9 Incorrect Blood Component Transfused (IBCT) (clinical and laboratory errors)

including wrong components transfused and where specific requirements were not met

Authors: Clinical incidents: Julie Ball and Paula Bolton-Maggs;
Laboratory incidents: Hema Mistry and Christine Gallagher

Definition:

The category of incorrect blood component transfused (IBCT) includes all reported episodes where a patient was transfused with a component that was intended for another patient, was a component of different type than that requested or did not meet the specific transfusion requirements of the patient.

DATA SUMMARY – Incorrect Blood Component Transfused & Specific Requirements Not Met
Total number of cases = 252

Implicated components		Mortality/morbidity	
Red cells	202	Deaths due to transfusion	0
FFP	15	Deaths probably/likely due to transfusion	0
Platelets	19	Deaths possibly due to transfusion	0
Cryoprecipitate	2	Major morbidity	11
Granulocytes	0	Potential for major morbidity (anti-D or -K only)	5
Anti-D Ig	0		
Multiple components	14		
Unknown	0		

Gender		Age		Emergency vs. routine and core hours vs. out of core hours		Where incident took place	
Male	119	≥ 18 years	207	Emergency	35	Emergency department	13
Female	124	16 years to <18 years	3	Urgent	58	Theatre	18
Not known	9	1 year to <16 years	22	Routine	152	ITU/NNU/HDU/Recovery	28
		>28 days to <1 year	4	Not known	7	Wards	145
		Birth to ≤28 days	8			Delivery Ward	1
		Not known	8	In core hours	177	Postnatal	1
				Out of core hours	67	Medical Assessment Unit	14
				Not known/Not applicable	8	Community	2
						Outpatient/day unit	20
						Hospice	1
						Antenatal Clinic	3
						Unknown	6

This chapter is confined to the following errors in the transfusion process:

- Phlebotomy errors resulting in 'wrong blood in tube'
- Laboratory procedural and testing errors
- Component collection and bedside administration errors
- Transfusion of component not meeting the patient's specific requirements

In 2012 there were 252 incidents where the incorrect blood component was transfused, an increase in comparison with 247 reports in 2011. In 176/252 (69.8%) cases the patient's specific requirements were not met.

This chapter is divided into four sections:

- Section 9.1.1 Incorrect blood components transfused (IBCT) – incidents originating in the clinical area
- Section 9.1.2 Incorrect blood components transfused (IBCT) – incidents originating in the hospital transfusion laboratory
- Section 9.2.1 Specific requirements not met (SRNM) – incidents originating in the clinical area
- Section 9.2.2 Specific requirements not met (SRNM) – incidents originating in the hospital transfusion laboratory

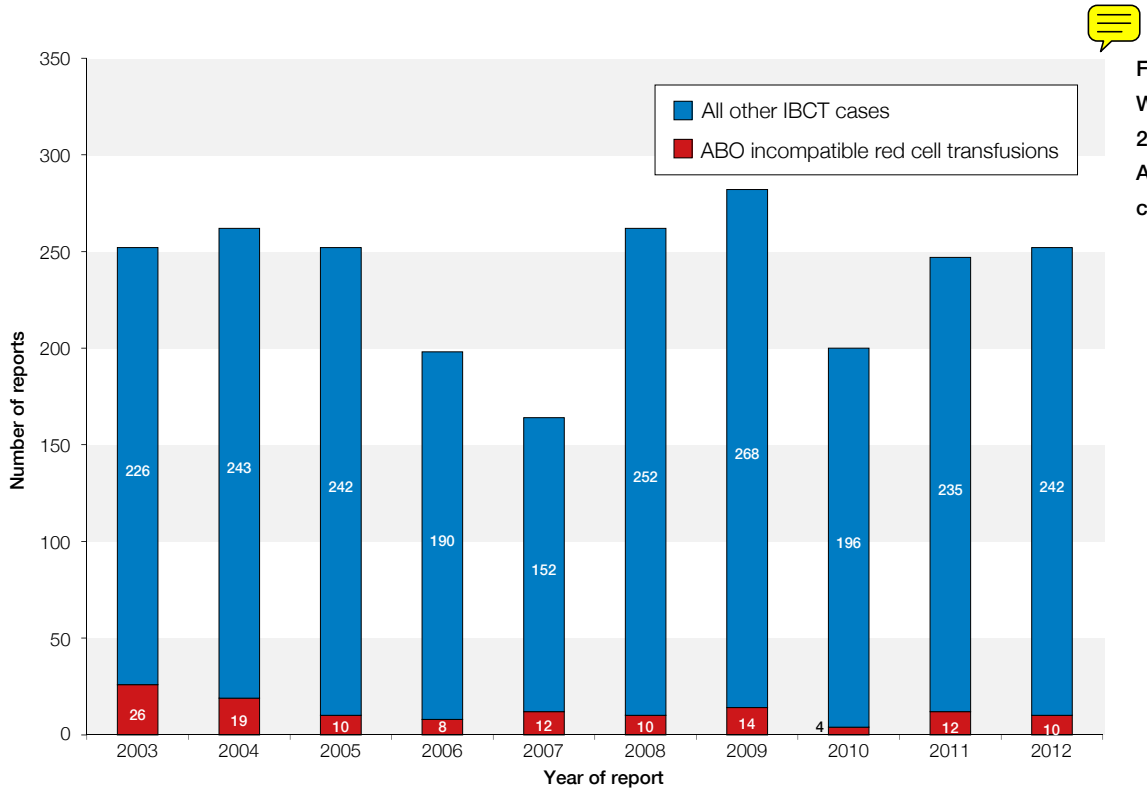

Figure 9.1: Wrong blood incidents 2003-2012 showing ABO incompatible red cell transfusions

