11a Delayed Transfusions n=179

Authors: Paula Bolton-Maggs, Josephine McCullagh and Simon Carter-Graham

Definition:

Where a transfusion of a blood or blood component was clinically indicated but was not undertaken or was significantly delayed or non-availability of blood components led to a delay with impact on patient care (not restricted to emergency transfusion).

Key SHOT messages

- Errors have been reported at all steps in the transfusion pathway and delays in provision of transfusion support to patients are incremental along the patient journey including transfers between wards or hospitals
- Communication issues continue to contribute to delays at all points of the transfusion pathway
- Reports where major haemorrhage protocols were not activated or not followed appropriately continue to be reported
- Staffing issues with poor patient to staff ratios in the clinical areas contribute to delays in administration of blood components. Staffing challenges in the transfusion laboratories are also contributory
- Paediatric major haemorrhage is rare and staff are often unfamiliar with the necessary procedures

Recommendations

- All actions recommended in the SHOT CAS alert 2022 must be completed to address preventable transfusion delays and ensure patient safety
- MHP are activated following rapid identification of actual, or suspected, major haemorrhage, with or without traumatic coagulopathy. These must be acted upon promptly like any other resuscitation calls to ensure effective treatment is delivered without any delays to bleeding patients
- Equipment (bleeps, pagers, printers) must be checked on a regular basis to prevent them contributing to delays in emergencies
- Hospitals who care for children should have a paediatric major haemorrhage protocol and ensure the relevant paediatric clinical and laboratory staff receive appropriate education and training

Action: Hospital transfusion committees, all transfusion staff

Introduction

Delayed transfusions continue to cause concern and the number of reports increase year on year (Figure 11a.1). These concerns resulted in publication of a CAS national alert, 'Preventing transfusion delays in bleeding and critically anaemic patients', with actions for hospitals including review of their policies and procedures (SHOT 2022). These actions should result in a reduction in delayed transfusion. Although there was a shortage of blood sample tubes in 2021 no cases of delay were reported in relation to this

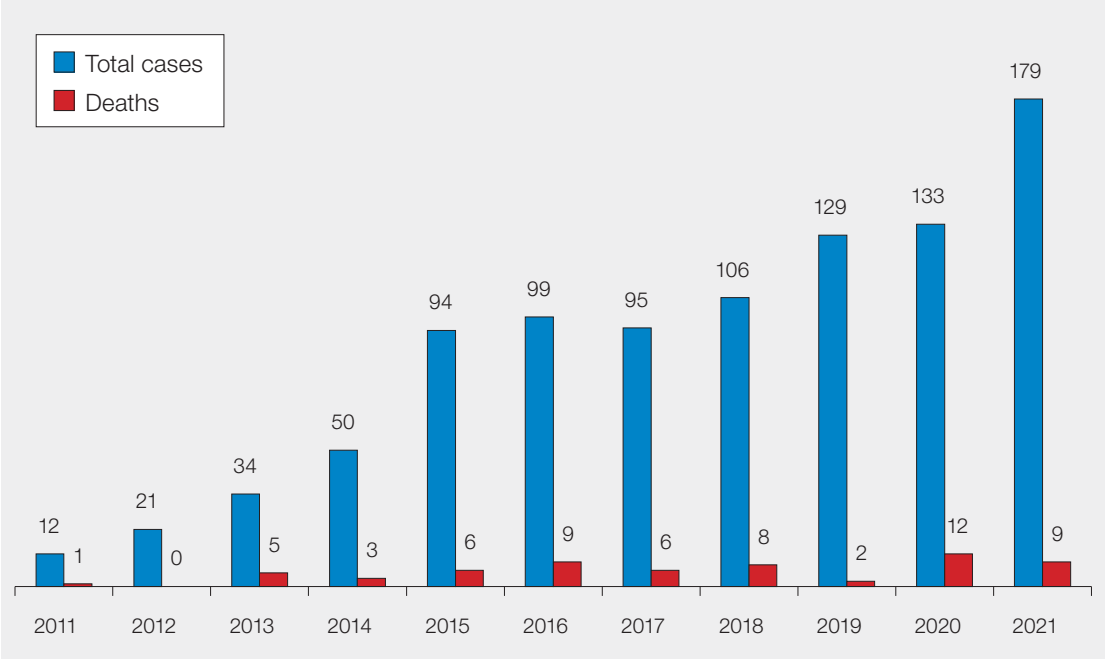


Figure 11a.1: Delayed transfusion reports and deaths by year 2011 to 2021 (n=952, deaths n=61)

Deaths related to transfusion n=9

Nine deaths were reported where the delay played a part, including 1 death in a premature infant with severe anaemia (Case 22.1 in Chapter 22, Paediatric Cases). Imputability in all these cases was 'possible'. There were 12 deaths reported in 2020.

