5.2 IBCT Errors Relating to IT Systems

Problems with IT systems (or their incorrect use) continue to cause IBCT incidents. In 2007 there were 25 reported incidents (compared with 27 in 2006) that led to the transfusion of an incorrect component.

Table 17
IBCT errors relating to IT systems

Error	Reports	Non-irradiated component transfused	Antigen positive unit transfused	Non-CMV neg unit transfused	Wrong group after SCT	Electronic issue error	Other
Failure to consult historical record	6	6	0	0	0	0	0
Historical record not identified[1]	3	2	1	0	0	0	0
Ignored warning flag	3	0	0	0	1	1	1 (outdated FFP issued)
Failure to update warning flags	3	0	1	0	1		1 (failed to issue IgA deficient unit)
Computer system 'down'	3	1	0	1	0	0	1 (inappropriate FFP group)
Data not transferred from old system	3	1	2	0		0	0
Electronic blood tracking system errors/misuse	2	0	0	0	0	0	1 (wrong blood taken from fridge in emergency[2]) 1 (outdated component issued[3])
No links between transfusion labs in same hospital group	1	1	0	0	0	0	0
Pharmacy computer error[4]	1	1	0	0	0	0	0

[1] In two cases there were multiple hospital numbers and the wrong laboratory records were accessed. In the third case an Emergency ID number did not link to the laboratory information management system (LIMS) records on the same patient.

[2] During an episode of obstetric haemorrhage, a midwife accessed the blood fridge by pressing the 'Emergency Button' and took out two units of O D positive red cells rather than the emergency O D negative stock.

[3] An outdated component was issued because of failure to update the tracking system's Management System.

[4] The automated alert to the blood transfusion laboratory when purine analogues were prescribed was inadvertently deleted during an upgrade of the pharmacy computer system.

COMMENTARY

A significant proportion of IBCT events originating in the hospital transfusion laboratory could be prevented by appropriate use of existing IT technology and development of systems to overcome common errors (see below).

The majority of IT-related errors (15/24) stemmed from failure of laboratory staff to consult, locate or heed historical records that indicated the need for special blood components or to ensure 'computer flags' were updated.

In 8 of the 11 cases where details of the laboratory staff involved were available, a BMS who worked regularly in the transfusion laboratory was responsible for the error. Six of the 8 cases occurred in normal 'core' hours and 2 during a night or evening shift. Several of these cases involved multiple systems errors, especially omission by clinical staff to indicate special requirements such as irradiated components.

Locum BMSs were involved in 2 of the 3 cases where warning flags on the laboratory information system were ignored or overridden. In the third case, a BMS on shift who did not work regularly in the transfusion laboratory selected the wrong ABO group for red cell support after a bone marrow transplant.

Patients continue to acquire multiple hospital ID numbers and case records. 'Emergency ID numbers' allocated to acute admissions increase the risk of failure to identify historical records.

In one case, two transfusion laboratories in the same hospital group had separate laboratory information systems with no shared database. A patient was known by one of the laboratories to require irradiated components after purine analogue therapy but was admitted to the other hospital.

IBCT errors continue to occur because historical data on special requirements are not transferred when new laboratory information systems are installed.

RECOMMENDATIONS

Based on current incidents and previous SHOT Reports:

- Frequent reconciliation 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). This should be a routine laboratory process that can be performed by appropriately trained and competency-assessed 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 the NPSA SPN 24[9]. However, this change must be carefully managed because not all current LIMS can use the NHS number as a primary identifier and there is the potential to lose access to historical records with unintended adverse consequences.
- 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.
- Laboratory IT systems should be designed to 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.
- Staff must be trained in appropriate search strategies to ensure that all relevant records are accessed. Work is required to develop *appropriate* and effective search strategies, perhaps co-ordinated by the BCSH Transfusion Task Force.
- Transfusion laboratories should have direct access to the hospital Patient Administration System (PAS) and the ability to review haematology results online (ideally on the same screen).
- 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 (see SHOT Annual Report 2005).
- Most failures to consult the historical record or the use of inappropriate search strategies were made during normal working hours by BMSs who work regularly in the transfusion laboratory. This problem is clearly not confined to 'on call' or rotating staff. Laboratories must ensure that all staff (including locums) using the IT systems have appropriate training, updates and documented competency assessment.
- The increasing use of routine computer alerts from pharmacies to transfusion laboratories has great potential to ensure that appropriate patients receive irradiated components. However, these systems must be robust, comprehensive and timely.
- As noted in previous SHOT Annual Reports, the development of IT links between transfusion laboratories, or access to an electronic patient record (EPR) containing accurate and up-to-date transfusion data, would significantly reduce the number of IBCT due to failure to meet special requirements. This would also impact on delayed haemolytic transfusion reactions caused by blood group alloantibodies that have fallen to undetectable levels. The UK Connecting for Health project has the potential to meet these needs but the question of how and when transfusion data are entered on the EPR must be resolved.
- All laboratories using electronic selection to issue red cells must ensure that their operating procedures are consistent with national guidelines and followed by laboratory staff[10]. 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 should understand the working of these systems and be able to 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 crucially important in clinical areas, such as operating theatres and delivery suites, where rapid access to emergency blood stocks is essential.

Recommendations still active from previous years

Year first made	Recommendation	Target	Progress
1998	IT as an aid to transfusion safety should be assessed and developed at national level	**NBTC IT WG, NPSA/NBTC/SHOT initiative, CfH**	Co-ordination now achieved between NBTC, NPSA, CfH; national standard specification under development; implementation is dependent on central funding through CfH or by individual Trusts

Development of laboratory IT systems to reduce SHOT incidents

The failure of laboratory staff to notice or heed 'computer flags' for special transfusion requirements, such as irradiated components or the use of methylene blue fresh frozen plasma (MB-FFP) for patients under 16 years of age, could be reduced by development or reconfiguration of LIMS. This requires close collaboration between users and manufacturers to increase the contribution of LIMS to transfusion safety. Examples of such developments include the following:

- As well as exhibiting warning flags on the opening screen, LIMS could use data on component irradiation that is embedded in the barcode attached at the processing blood centre. An additional warning flag could be generated, at the point where blood is reserved for the patient, if an attempt is made to issue a non-irradiated component. Clearly, this must be an alert, rather than preventing appropriate issue of non-irradiated components in an emergency.

- Linkage between the component barcode and the patient's date of birth could produce an additional alert to ensure methylene-blue treated, non-UK derived fresh frozen plasma (MB-FFP) is reserved for patients under 16 years of age in line with Department of Health guidance.

- There were 23 episodes of 'right blood to right patient' (page 63) that were due to the transposition of issue labels, between units selected for the same patient. The introduction of systems capable of automatically printing the donation number in a barcode on the laboratory-generated issue label, combined with a further step where the donation number and product code on the pack and laboratory issue label are electronically reconciled at reservation, would prevent these errors.