It is sometimes the case that selection of components of a different ABO and/or Rh group from that of the patient is a deliberate decision based on individual clinical assessment, and influenced by age, gender and component availability. These pragmatic decisions are not reportable to SHOT (unless of course there is demonstrable adverse outcome for the patient). All cases reported in this chapter involve errors at some point leading to the provision of blood components and have been classified as 'non-identical' where a different blood group is fortuitously compatible with the patient or 'incompatible' where there is the potential for an acute haemolytic reaction.

Table 9.1: Summary of incorrect blood component transfused cases

Type of event	No. of incompatible ABO red cell cases	No. of incorrect ABO/RhD cases	Total number
Collection and administration of incorrect blood component			**32**
ABO incompatible red cells	6		
RhD mismatched red cells		1	
ABO non-identical and RhD mismatched red cells		1	
ABO non-identical red cells		4	
ABO identical red cells		10	
Others		10	
'Wrong blood in tube'			**6**
ABO incompatible red cells	2		
RhD mismatched red cells		1*	
ABO non identical red cells		2	
ABO identical red cells		0	
Other		1	
Laboratory errors			**21**
ABO incompatible red cells	0		
RhD mismatched red cells		9	
ABO non identical red cells		4	
ABO identical red cells		1	
Other		7**	
Incorrect ABO/RhD group transfused to haemopoietic stem cell transplant patients (HSCT)			**14**
Clinical	2	2	
Laboratory		10	
Clinically based cases of specific requirements not met			**106**
Laboratory based cases of specific requirements not met			**70**
Clinical miscellaneous			**3**
Total	**10**	**63**	**252**

** This also included, in addition to red cells, a transfusion of O RhD positive fresh frozen plasma (FFP) to a B RhD negative recipient.*

*** There were 2 ABO incompatible FFP transfusions in paediatric patients.*

Summary of key data for all incorrect blood component transfused cases

Mortality n=0

There were no fatal wrong blood incidents reported.

Major morbidity n=11

There were 2 'wrong blood in tube' incidents and 1 administration error which resulted in ABO incompatible red cell transfusions. In 7 cases involving laboratory errors, 5 resulted in the development of anti-K in women of childbearing potential who had been transfused with K positive red cells following incorrect component selection. In the remaining 2 cases, two patients experienced transfusion reactions after misinterpretation of antibody panels and subsequent issue of antigen positive units. In one case a patient receiving a minor ABO mismatched haemopoietic stem cell transplant (HSCT) developed evidence of haemolysis with increased bilirubin and falling haemoglobin when transfused with red cells of the wrong ABO group 10 days after the transplant.

ABO incompatible red cell transfusions n=10 

These were all clinical incidents and are summarised in Section 9.1.1.

ABO non-identical and RhD mismatch red cell transfusions n=1

This was due to a clinical administration error.

RhD mismatched red cell transfusions n=11

There were 11 cases, 2 occurred in the clinical area (1 due to 'wrong blood in tube', 1 due to a component collection and administration error). The other 9 were caused by laboratory errors: 7 component selection errors, 2 RhD grouping errors (one as a result of a transcription error and the other due to misinterpretation).

Incorrect ABO or RhD type blood components for haemopoietic stem cell transplant patients (HSCT) n=14

There were 9 cases in which HSCT patients received a component of an incorrect ABO group (4 red cells, 3 platelets and 2 FFP). The remaining 5 cases resulted in RhD mismatched components (4 red cells, 1 platelets) being transfused.

These are summarised and the errors discussed in Chapter 29 – Analysis of Incidents Related to Transplant Cases. One case of major morbidity after HSCT is described above and in Chapter 29.

Section 9.1 Incorrect blood component transfused (IBCT): Total n=76

Definition:

Where a patient was transfused with a blood component of an incorrect blood group, or which was intended for another patient and was incompatible with the recipient, which was intended for another recipient but happened to be compatible with the recipient, or which was other than that prescribed, e.g. platelets instead of red cells.

Section 9.1.1 IBCT – incidents originating in the clinical area n=45

Authors: Julie Ball and Paula Bolton-Maggs

Overview

Forty-five clinical case reports were analysed. There were 24 reports relating to male and 18 to female patients and in 3 cases of intrauterine transfusion (IUT) gender was unknown. The median age was 62, range 0-89 years. Nine reports related to children, in 2 cases children received adult emergency O RhD negative units when more suitable paedipacks were available and in three cases emergency non-irradiated O RhD negative paedipacks were used for IUT. The paediatric cases are discussed in more detail in the Paediatric chapter (Chapter 27).