Case 11a.1: Urgent need for blood during surgery - pager failure

Theatre staff needed blood during repair of an AAA for a man in his 80s but could not contact the BMS due to pager failure. The delay was 30 minutes and was thought to have contributed to the patient's death.

Major haemorrhage drills should include testing of communication channels and equipment. Clinical staff must be able to reach transfusion laboratory staff in case of emergencies.

Case 11a.2: Delayed transfusion contributes to death due to myocardial ischaemia

A man in his 80s with myocardial ischaemia and anaemia, Hb 63g/L, received a first unit of red cells but the second was delayed for 12 hours contributing to his death. There were several issues:

- *The request form had incorrect details so was rejected*
- *The revised request form could not be found when the porter came to collect the unit. The porter did not inform the clinical area of this*
- *A further collection form had to be sent*
- *All these factors and poor communication contributed to the delay. It is important that transfusion requests are completed accurately to avoid delays – 'Get it right first time every time'*

Case 11a.3: An unexpected death from sickle cell disease

A young man with sickle cell disease had a routine ERCP with removal of a biliary stent and went home. The next day he was admitted with fever and treated for biliary sepsis (Klebsiella was grown from the blood culture). His bilirubin remained high over the next 3 days and on day 5 he developed a sickle cell crisis with an acute chest syndrome. He rapidly deteriorated and was admitted to the intensive care unit. He developed multiple organ dysfunction and died. The review noted failure to act on the deteriorating condition in a timely manner (failure to escalate the deteriorating early warning scores) and failure to initiate prompt transfusion after recognition of deterioration. The patient was admitted to a general medical ward where staff were not familiar with sickle cell disease, and was

not managed by the haematology team directly. The coroners report suggested earlier transfusion should have been considered.

The above resulted in a recommendation from the All-Party Parliamentary Group on sickle cell and thalassaemia report (Sickle Cell Society 2021) 'No one's listening' that all NHS organisations must ensure that haematology teams are informed whenever a sickle cell patient accesses or is admitted to the hospital to ensure the patient's clinical history is known and advice can be passed on regarding their care. Staff managing the patient in this case were unfamiliar with sickle cell disease and failed to seek input from the haematology team regarding his management in a timely manner. There was no delay in the provision of blood once the haematology team were notified and a decision was made to proceed with an emergency automated red cell exchange. The APPG report includes several key recommendations that are critical to ensure safe and timely provision of care for sickle cell patients. One of the main recommendations is to ensure all healthcare professionals in the UK are trained and are familiar with management of patients with sickle cell disorder. Training should cover diagnosis, presentations, management, acute complications (such as pain, acute chest syndrome, stroke) and ongoing care and featuring direct contributions from sickle cell patients.

Learning point

- Care of patients with sickle cell disease is complex and specialised. Urgent referral to haematology locally and liaison with a specialist centre is recommended to optimise care (Sickle Cell Society 2018; BSH 2016; Trompeter et al. 2020; Sickle Cell Society 2021)

Case 11a.4: Confusion between two patients needing transfusion in the ED

Emergency red cell units were given to the wrong patient resulting in delay of blood to the intended patient and inappropriate use of emergency blood to the transfused patient. ED staff had not been able to talk to the BMS who was on the telephone about another transfusion issue. The intended recipient, Patient 1, a male in his 90s, had a Hb of 47g/L and died 15 hours after the initial request with the delayed transfusion cited as contributory. Two units of emergency blood were issued 10 minutes after the doctor requested them but were transfused to Patient 2, a woman in her 70s needing urgent surgery who had the major haemorrhage protocol activated in theatre later. Patient 1 received two units about 4.5 hours later, and two more 4 hours later. There were additional issues with unlabelled samples, wrong paperwork and training of porters.

Learning points

- Communication issues frequently contribute to delayed transfusions. It is important to be concise, clear, and provide all necessary patient identification information to the transfusion laboratory including urgency of transfusion
- Failure to label samples correctly, errors in safety checks pre transfusion, wrong paperwork, and poor training all contribute to delays. It is vital to get it right first time to avoid such delays

Additional case studies for deaths possibly related to transfusion can be found in the supplementary information on the SHOT website (https://www.shotuk.org/shot-reports/report-summary-and-supplement-2021/).

