessary transfusions or transfusion of excessive duration. In 5 cases the component was not prescribed at all, in 3 cases red cell units were prescribed and administered to patients despite instructions to only have units in reserve for surgery. There were 2 patients with 'rolling prescriptions' who were repeatedly transfused without review of the Hb for each transfusion episode.

Case 12: Platelets prescribed to run over 4 hours

A patient was receiving a platelet transfusion which was commenced at around 08:30. The platelets were wrongly prescribed to infuse over 4 hours. Standard practice is for platelet transfusion to be given over 30 minutes.

Inappropriate components prescribed n=5

In one case platelets were prescribed for a patient who had suffered an intracranial haemorrhage following thrombolysis but whose platelet count was normal. Three patients were given FFP inappropriately, 2 were on warfarin and the other patient was intended to receive platelets not FFP. In the 5th case an elderly man with massive gastrointestinal bleeding received 8 units of red cells when the intention was for him to receive 6 units of red cells with 4 of FFP. This error occurred due to ambiguous prescribing and poor handover at a shift change.

Errors related to blood gas analysers and point of care testing devices n=9

Point of care testing devices are helpful to guide transfusion however, they must be quality assured and validated for haemoglobin measurements [21]. In addition all users must be properly trained in their use. A full blood count should be sent to the laboratory as soon as possible to confirm any abnormal results and prevent unnecessary transfusion.

Case 13: A doctor's lack of training to use a point of care testing device contributes to avoidable use of emergency O RhD negative red cells

A 35 year old woman with a suspected upper gastrointestinal bleed was transfused emergency O RhD negative red cells following a point of care testing result. The Hb from the laboratory was 140g/L. The device required a user code but the doctor operating the device had not been trained. The investigation could not establish whose user code had been used to enable the doctor to access the device. A check full blood count on a pre-transfusion sample was normal and the use of emergency blood was not indicated.

Learning point

- Clinical staff are reminded that passwords, user codes or log in details must not be shared with other staff members. Limited access is designed to ensure that only trained personnel can use such testing devices

Low body weight patients n=6

There were 2 paediatric cases in this group. Issues with overtransfusion of children are discussed in Chapter 25 Paediatric Cases in more detail. In the other 4 cases the prescribers did not take into account the patient's low body weight leading to excessive volumes which can put patients at risk of developing transfusion-associated circulatory overload.

Inappropriate transfusions to patients with an objection to transfusion n=2

Patients who have an objection to transfusion whether for personal or religious reasons may carry a written 'advanced directive' to advise of their wishes, however clear consent or not can prove difficult to achieve in confused or incapacitated patients.

In one of these cases the patient had a clear directive in place but lacked capacity meaning she did not raise an objection at the time. In the second case it was not clear from the case notes and the patient had not made their wishes clear.

An additional case is discussed below where a Jehovah's Witness nearly received an inappropriate transfusion (Case 16).

These cases are a reminder that consent for transfusion should be sought wherever possible and not simply assumed.

Units spiked before pre-administration checks avoidable transfusion or near miss? n=3

In 3 cases a unit of blood was spiked without ensuring that the pre-transfusion bedside checks had taken place.

It can be difficult to define exactly the point at which a transfusion has started. SHOT has used the International Society of Blood Transfusion (ISBT) definition, which considers transfusion to have started when the unit is spiked. That means a few cases in this and previous Annual SHOT Reports are categorised as avoidable transfusions, even though the reporters are quite clear that no part of the component was given to the patient. Following a discussion at the SHOT Working Expert Group in February 2014, it was decided that in future such cases should be categorised according to how the unit was fated. Therefore, from 2014 incidents will be categorised as near miss if the spiked unit is fated as wasted, rather than transfused.

These 3 cases would then be classified as 'near miss' rather than 'avoidable transfusions'. This decision was made after the numbers of cases were collated for 2013 and so, for this report, remain in ADU but next year such cases will be classified as 'near miss' events.

Case 14: FFP nearly transfused to a baby based on wrong indication

FFP was issued (although challenged by transfusion staff) based on an erroneous coagulation screen result because the baby had a diagnosis of necrotising enterocolitis (NEC) and was to be transferred to a specialist unit. The component was taken to the ward and drawn into a syringe ready to administer, which is equivalent to spiking the unit, but a repeat coagulation screen showed the clotting to be normal so the component was not administered.

Case 15: Emergency O RhD units taken for a patient inappropriately

A unit of emergency O RhD negative red cells was collected and taken to the ward. The patient had been found on the previous day to have a 'non-specific' cold antibody. A sample was available in the laboratory but no units had been requested. The prescription chart was seen by laboratory staff who noted that this emergency unit was to be transfused over 2 hours.

This was not an emergency and is an inappropriate and potentially unsafe use of emergency O RhD negative blood. The staff nurse had run the unit through the giving set but had not yet connected the unit. The unit was not given but was wasted. A 2 unit crossmatch was performed manually (the patient was not suitable for electronic issue of red cells due to the antibody) on the sample from the previous day.

Case 16: Platelets set up for transfusion before the patient refused

A platelet bag was spiked and about to be administered when the patient declared that he was a Jehovah's Witness and did not want a platelet transfusion. No evidence of consent or discussion was documented in the medical notes.

In all these examples the units were fated as wasted and not as transfused.

Transcription of results n=4

Incorrect transcription of results led to unnecessary transfusion in 4 patients.