Deaths due to wrong transfusion n=0

There were 7 deaths reported but in all cases they were stated to be unrelated to the transfusion.

Major morbidity n=3

These 3 incidents where each patient suffered 'severe harm as a result of the inadvertent transfusion of ABO incompatible blood' are classified as 'Never Events'[20] by the Department of Health (DH).

Case 1: Incompatible transfusion due to mislabelled sample in a person with multiple trauma treated in several medical facilities

A 27 year old male with major trauma was grouped at the first emergency hospital as O RhD positive, was transferred to a larger hospital where he was misgrouped as A RhD positive – the sample was from another patient. He received multiple transfusions (4 units of O RhD negative and 24 units of A RhD positive red cells, 5 units of group A platelets in addition to AB FFP). He subsequently received care in 3 further hospitals. At the first of these he was noted to have a transfusion reaction with evidence of haemolysis which complicated the management of his major trauma, but he made a full recovery without needing renal dialysis.

Case 2: Patient symptoms failed to lead to recognition of incompatible ABO transfusion

An 88 year old man scheduled for repair of fractured neck of femur grouped as O RhD positive. However it was noted that several months earlier during a previous admission he had grouped as A RhD positive and had received a group A RhD positive unit. He was recorded as having developed rigors, hypertension, hypoxia and vomiting. Although the staff decided not to continue with further units of blood on the previous admission, the incident was not recognised or investigated at the time as an acute transfusion reaction.

Case 3: Patient symptoms lead to recognition of incompatible ABO blood transfusion

A patient received a unit of blood intended for another patient because of failure to conduct the bedside checks correctly. The error was only noted when the patient developed a haemolytic transfusion reaction, complaining of feeling unwell with rigors, increased respiratory rate and pulse rate and his temperature rose from a baseline of 36.6°C to 39.4°C. The oxygen saturation fell from 97% to 75%. The post-transfusion blood group was not interpretable on the analyser and the direct antiglobulin test (DAT) was positive. The patient's blood group was O RhD positive and the

incompatible unit was group A RhD positive. Both members of staff involved had been trained and competency assessed.

Learning point

- Clinical staff need to be educated to recognise a transfusion reaction when any symptoms such as those described in Case 2 occur following a transfusion

ABO incompatible red cell transfusions n=10

The 10 ABO red cell incompatible transfusions were the result of 2 'wrong blood in tube' incidents, 1 collection and administration error, 5 errors of administration alone and 2 incidents relating to HSCT patients discussed in more detail in the transplant chapter (Chapter 29).

In a further case, O RhD positive FFP and red cells were given to a B RhD positive recipient due to a 'wrong blood in tube' phlebotomy error.

RhD mismatch n=3

In all 3 cases of unintended RhD mismatch, the recipients were RhD negative men ≥ 65 years of age who received RhD positive components, but the RhD group change was not a deliberate decision.

'Wrong blood in tube' incidents n=6

There were 6 reports where a component (red cells/fresh frozen plasma) of a different group was transfused because of a 'wrong blood in tube' (WBIT), 2 of these incidents resulted in the transfusion of ABO incompatible red cells, (Cases 1 and 2), and 1 led to the transfusion of ABO incompatible FFP.

Case 4: Patient identification error on admission due to wrong patient selection on the computer system results in a wrong blood transfusion

A transcription error was made by a bed manager when admitting a patient (M) onto the hospital system. The incorrect identifiers were then used for records and identification wristband. The patient was confused and unable to confirm his/her identity. The details used belonged to a different patient (P) with same year of birth. The correct patient (M) was bled but the other patient's history (P) was accessed on the information technology (IT) system. Patient M had an antibody history with anti-Jk^a recorded in the laboratory. Patient P's transfusion history was different so Jk^a negative blood was not selected. The patient identification error was discovered by the infection control nurse when the patient was transferred to another ward within the hospital.

There was some evidence of a possible delayed haemolytic transfusion reaction with a subclinical response (a rise in anti-Jk^a titre) identified during further investigation by the Blood Service red cell immunohaematology laboratory, but the phenotype of the donor was unknown.

In 4/6 reports of 'wrong blood in tube' incidents, the error was detected at a subsequent hospital admission when a new blood sample gave an ABO group that was different to the historical record. This was confirmed by a second sample during this subsequent admission. In all 4 cases, the patients had been transfused with an incorrect blood component during the previous admission. In one case this was only detected 12 years later.

In the other 2/6 cases, sample labelling errors were confirmed during the same admission.

Incorrect blood components transfused to haemopoietic stem cell transplant recipients n=4

These cases are discussed in the chapter on transplants (Chapter 29).

Combined collection and administration errors n=16

Incorrect component type collected n=12

There were 12 cases where patients received an incorrect component type i.e. a different component than the one prescribed/required. In 9 of these 12 cases the situation was an emergency or urgent. The other 3 were routine transfusions.