Major morbidity n=7

Seven patients suffered major morbidity related to the transfusion delays, 4 patients died due to other causes and 3 patients recovered (these were all associated with MHP activation and communication failures).

Case 11a.5: Delayed transfusion resulted from looking at the wrong result

A man in his 50s was admitted with difficulty breathing and had a Hb of 58g/L falling to 48g/L 2 days later. The MHP was activated, and he was transfused and required admission to the ICU which might have been avoided if he had been transfused in a timely way. The doctor had looked at the wrong Hb result on the computer (101g/L from a different date).

Case 11a.6: Slow provision of components due to lack of clear communication

A man in his 50s was admitted with upper GI bleeding. MHP was initiated but red cells did not arrive in the expected time frame from the laboratory (within 15 minutes). Emergency red cell units from a satellite refrigerator were transfused and a second MHP call was initiated in view of ongoing bleed and patient deterioration. It was identified that a lack of clarity about the urgency of the MHP call resulted in a delay in provision of the blood components.

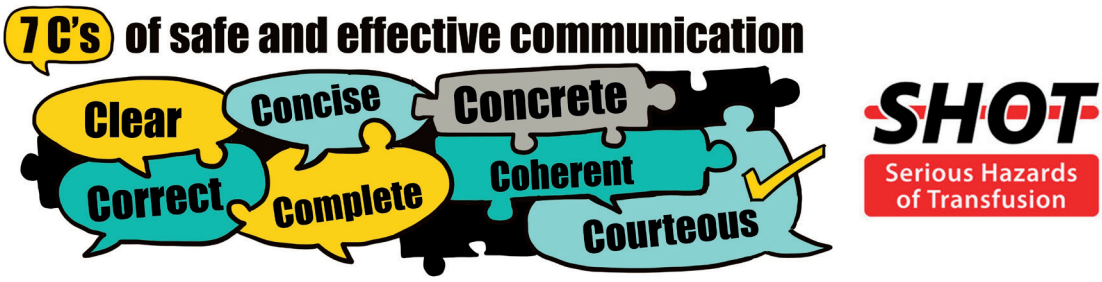
Case 11a.7: Patient struggled with breathing overnight due to delayed transfusion

A man in his 60s with cirrhosis suffered a peritoneal bleed with a Hb of 49g/L. Delay was caused by three factors: the first sample was unlabelled; a new antibody was present in the second sample (2 hours later) so was sent to the Blood Service out-of-hours for crossmatch. Although the blood was ready for transfusion by 02:00 it could not be transfused until 06:45 due to lack of ward staff. The patient struggled to breathe overnight.

Learning points

- Clinical staff at the site of a major haemorrhage alert should only have to telephone a single emergency number and have a standard script covering all essential information. Then the call can be cascaded from switchboard to other essential services. This will avoid staff dealing with the emergency being delayed by unnecessary calls
- Labelling errors must be avoided especially in emergency situations to avoid transfusion delays

A further case where the patient suffered major morbidity is discussed in Chapter 14, Laboratory Errors (Case 14.2).



Staffing and logistic issues resulting in delay

Case 11a.8: Delayed transfusion due to staff shortage (1)

A postnatal woman was seen by a doctor on a Sunday and was noted to have a Hb of 64g/L. She was symptomatic so a transfusion was requested. Blood was issued in the afternoon and confirmed by the transfusion laboratory. On review the following day the team were told that the blood was not given because the ward staff were too busy, and this was not escalated. Her Hb was now 55g/L and so further blood was requested and transfused.

Case 11a.9: Delayed transfusion due to staff shortage (2)

A woman being given palliative care had a Hb of 68g/L and a unit of red cells was requested. There was a delay of 5 days due to having staff shortages and avoiding transfusion overnight. The transfusion was eventually given with help from a neighbouring ward.

Learning point

- Staffing and workload issues have been reported as contributory factors to transfusion delays. Safe staffing levels appropriate to the workload must be in place so that necessary transfusions are not delayed. Contingency plans must be in place so that staff competent in providing transfusion support are available especially in case of emergencies

Case 11a.10: Delay in urgent transfusion caused by lack of labels in the remote refrigerator printer

A man with gastrointestinal bleeding came to theatre, shocked with hypotension and tachycardia and a Hb of 70g/L. He was eligible for electronic issue, but staff were unable to release blood from the electronically controlled refrigerator as there was no paper in the printer for the compatibility tags. Staff had to wait for the transfusion laboratory staff to come to theatre to put the labels in. During the first telephone call requesting help the staff were told the transfusion laboratory staff were in the middle of handover. The second telephone call was made by the anaesthetic consultant who said they needed someone to 'come now'. The label printer did not generate a local nor remote alert when empty and was designed to count a specified number of printed labels. It was supposed to send a remote alert when it reached a low threshold. Access to the printer was open to anyone, and is easily knocked, resulting in misalignment of the feed.