Unnecessary transfusions result from poor assessment of symptoms by inexperienced junior doctors n=2

Case 17: A junior doctor misinterpreted a panic attack for symptoms of severe anaemia

The patient had Hb 72g/L due to iron deficiency; the transfusion was stopped and the patient was treated with intravenous (IV) iron.

Case 18: Misinterpretation of symptoms leads to unnecessary transfusion

A post-delivery mother with Hb 84g/L was transfused because the junior doctor thought her symptoms were due to anaemia. This was above the trigger threshold of 70g/L and was unnecessary.

Miscellaneous n=1

Case 19: Patient in theatre receives unnecessary red cells in order to prevent wastage of unit

A woman was undergoing an emergency procedure to stop her bleeding and 3 units of blood were taken into theatre for her. The bleeding stopped before the third unit was transfused. The anaesthetist decided the patient did not need the third unit and attempted to return it to stock. The unit had been out of the controlled environment for more than 30 minutes and could not be returned. The anaesthetist decided to administer the unit rather than waste it. The post-transfusion Hb was recorded as 122g/L.

Undertransfusion n=7

In 5/7 cases the undertransfusion was due to incomplete transfusions of FFP despite prescription of a full adult therapeutic dose. The other 2 cases were red cell transfusions for paediatric patients which are discussed in Chapter 25, Paediatric Cases.

Near miss ADU cases n=15

Similar lessons can be learnt from near miss cases that were detected before the patient received an avoidable or inappropriate transfusion.

Table 11.3: Near misses that could have led to avoidable or unnecessary transfusions n=15

Point in the process	Type of error made	Number of cases
Request	Requested by inappropriate person	3
	Requested on the basis of erroneous results	2
	Requested for incorrect patient	1
Sample taking	Wrong blood in tube full blood count (FBC) sample	6
Testing	Misinterpretation of FBC results	3
Total		**15**

Case 20: Alteration by a patient's friend could have lead to inappropriate transfusion

A patient's friend who was a retired doctor, altered the patient's request form from a 'group and antibody screen' to a two-unit crossmatch. A nurse noticed the alteration and a potentially inappropriate transfusion was averted.

IT-related ADU cases n=2

There were 2 ADU cases that also had an IT element and these are described below. The numbers are included in tables above where appropriate, so these are not additional cases. There was 1 clinical error, and 1 laboratory error.

Both of these cases exemplify different aspects of IT systems that can lead to patient-related problems.

Case 21: Inappropriate transfusion because incorrect electronic patient record was selected

A patient was transfused 2 units of red cells with a pre-transfusion Hb of 106g/L, which is above the recommended threshold Hb level for the patient's condition. The wrong patient had been selected for crossmatch by using an outpatient department computer screen that was logged into another patient's electronic record by a previous user of the terminal.

Learning points

- Always log out of an information technology (IT) system when the task is finished. Individuals are personally responsible for any work that is carried out under their username and logging off when leaving the system ensures that no one else can use an incorrect account
- Always check that the correct patient has been identified when ordering tests or looking at results by checking the name, date of birth and patient hospital number

Case 22: Laboratory standard operating procedure (SOP) not adequate to allow issue of emergency blood to a neonate

A premature baby developed intracerebral bleeding and required emergency transfusion followed by transfer to a specialist unit. The biomedical scientist (BMS) could not override the computer alert screen that required a blood group on the baby before issuing blood. There was no laboratory SOP to cover this scenario and the transfer of the baby was delayed waiting for the blood.

Learning point

- All emergency procedures should be subject to practice drills both in clinical and laboratory areas. Include common and less common scenarios and include the laboratory in the drills

COMMENTARY

The number of delayed transfusions reported to SHOT has increased year on year. While the NPSA Rapid Response Report was concerned mainly with instances of major haemorrhage, the evidence here shows that there are other instances of delay that put patients at risk. In 2 cases foundation year doctors did not recognise classic signs of haemorrhagic shock (tachycardia and falling blood pressure). Both these instances and another where the patient died were also associated with weekend periods with shift changes and poor record-keeping. Such cases reinforce the need to achieve better consultant supervision and cover at weekends. Other problems arise when patients are transferred several times ('patients are shunted like parcels in the night' – the Times, March 19, 2014), and not only is the handover incomplete, but consultant responsibility becomes unclear. Issues with the implementation of the European Working Time directive have been identified in a recent report from the Royal College of Surgeons leading to 'negative effects' with long intense shifts and junior staff losing contact with their trainers and feeling unsupported [36].

Nine patients with haematinic deficiencies were treated with transfusion rather than replacement of iron/B12, and a death in a patient with iron deficiency from transfusion-associated circulatory overload is reported in Chapter 23 Transfusion-Associated Circulatory Overload (TACO).

As more patients are treated with transfusion as day cases and community care is encouraged, it is important that General Practitioners are more familiar with transfusion practice and the indications and risks.

Recommendations

- The curriculum for Foundation Year training needs to be amended to include specific teaching on the recognition and urgent management of haemorrhagic shock

Action: Chair Foundation Programme Committee, Academy of Medical Royal Colleges and National Director UK Foundation Programme Office (UKFPO) in association with the General Medical Council

- Patients with iron or B12 deficiency should be carefully assessed and treated with haematinic replacement therapy and only with transfusions of red cells when there are clear indications

Action: Chief Executive Officers and Medical Directors of Hospitals/Trusts/Health Boards and the Royal College of General Practitioners

Recommendations still active from previous years are available in the 2013 Annual SHOT Report Supplement located on the SHOT website, www.shotuk.org under SHOT Annual Reports and Summaries, Report, Summary and Supplement 2013.