Table 9.2: Collection errors

Prescribed/required component	Component collected	Collector	Detected by
Emergency O RhD negative red cells	Stock O RhD negative red cells from a refrigerator fitted with an electronic tracking system	Nursing staff	Completed stock units were returned to the hub laboratory with handwritten labels attached
Neonatal emergency O RhD negative red cells	Adult emergency O RhD negative red cells (Cytomegalovirus (CMV) negative, K negative)	Porter (sent with blood collection form for mother completed in error by midwife)	Midwife realised that the units requested were for the baby after discussion with paediatric registrar
Neonatal emergency O RhD negative red cells	Adult emergency O RhD negative red cells	Midwife	Unspecified
Emergency O RhD negative red cells	O RhD negative unit that was labelled for another patient	Clinical staff	Routine traceability checks by laboratory
FFP	Platelets	Unknown	Clinical staff noticed platelets in progress instead of FFP
Platelets	FFP	Porter	Laboratory when ward staff requested FFP but all units had been taken
FFP	Platelets	Porter	Biomedical scientist realised that platelets were missing from the agitator
FFP	Platelets	HCA*	Realised by a doctor the following morning
FFP	Red cells	Porter	Discovered at 15 minute observations
Platelets	Red cells	Nurse	Nurse realised error when transfusion in progress
Platelets	Red cells	Nurse	When nurse went to collect second unit of platelets
FFP	Platelets	Porter	When the ward contacted the laboratory to request platelets

**HCA Health Care Assistant.*

The common elements in these cases were communication issues between the requestor and the collector about what was required, misinterpretation of prescription or instructions, a lack of awareness of component types and their suitability for individual patient groups, and haste in an emergency.

Units collected that were intended for another patient n=4

In 4 additional cases, patients were transfused with components that were intended for another patient. Errors identified were: using a colleague's identity card to access the blood refrigerator, carrying 2 collection slips for two different patients at the same time, not using a collection slip for reference and components being delivered to the wrong ward.

Learning point

- Components delivered to the clinical area should be checked as the correct component by a trained and competent staff member before accepting them, in addition to confirmation of patient identity[27]

Administration alone n=15

In 14 cases the erroneous transfusion related to red cell units and one related to platelets. In 5/15 cases the transfusion was ABO incompatible.

Case 5: Incorrect request for red cells leads to wrong transfusion

Two patients on the same ward with anaemia had blood available in the transfusion laboratory issue refrigerator. One patient (X) was prescribed a transfusion. A nurse mistakenly requested it for another patient (Y). The same nurse then administered the unit issued for Y to patient X, having "checked" the unit with another nurse. Neither nurse involved noticed that the blood was labelled for patient Y. The error was detected a short while later by the relatives of patient X who noticed that the name on the transfusion chart was different from their relative. The unit labelled for patient Y was retrospectively crossmatched against patient X who received it and found to be compatible.

In 5 reports the incorrect component was connected but none of the erroneous component was transfused. Fortunately the error was identified before the patient received any of the erroneous component but these cases are included here because the final bedside checks had failed so these meet the ISBT definition of 'transfused component'[1]. These would have resulted in 2 cases of ABO incompatibility, 1 case of ABO and RhD incompatibility and 1 RhD mismatch had the error not been detected. In the 5th case the component was ABO and RhD identical to the recipient.

Component ordering and selection error n=1

Case 6: Platelets requested for wrong patient leads to wrong transfusion

There were two patients with same name on a haematology ward. Platelets were ordered for the incorrect patient; these were O RhD positive and irradiated. When they arrived in the laboratory they were tagged and placed on the agitator with only the patient's name on the label. Following a change of shifts, a request form was received for 3 bags of platelets for the other patient on the ward with the same name. This patient had a different group (B RhD positive) and complicated critical notes with a record of send away tests and transfusion at other hospitals. The critical notes stated that the patient should receive crossmatched O RhD positive red cells but did not recommend a group for plasma components. The BMS labelled and issued the three group O RhD positive platelets assuming that they had been specifically ordered for this patient, and since it was a haematology patient the platelets must have been authorised. The BMS checked they were 'high titre negative' prior to issue and as the patient had received group O platelets at another hospital assumed they were suitable.

This patient was of a different group and was being treated at 3 hospitals. The group was finally confirmed as B RhD positive.

Miscellaneous reports n=3

There were 3 cases where emergency paediatric O RhD negative units were used for intrauterine transfusion. These are discussed further in the Paediatric chapter (Chapter 27).

COMMENTARY

The final 'bedside' check is the last opportunity to ensure that the correct unit or component has been collected for the patient receiving the transfusion. Complete and thorough bedside checks involving one or two staff members must be completed independently and without interruption[27].

The Department of Health 'Never Events 2012/13' lists the inadvertent transfusion of ABO incompatible components where death or serious harm resulted, and the misidentification of patients as two serious, preventable errors[20].

The transfusion awareness campaign 'Do you know who I am?' was launched in October 2012 following a SHOT recommendation in 2009 regarding patient identification. It encourages patients to confirm their identity with staff at every intervention, and especially prior to transfusion. A wide range of campaign posters and other educational materials have been produced by National Health Service Blood &

Transplant (NHSBT)[44] to be displayed in the clinical area which are aimed at both staff and patients. These include advice regarding transfusion of patients who are unable to positively identify themselves and/or not wearing a wristband.