Case 11a.11: Incomplete testing results in delayed intrauterine transfusion

A severely anaemic fetus required intrauterine transfusion. A unit was requested on the basis of previous maternal antibodies (anti-c and anti-E) but the current sample displayed an additional antibody (anti-Jk^{a}) meaning the selected unit was incompatible. The hospital BMS had not completed the maternal antibody identification panels. A further unit had to be sourced from elsewhere in the country and there was a delay of 24 hours.

Case review identified that the hospital BMS required complete retraining in the manual section, was having difficulty understanding written English, and that there were staff shortages that were being addressed. The BMS has been successfully retrained and competency demonstrated. At the time of this incident the transfusion laboratory was on the hospital's risk register due to lack of staff in general and experienced staff in particular. They have continued to recruit and retain staff and are constantly reviewing and updating their training packages.

Lone working out-of-hours was identified in 4 reports as contributing to laboratory delays. One of these was a patient with sickle cell disease needing exchange transfusion for whom the wrong group had been ordered. They had to be admitted overnight.

Learning points

- Laboratory staff working in transfusion should be adequately trained and competency-assessed
- All lone workers should be adequately supported through their training and competency-assessment to ensure they are equipped with adequate skills and knowledge. Laboratory management have a responsibility to ensure all staff members are competent before exposing them to lone working

Delays associated with the Blood Services

Unavoidable delays

The presence of irregular antibodies may require samples to be sent to the Blood Service for investigation and crossmatch. Delays in provision of suitable blood components was noted for 14 cases. Patients with autoimmune haemolysis may have severe anaemia and require urgent transfusion, such as 1 case where the Hb was 34g/L so concessionary release was agreed for one red cell unit and two more became available from the Blood Service 5 hours later. Patients should not die from anaemia or bleeding.

Learning points

- Laboratory staff should liaise with clinicians and consider the urgency. The laboratory should have a policy for concessionary release of best matched red cells
- There should be clear communication between the hospital transfusion laboratory and the Blood Service about the urgency of request and any expected delays in provision to allow concessionary release

Avoidable delays

In 5 cases errors occurred at the Blood Service.

Case 11a.12: Red cells sent to the wrong hospital

An elderly man required transfusion to treat anaemia due to chemotherapy. The Blood Service used a taxi to send crossmatched and stock red cells but to the wrong hospital. A new crossmatch was arranged as the units would have been out of temperature control with another taxi transfer. The transfusion was delayed until the next day.

Case 11a.13: Miscommunication results in cancelled crossmatch and overnight admission of the patient

An elderly woman was found to have irregular antibodies. The sample was sent to the Blood Service laboratory for investigation on a morning transport run. Later the Blood Service laboratory was contacted both by telephone and email from the hospital to note that the patient required transfusion the following morning. Overnight the request was cancelled following discussion between the hospital BMS (who had not received a handover about this) and the Blood Service staff. This was a miscommunication. The patient had to be rebled and was admitted overnight. The email was found in the 'deleted' folder.

There were errors at both the hospital (handover not done and order not completed on the computer system) and the Blood Service laboratory (information poorly displayed or not accessible).

Case 11a.14: Hospital staff unable to contact the on call BMS at the Blood Service

The Blood Service laboratory could not be contacted on multiple occasions in the middle of the night when platelets were required urgently for an elderly patient with thrombocytopenia and haemoptysis. There was a 4-hour delay.

Investigation at the Blood Service identified that the hospital services telephone was diverted to the on-call colleague's work telephone which was out of order at the time. This was incorrect procedure as this was already known and the BMS had requested calls be diverted to their personal telephone, but the latest rota had not been updated with this information. This highlights the importance of having robust contingency plans for communication between clinical and laboratory staff in case of emergencies. Communication methods must be reliable with clear processes in place for escalation.

