7.1. Errors Relating to IT Systems (IBCT IT)

In 2010, there were 56 reported incidents of errors relating to IT systems (see Table 24), compared with 59 in 2009 and 44 in 2008. Fifty-four of these incidents originated in the transfusion laboratory. A total of 43 cases involved red cells, 8 involved platelet components and 5 involved plasma components. Five of the 56 cases occurred in children, 7 of whom were infants below the age of 1 year. This year, 10 errors relating to the administration of prophylactic anti-D Ig were reported (see Table 25) and these are discussed later in this chapter.

Table 24
Categories of IT systems errors

Error	Reports	Non-irradiated component transfused	Antigen-positive unit transfused	Non-CMV-negative unit transfused	Wrong group after SCT	EI error	Other
Failure to consult or identify historical record	4	0	2	0	1	1	
Ignored/missed warning flag	22	3	5	0	11	1	1 (failed to issue MB-FFP to a child)
Failure to update warning flags	12	3	3	5	1	1	1 (irradiated RBC unit issued after expiry)
Computer system down	0	0	0	0	0	0	
Data not transferred from old system	1	1	0	0	0	0	
Electronic blood tracking system errors/misuse	1	0	0	0	0	0	1 (RBC unit transfused after >30 minutes out of controlled storage)
Failure to merge or reconcile records	4	2	1	0	1	0	
Error/deficiency in computer system or misuse	12	0	1	1	0	2	7 (miscellaneous – see text)
Total	**56**	**9**	**12**	**6**	**14**	**5**	**10**

Case 1

Failure to check historical record leads to issue of non-HLA-matched platelets

A patient with severe aplastic anaemia was refractory to random donor platelets because of HLA-alloimmunisation. A non-urgent request for further platelets was made in normal working hours but the transfusion scientist did not check the historical record on LIMS and unselected platelets were issued.

Case 2

Failure to transfer warning flag to current database leads to delay of stem cell harvest

A patient with acute leukaemia in remission was transfused with non-irradiated platelets 5 days before a planned autologous stem cell harvest. Local policy is to administer irradiated components from 14 days before stem cell harvest. Special requirements data had not been successfully transferred to the new LIMS database. The harvest was delayed but there were no clinical sequelae.

Case 3

Separate LIMS on two sites in same hospital group leads to transfusion of inappropriate blood group after allogeneic stem cell transplant

A group B RhD positive patient with relapsed acute myeloid leukaemia (AML) received an allogeneic transplant from a group O RhD positive donor. Protocol specifies issue of O RhD positive components after transplant. Warning flags were placed on LIMS in site 1, but patient treated on site 2. Following request for platelets, only the site 2 database (with details of his original group) was searched, contrary to the laboratory SOP, and B RhD positive platelets were issued on two consecutive occasions. The patient, aware of his post-transplant blood group change, drew this to the attention of clinical staff after the second occasion.

Case 4

Transcription error in laboratory leads to inappropriate EI of red cells

Patient found to have weakly positive antibody screen of uncertain specificity and referred to the reference laboratory. No definite atypical antibodies were identified, but reported as unsuitable for EI. Only the first part of the reference laboratory report ('no atypical antibodies detected') was placed on the hospital LIMS and the patient subsequently received red cell transfusion on two occasions by EI before the error was discovered. There were no adverse clinical consequences.

Case 5

Failure to update warning flag in a timely fashion and inadequate handover between shifts leads to transfusion of non-HPA-matched platelets to neonate with possible neonatal alloimmune thrombocytopenia (NAITP)

A thrombocytopenic neonate was suspected of having NAITP and HPA-1a 5b negative platelets were requested. The request arrived just before shift handover and the special requirement was not entered on the LIMS as the baby's blood group had not yet been established. The special requirement was also not recorded in the handover note pad. The BMS coming on duty thus ordered standard neonatal platelets (although the special requirement was also stated on the clinical request form). There were no adverse consequences.