A key recommendation in the new British Committee for Standards in Haematology (BCSH) pre-transfusion compatibility guidelines[35] states 'unless a secure electronic patient identification system is in place, a second sample should be requested for confirmation of the ABO group of a first time patient prior to transfusion, where this does not impede the delivery of urgent red cells or other components'. If this practice had been in place 4 wrong transfusions reported here could have been prevented.

Recommendations

- It is essential that medical and nursing staff are educated to recognise and act on transfusion reactions as this might be the first sign of ABO incompatibility or anaphylaxis where prompt management may be lifesaving (see also Chapter 16, Acute Transfusion Reactions)

Action: Hospital Transfusion Teams, Royal College of Nursing, Royal College of Midwifery, General Medical Council (for all medical curricula)

- A recommendation from 2011 continues to be important. Every person in the transfusion process must perform rigorous identity checks at each point and ensure that the component collected is the one prescribed. The use of a transfusion checklist is recommended

Action: Hospital Transfusion Teams (HTT)

Section 9.1.2 Incorrect blood components transfused (IBCT) – incidents originating in the hospital transfusion laboratory n=31

Authors: Hema Mistry and Christine Gallagher

Overview

In 2012 a total of 31 instances of wrong component transfused were reported in which the primary error occurred in the laboratory, representing 40.8% of the total 76 IBCT cases. A third of these laboratory cases, 10/31, were in haemopoietic stem cell transplant (HSCT) patients and these are analysed in detail in Chapter 29.

Deaths n=0

There were no transfusion-related deaths reported.

Major morbidity n=1

In one case a patient who had received a minor ABO mismatched HSCT developed evidence of haemolysis and this case is discussed in the transplant chapter, Chapter 29.

Potential for major morbidity n=2

In 2 cases, RhD positive red cells were given to RhD negative women of childbearing potential. In both cases the incorrect component was selected and the laboratory computer system gave a warning that was overridden by the issuing biomedical scientist (BMS). There was potential risk of RhD sensitisation in these patients but no follow up data was available at the time of reporting.

ABO/RhD	No. of reports	Blood component
ABO incompatible FFP	**2**	
ABO non-identical	**11**	
	6	Red cells
	3	FFP
	2	Platelets
RhD mismatch	**14**	
	13	Red cells
	1	Platelets
Wrong component	**3**	
	1	Red cells
	2	Cryoprecipitate
ABO identical	**1**	
	1	Red cells

Table 9.3: Summary of IBCT reports of errors originating in the laboratory

**Included in the table above are 10 cases where the incorrect ABO/Rh type was transfused to HSCT patients.*

ABO incompatible and non-identical, and RhD mismatched transfusions n=27

Two patients received ABO incompatible solvent detergent-treated fresh frozen plasma (SD-FFP) transfusions, one due to a grouping error and the second due to a component selection error. In one case SD-FFP of the wrong ABO group was issued to a 1 month old female and this case is discussed further in the Paediatric chapter. The second case is detailed below. There were 10/27 (37.0%) cases where HSCT patients received blood components of a non-identical ABO/RhD group which are discussed further in Chapter 29 (Transplant cases).

Case 1: A patient received incompatible fresh frozen plasma (FFP) due to a component selection error

A 15 year old male patient, blood group A RhD positive, required FFP. Four units of group AB SD-FFP were selected and transfused. Later a further 2 group AB and 2 group O SD-FFP were issued by a biomedical scientist (BMS) who does not routinely work in transfusion laboratory and these were also transfused.

There were 11 non-identical ABO transfusions, 5 were in HSCT patients and are described in Chapter 29 (Transplant cases). The other 6 are described below:

- 4 red cells
  - 3 females received ABO non-identical transfusions as a result of transcription errors
  - 1 male received an ABO non-identical transfusion due to the selection of the wrong sample for testing
- 1 platelets
  - 1 female patient group A RhD negative received group B platelets as a result of a grouping error when the BMS misinterpreted the manual tile group and subsequently issued group B RhD negative platelets (see Case 2 below)
- 1 FFP
  - 1 male patient received ABO non-identical FFP as a result of failure to follow standard operating procedure (SOP)

Case 2: Misinterpretation of manual tile group results in an ABO non-identical transfusion

A group and screen sample with an urgent request for one unit of platelets was received in the laboratory. The BMS performed a manual tile group, so that platelets could be ordered urgently from the Blood Service, and interpreted the result as B RhD negative. A second BMS manually entered the group into the laboratory information management system (LIMS) as B RhD negative and issued the platelets based on this result. The sample was then grouped on the automated analyser and found to be A RhD negative. The group was confirmed as A RhD negative by two independent senior BMS. The BMS performing the initial testing failed to follow the standard operating procedure (SOP) which required a check on the manual group by testing the sample on the automated analyser. Then, following a shift handover, the second BMS assumed that the group had been checked on the analyser but did not confirm this.