Additional case studies can be found in the supplementary information on the SHOT website (https://www.shotuk.org/shot-reports/report-summary-and-supplement-2021/)

Learning points

- Errors anywhere along the transfusion pathway including Blood Service errors can contribute to delays in transfusion
- Human factors also impact staff working in the Blood Services. Training in this should be provided and human factors/ergonomics should be used in system design to reduce the risk of errors

Delays associated with major haemorrhage n=28

See the supplementary information on the SHOT website (https://www.shotuk.org/shot-reports/report-summary-and-supplement-2021/) for details.

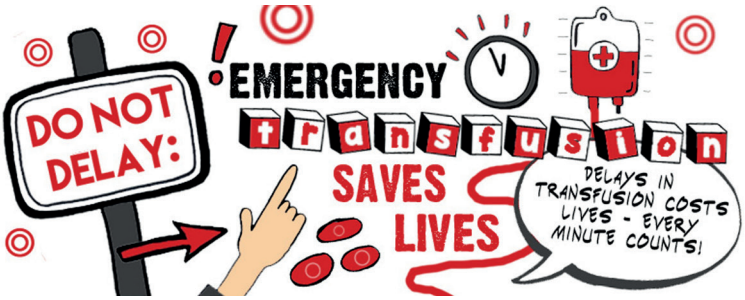
Near miss cases n=1

Case 11a.15: MHP activated for the wrong patient

Activation of the MHP for Patient 1 from the delivery suite was the incorrect patient. This should have been for Patient 2, so there was potential for delay in issuing the correct blood group for the patient in an emergency situation. However, this was recognised very quickly by clinical staff so did not result in significant delay.

Conclusion

The urgent provision of blood components and/or blood products is vital for life threatening bleeding and severe anaemia. Delays in provision and transfusion of blood components puts patients at risk and may contribute to death. Transfusion delays continue to be reported and multiple factors are usually contributory. Communication failures were identified in 48.0% of reports as a continuing problem leading to or compounding delay. Failures in team function contributed to some extent in 50.3%, and workload issues are also identified in a third of reports. Individual patient factors were much less likely to contribute. Staffing shortages are a widespread problem across the NHS and have been identified as a contributory factor in many cases of delayed transfusion reported in 2021. Urgent actions are needed to ensure safe staffing in clinical areas and laboratories and staff should escalate these issues to their managers and review their capacity plans. The recommended actions as per the SHOT CAS alert will help address preventable transfusion delays and improve patient safety. Patients should not die or suffer harm from avoidable delays in transfusion.



SHOT
Serious Hazards of Transfusion

Recommended resources

SHOT Bite No. 8: Massive Haemorrhage Delays
https://www.shotuk.org/resources/current-resources/shot-bites/

SHOT Video: Delayed Transfusion in Major Haemorrhage
https://www.shotuk.org/resources/current-resources/videos/

SHOT Webinar: Every Minute Counts
https://www.shotuk.org/resources/current-resources/webinars/

UK Transfusion Guidance in Response to the Shortage of Blood Collection Tubes
https://www.shotuk.org/resources/current-resources/

References

BSH Davis B, Allard S, Qureshi A, et al. Guidelines on red cell transfusion in sickle cell disease. Part I: principles and laboratory aspects. *British Journal of Haematology* 2016;**176(2)**:179-191.

BSH Davis B, Allard S, Qureshi A, et al. Guidelines on red cell transfusion in sickle cell disease. Part II: indications for transfusion. *British Journal of Haematology* 2016;**176(2)**:192-209.

Sickle Cell Society. No One's Listening – A Report (2021). https://www.sicklecellsociety.org/no-ones-listening/ [accessed 05 May 2022].

Sickle Cell Society. Standards for the clinical care of adults with sickle cell disease in the UK. 2nd Edition:2018. https://www.sicklecellsociety.org/sicklecellstandards/ [accessed 05 May 2022].

SHOT. Preventing transfusion delays in bleeding and critically anaemic patients SHOT/2022/001 (2022) https://www.cas.mhra.gov.uk/ViewandAcknowledgment/ViewAlert.aspx?AlertID=103190 [accessed 05 May 2022].

Trompeter S, Bolton-Maggs P, Ryan K, et al. National comparative audit of blood transfusion: 2014 audit of transfusion services and practice in children and adults with sickle cell disease. *Transfus Med.* 2020;**30(3)**:186-195.

Trompeter S, Estcourt L, Mora A, et al. The haemoglobinopathy survey: The reality of transfusion practice in sickle cell disease and thalassaemia in England. *Transfus Med* 2020;**30(6)**:456-466.