Case 6

Sickle cell patient with known alloantibodies transfused with unselected red cells because of duplicate hospital number and failure to identify historical record

A patient with sickle cell disease was admitted urgently through the A&E and issued with a new hospital ID number. A crossmatch request for red cells was received by the laboratory and the historical record only checked under the new number. The patient had extensive previous records under a different registration number, with known clinically significant antibodies (not detectable on current screen). These would have been identified by a computer check under name and date of birth. Unselected red cells were issued but another BMS recognised the patient's name as the request forms were being filed. An urgent recall was undertaken and the patient received only '15 drops' of the unselected blood.

Case 7

Patient with HbSC disease given non-phenotyped units from a remote issue fridge

A patient with HbSC disease was admitted as a trauma patient and was transfused 2 units of red cells prior to the laboratory being aware of the special requirements. When further units were requested, the laboratory performed the additional testing, crossmatched suitable units and informed the haematology specialist registrar (SpR) that units were ready for collection. However, the patient was on ITU, which has access to a remote issue fridge and the patient had not been blocked from remote issue. The patient was transfused with units from this fridge that were not confirmed HbS negative nor matched for RhD and K antigens as recommended in the BCSH guidelines.

COMMENTARY

As before, failure to update warning flags on the LIMS or transfer patient data from legacy computer systems, failure to notice (or heed) warning flags and failure to consult the historical record remain common causes of IBCT. Four errors were due to failure to merge or reconcile records. Five reports (9%) involved patients under 16 years and 7 (12.5%) involved infants under 1 year.

Fifty-four of the IT-error cases reported to SHOT this year originated in the laboratory (96%). Only 12 (21%) of these occurred outside 'core' laboratory working hours and 16 (28%) in an emergency situation. The percentage of errors occurring outside normal hours is similar to the proportion of out-of-hours requests (25%) found in the audit of 'When and why is blood crossmatched'.[1] As before, the large majority of errors involved regular laboratory staff during normal working hours. A number of the reports sent to SHOT this year commented that low staffing levels, stress and absence or unavailability of senior staff members contributed to the human error in the transfusion laboratory. Although most errors were reported from the laboratory, many episodes also involved clinical errors in the process, most commonly failure to request or prescribe special requirements such as irradiated or CMV-negative components. Around 30% of the errors would have been preventable at the point of the bedside check.

A particular feature this year is the number of reported errors in the selection of blood components of the appropriate group after allogeneic haemopoietic stem cell transplantation (14 cases, the single largest clinical category). Most cases were laboratory errors caused by missing or ignoring warning notes on the LIMS but some cases also clearly showed difficulties in interpretation by laboratory and clinical staff. As noted in the 2009 SHOT report, selection of the appropriate blood group after allogeneic stem cell transplant can be complex and counter-intuitive. We re-emphasise the recommendation that a post-transplant transfusion plan be agreed and circulated for each patient. Both laboratory and clinical staff involved in this process should be appropriately trained and have relevant serological knowledge.

Three of 4 cases where there was a failure to issue imported, virucidally-inactivated FFP (MB-FFP) for patients under 16 years were attributed to a deficiency in the LIMS, specifically the inability to flag this requirement automatically on an age basis. In the fourth case, the BMS missed or ignored a warning flag.

IT errors were implicated in 5 cases of inappropriate EI of red cell components, most often due to failure to identify historical records or heed warning flags disqualifying the patient from this technique.

Anti-D Ig errors

Table 25
Errors relating to administration of prophylactic anti-D Ig

Error	Reports	Unnecessary anti-D administered	Failure to administer anti-D or excessive delay
Error when transcribing result of mother or baby's group into LIMS	4	3	1
Data not transferred from old computer system	1	1	0
Failure to consult historical record	2	2	0
Computer system down	1	0	1
Maternal group entered into baby's record on LIMS	1	0	1
Accessed wrong baby's record on LIMS	1	0	1
Total	**10**	**6**	**4**

There were 10 reports in 2010 where laboratory IT-related errors or problems led to the unnecessary administration of anti-D Ig (6 cases) or omission/delay in giving anti-D prophylaxis (4 cases). In a similar pattern to IT errors in general, 80% of these cases involved staff who routinely work in the transfusion laboratory and 70% occurred within normal working hours.