Learning point

- Staff should not short cut established procedures. Transfusion laboratories should have a standard operating procedure (SOP) for abbreviated pre-transfusion testing for the provision of blood components in emergencies

There were 14 RhD mismatched red cell transfusions, 5 occurred in HSCT patients and are described in Chapter 29 (Transplants). The other 9 are described below.

Three RhD negative females, two of childbearing potential, received transfusions of RhD positive red cells. The 2 women of childbearing potential received RhD positive red cells as a result of component selection errors. In one case the laboratory computer system (LIMS) gave a warning that was overridden by the issuing BMS who was newly qualified and should have been supervised by a senior BMS. In the other case the woman received RhD positive red cells as a result of a transcription error when the RhD type was incorrectly transcribed into the LIMS.

Five RhD negative males received transfusions of RhD positive red cells, 4 as a result of component selection errors and 1 as the result of a grouping error due to misinterpretation of a mixed field reaction as RhD positive.

An additional patient (gender not indicated) received RhD mismatched red cells after the information technology (IT) warning flag highlighting the error was overridden during the issue process.

Wrong components transfused n=3

Two patients were transfused with a component other than that prescribed: cryoprecipitate was requested for both patients but one patient received FFP that was selected, thawed and issued in error. The second case is described below:

Case 3: Cryodepleted plasma ordered in error from the blood service and issued as cryoprecipitate

Cryodepleted plasma (CDP) was ordered instead of cryoprecipitate from the Blood Centre. The hospital received a telephone call stating this component would have to be sought from another Blood Centre and there would therefore be a slight delay, but the inexperienced BMS who took the message did not relay this information to anyone. When the component arrived the BMS could not scan the component barcode when trying to enter the units into stock via the laboratory information management system (LIMS) because the code for CDP was not defined on the system. The BMS assumed it was an electronic problem and so entered the details manually, but erroneously entered the component as cryoprecipitate. A request was received for cryoprecipitate for a bleeding patient and the cryodepleted plasma was removed from storage, thawed and issued for the patient. The LIMS did not alert the issuing BMS as the system recognised the component as cryoprecipitate from the manual data entry. The patient was transfused 2 units of the incorrect component. The error was spotted during an ad hoc stock check when the third and fourth units were found.

Cryodepleted FFP does not contain fibrinogen so is an inappropriate component to transfuse to a patient who is bleeding due to low fibrinogen levels. There were multiple errors in this case in the laboratory processes of ordering, stock entry and selection culminating in the issue of an incorrect component. The final bedside check offers an opportunity to detect an incorrect component type, but the subtle difference between CDP and cryoprecipitate (and virtually identical pack presentation) means that this did not happen in this case.

Learning point

- Biomedical scientists and clinical ward staff need to be aware that plasma components look similar to each other and must be carefully confirmed against the request and prescription
- In addition to checking that the patient identity matches that on the component, it is essential to ensure that the correct type of component is being administered, and also that it is not out of date

In the remaining case inappropriate blood components were issued and transfused for a neonate requiring an exchange transfusion. The two units were issued as compatible but were not of an appropriate specification for exchange transfusion.

ABO identical transfusions n=1

A request for FFP and red cells for a patient was received by the laboratory. The BMS misread the age of the patient to be 1 year when the patient was actually only 1 month of age. The sample grouped as A RhD positive and group A components were issued and transfused. The laboratory policy based on national guidance is to issue group O red cell components in this situation, as there was no record of the maternal group or antibody status[45].

COMMENTARY

Errors in component selection continue to occur and are the biggest contributing factor to wrong transfusions (64.5% – 20/31). In 10 cases HSCT patients received transfusions of the wrong blood group.

There were 6 ABO grouping errors in 2012, all of which involved manual intervention and these are highlighted in the chapter on Laboratory Errors (Chapter 10). ABO and RhD grouping errors are shown in Table 9.4.

Despite 6 ABO grouping errors, there were no reported cases of ABO incompatible red cell transfusions caused by laboratory error this year.

Table 9.4: Summary of ABO incompatible and RhD mismatched transfusions (with a potential for major morbidity) resulting from errors originating in the laboratory

ABO incompatible or RhD mismatch	Component	Patient group	Transfused group	Type of error	Outcome
ABO incompatible FFP	SD-FFP	AB RhD positive	O RhD positive	Grouping error	No adverse reaction
ABO incompatible FFP	SD-FFP	A RhD positive	O RhD positive	Component selection error	No adverse reaction
RhD mismatch	Red cells	B RhD negative	O RhD positive	Component selection error	Potential to develop Anti-D
RhD mismatch	Red cells	B RhD negative	B RhD positive	Component selection error	Potential to develop Anti-D
ABO non-identical	Red cells	A RhD positive	O RhD negative	Grouping error	No adverse reaction
ABO non-identical	Red cells	B RhD positive	O RhD positive	Grouping error	No adverse reaction
ABO non-identical	Red cells	A RhD negative	O RhD negative	Wrong sample	No adverse reaction
ABO non-identical	Red cells	A RhD positive	O RhD positive	Grouping error	No adverse reaction

**There were two further cases where ABO non-identical red cells were transfused to HSCT patients. These are not included in this table.*

Tables showing the trends in ABO and RhD grouping errors over time are available in the Annual SHOT Report 2012 Supplement located on the SHOT website, www.shotuk.org under SHOT Annual Reports and Summaries, Report, Summary and Supplement 2012.

Learning points

- SHOT reports have consistently demonstrated that the majority of ABO/RhD grouping errors result from manual testing or interventions. The ABO and RhD group must wherever possible be verified against previous results and the validated grouping method in use in the laboratory
- The information technology (IT) system should be configured to flag a discrepancy between the component type requested and the component selected for issue and this should be fully validated. If this is not possible locally then these development requirements must be raised with the laboratory information management system (LIMS) suppliers
- Training and competency-based assessment must include appropriate actions on receipt of alerts/warnings on the laboratory information management system (LIMS) or an analyser
- The qualified biomedical scientist (BMS) who performs crossmatching of red cells or issuing components must take responsibility for checking all available patient information to ensure that components issued are of the correct specification

Specific requirements not met (SRNM): Total n=176 Section 9.2

Definition:

Where a patient was transfused with a blood component that did not meet their specific transfusion requirements for example irradiated components, HLA-matched platelets when indicated; antigen-negative red cell units for a patient with known antibodies, red cells of extended phenotype for a patient with a specific clinical condition (e.g. haemoglobinopathy), or components with a neonatal specification where indicated. (This does not include cases where a clinical decision was taken to knowingly transfuse components not meeting the specification in view of clinical urgency).

SRNM – incidents originating in the clinical area n=106 Section 9.2.1

Authors: Julie Ball and Paula Bolton-Maggs

Overview

There were 106 cases where clinical specific requirements were not met, 51 female and 53 male patients and in 2 reports gender was not specified. The median age of the patients was 58 (range 0 days to 85 years). The patient age was not given in 8 reports.

Specific requirement not met	Total
Irradiated	82
CMV screened	18*
Irradiated and CMV	2
Phenotyped units for sickle cell patients	2
Emergency O RhD negative blood given to patient with known anti-c	1
K negative unit required	1

Table 9.5: Specific requirements not met where the error was clinical

**CMV requirements changed with recommendations from The Advisory Committee on the Safety of Blood, Tissues and Organs (SaBTO) in March and reports received after 1st April 2012 have been reviewed based on the new recommendations.*

Of the 84 clinically based omissions for irradiated components (82+2 who also required CMV screened units) the indications were as follows:

- 35 treated with fludarabine or other purine analogue
- 18 current or historical Hodgkin lymphoma
- 8 after treatment with antithymocyte globulin
- 8 treated with Campath® (alemtuzumab)
- 3 haemopoietic stem cell transplants (HSCT)
- 6 patients with non-Hodgkin lymphoma (indication for irradiation unclear in these unless due to unspecified chemotherapy)
- 1 case of aplastic anaemia
- 4 acute leukaemia (rationale for requesting irradiated components unclear unless determined by type of chemotherapy which was not given in the reports, or prior to HSCT)
- 1 irradiated unit of red cells not requested for neonate following intrauterine transfusion

The number of non-irradiated units transfused prior to recognition of the missed requirement ranged from 1 to 26. Three patients received substantial numbers, 19, 22 and 26 units. In two cases this was due to failure to elicit and act upon a prior history of Hodgkin lymphoma. The third case was a child receiving shared care between two hospitals who received 19 transfusions over a 6 month period before the missed requirement was identified. This was confused by two contradictory discharge summaries from the primary centre.

Errors identified:

A major reason for failure to provide irradiated units again this year was poor communication between clinical and laboratory staff for several different reasons particularly not indicating this on the request forms. Some patients should have been flagged up by pharmacy notifications but were transfused before the flag appeared. Another common problem is a lack of knowledge about the requirement for irradiated components in patients treated with purine analogues and other T-cell depleting agents, particularly where patients were admitted to other specialties.

COMMENTARY

As in previous years, the most common missed specific requirement was for irradiated units in patients at risk of transfusion-associated graft versus host disease (TA-GvHD)**.** Fortunately over the last 11 years of SHOT reporting, following the introduction of leucodepletion, no TA-GvHD has been reported in relation to missed irradiation in 877 cases[46]**.** However a fatal case of TA-GvHD occurred in 2012 where blood for an intrauterine transfusion was neither leucodepleted nor irradiated and is discussed in detail in the chapter on TA-GvHD, Chapter 20.

The indications for CMV screening have changed. In March 2012, The Advisory Committee on the Safety of Blood, Tissues and Organs (SaBTO) issued a position statement outlining its recommendations for specific patient groups who require CMV negative components[47]. In view of this, some groups of patients who previously qualified for CMV screened components are no longer included, and SHOT ceased accepting cases relating to these where the blood was transfused after 1st April 2012.