There were 4 postnatal anti-D Ig administration errors directly related to the transcription of cord blood grouping results into the LIMS. In 3 cases the tests were performed by a semi-automated technique and by a manual technique in the other case; the common feature was the requirement for human intervention in transcribing the results into the LIMS. Three of these mothers received an unnecessary postnatal anti-D Ig injection and 1 failed to receive anti-D Ig within 72 hours of delivery. Clearly, any system that requires manual transfer of test results into the laboratory computer risks transcription error. In 3 of these cases, the local laboratory procedure mandates a check by a second BMS but this was not performed.

Three mothers received unnecessary routine antenatal anti-D prophylaxis (RAADP) following a clinical request. All were due to failure to check or identify the historical record. One mother was RhD positive, a second had known immune anti-D and in the third case the mother was known to have a weak D antigen (confirmed by the reference laboratory) but the record had not been transferred to the new laboratory computer.

The other 3 errors were erroneously entering the mother's blood group (RhD negative) on the baby's LIMS record, leading to failure to administer postnatal anti-D Ig, accessing the wrong record and reporting the baby as RhD negative rather than RhD positive, leading to delay in anti-D Ig administration, and delay in booking in and testing a maternal sample after a vaginal bleed because 'the computer was down', leading to a 36-hour delay in administering anti-D Ig.

Improving laboratory standards

(based on data from 2010 and previous reporting years)

Frequent reconciliation, or linking, of multiple computer records on the same patient is important for safe practice (a clear historical trail of all amendments to the records must be maintained to comply with BSQR[2]). This should be a routine laboratory process that can be performed by appropriately trained and competency-assessed senior staff.

The problem of multiple hospital numbers and case records could be reduced by routine use of the unique NHS number as a primary patient identifier in line with the recommendation from NPSA SPN 24.[3]

When new laboratory IT systems are installed, patient data from the old system should be transferred to the new system. Wherever possible this should be done electronically to avoid transcription errors.

When laboratory IT systems are off-line, non-essential transfusions should be avoided. Robust manual back-up procedures and recovery plans must be in place and tested. Manual transcription of results should be kept to an essential minimum.

Laboratory IT systems should ensure that warning flags are prominently displayed, preferably on the opening screen. Where appropriate (e.g. criteria for electronic selection) it should not be possible to override or bypass flags. Alert systems should not prevent the issue of clinically appropriate components of a different group to the patient (such as after SCT).

Transfusion laboratories should have access to the hospital patient administration system (PAS) and the ability to review haematology results online (ideally on the same screen).

All laboratories using electronic selection to issue red cells must ensure that their SOPs are consistent with national guidelines and followed fully by all laboratory staff.[4] The computer algorithms in use must prevent issue outside the guidelines.

IT systems to support transfusion safety, monitoring and traceability outside the laboratory (e.g. blood-tracking systems and bedside ID systems) should integrate with laboratory systems and processes. Laboratory staff must understand the working of these systems and be trained and competency assessed to react appropriately to alarms and warnings, and provide support and advice to clinical areas on a 24/7 basis. All clinical staff using these systems must be trained and competency assessed. This is crucial in clinical areas, such as operating theatres and delivery suites, where rapid access to emergency blood stocks is essential.

Recommendations

- The two key recommendations made in the 2009 SHOT report (namely the need to produce a post-transplant transfusion plan for each patient and to consult the patient's historical record on LIMS; see SHOT website) remain highly pertinent, especially in the light of increased reports of mis-selection of blood components of the appropriate group after allogeneic haemopoietic SCT and continuing failures to identify or heed historical records.

- Transcription errors in entering semi-automated or manually performed cord blood grouping results into the LIMS can result in unnecessary administration or failure to administer postnatal anti-D Ig. Wherever possible, test results should be transferred electronically into the LIMS. Otherwise, there should be robust independent checking procedures in place to review and confirm manually transcribed data.

  Action: Lead BMS for hospital transfusion laboratories, transfusion laboratory managers

Further recommendations are given in Chapter 6. For active recommendations and an update on their progress, please refer to the SHOT website.