Learning point

- Failure to provide appropriate units for patients with sickle cell disease can have serious consequences with alloimmunisation and delayed haemolytic transfusion reactions (which are further discussed in the appropriate chapters – Haemolytic Transfusion Reactions Chapter 17 and Haemoglobinopathies Chapter 28)

Recommendations

Recommendations from last year are still active as are others from previous years:

2011 – **Care needs for patients with specific transfusion requirements**

- Patients who require irradiation and other specific components should be provided with an appropriate card as recommended by the British Committee for Standards in Haematology (BCSH)[48]
- Patients with cards noting specific requirements should be educated about their meaning and importance, in particular always to show these to clinical staff on admission to any hospital.
- Haematologists are advised to confirm that there has been appropriate handover of information and to audit this process
- Patients with sickle cell disease should be identified to the transfusion laboratory whenever admitted to hospital
- All patients with irregular antibodies should be issued with antibody cards, and be educated about their importance. General practitioners can also note important transfusion requirements and include these in the referral to hospital whether emergency or elective

Action: Hospital Transfusion Teams and consultant haematologists

SRNM – incidents originating in the hospital transfusion laboratory n=70 Section 9.2.2

Authors: Hema Mistry and Christine Gallagher

Overview

There has been a disappointing increase in the number of cases reported in 2012 where specific requirements were not met, 70 cases in 2012 compared with 51 cases in 2011 and these are summarised in Table 9.6. There were 31/70 cases that involved errors relating to IT systems and these have been analysed in more detail in the IT chapter (Chapter 11).

Deaths n=0

There were no transfusion-related deaths reported.

Major morbidity n=7

There were 7 women of childbearing potential who received K positive units, of whom 5 were sensitised and produced anti-K.

Two patients experienced transfusion reactions after misinterpretation of antibody panel results. As a result Kidd antibodies were missed and the patients did not receive appropriate antigen negative units.

Potential for major morbidity n=2

The K status was inconclusive or unconfirmed for 2 women of childbearing potential.

Specific requirement not met	Number of cases
Incorrect phenotype	33
Incomplete testing/failure to follow SOP	*13*
Incorrect component selected	*10*
Interpretation error	*5*
Failure to heed patient history	*3*
Wrong sample	*1*
Transcription error	*1*
Irradiated units	12
Cytomegalovirus (CMV) negative units	2
Irradiated and CMV negative units	1
K negative units for females of childbearing potential	7
Pathogen-inactivated Fresh Frozen Plasma or Cryoprecipitate	7
Human Leucocyte Antigen (HLA) matched platelets	1
Miscellaneous	7
Total	**70**

Table 9.6: Summary of specific requirements not met n=70

Incorrect phenotype issued by the laboratory n=33

Case 1: Anti-E missed in antibody identification panels performed out of hours.

The patient was known to have anti-Fy^a and anti-S, which masked an anti-E in the indirect antiglobulin test (IAT) panel. Crossmatch-compatible red cells were issued and transfused overnight and the error was noticed the following morning. The anti-E was subsequently shown to react only with homozygous E positive cells. The phenotypes of the transfused units were checked and one unit was found to be heterozygous E positive.

Interpretation of antibody identification results requires serological knowledge and experience and, as a manual process, is vulnerable to error. Laboratories performing antibody identification should be registered with an accredited external quality assessment scheme and follow appropriate guidelines[35].

Failure to recognise the specific requirements of a particular patient group n=30

There were 30 cases where the specific requirement for a patient was not met. These are shown in Table 9.7.

Table 9.7: Failure to supply components with the required specification

Specific requirement not met	Causes			
	Failure to notice information on request form	Incorrect component selected	Labelling error	Total
Irradiated units	7	5		**12**
CMV negative units	1	1		**2**
Irradiated/CMV negative units		1		**1**
Methylene blue (MB)-FFP/ Cryoprecipitate		7		**7**
K negative units to women of childbearing potential		7		**7**
HLA matched platelets			1	**1**

In 9/12 cases where irradiated units were required, IT errors contributed to the failures. In 3 cases warning flags were not in place, in 3 cases they were ignored, and 1 flag had been removed. In the remaining 2 cases there was more than one patient record.

Selecting K negative units for females under the age of 60 has been accepted as good practice[45] but this has recently been revised to 50 years[35]. IT systems should be used to their full potential to prompt staff about specific requirements either through algorithms based on date of birth and/or gender, or via warning flags. Errors relating to warning flags are discussed in the IT chapter (Chapter 11).

Miscellaneous n=7

There were 7 cases where electronic issue (EI) was used inappropriately following manual edits of grouping results. The LIMS could not identify the edited results as part of the EI algorithm so the BMS should have added the patients to the EI exclusion list[49]. This had not been done.

COMMENTARY

Errors associated with pre-transfusion testing mirror those of previous years:

The main mistakes were procedural such as incomplete testing and wrong component selection. The failure of laboratory staff to select appropriate components when warning flags are present is hard to understand, especially as 46/70 (65.7%) of laboratory procedures were performed during normal working hours. IT could have prevented 31 of the cases if used appropriately. Staff must have both a level of knowledge and be competency assessed to ensure that they fully understand all alerts/prompts and warning flags.

(For learning points and recommendations on laboratory incidents please see Chapter 10).