

2022 Annual SHOT Report – Supplementary information

Chapter 11: Avoidable, Delayed or Under/Overtransfusion (ADU)

Additional analysis not included in the main 2022 Annual SHOT Report.

Problems with MHP activations n=64

In 64 cases in these categories, activation of the MHP was reported (half, 32, of these occurred out-of-hours):

- 41 delays (2 deaths possibly related)
- 21 avoidable including 16 instances with use of O D-negative red cells
- 1 overtransfusion
- 1 PCC

In reporting the answer to the human factors question 'To what extent did poor written, or verbal communication worsen the situation?', 33/64 (51.6%) cases reported 'a lot', 'fully' (together 21/33, 63.6%) or 'some' (12). The majority of these were associated with delay, 25/33 (75.8%). Communication issues can occur at several different points and delays accumulate (Cases 11.1 and 11.2).

Case 11.1: Failure to recognise internal haemorrhage with fatal outcome

A man in his 70s arrived in the ED at 10:01 with chest pain and confusion. He had previously been discharged 2 days earlier with a chest infection and COVID-19 on doxycycline (which can enhance the anticoagulant effect of warfarin).

He was on warfarin together with Low-molecular-weight heparin (LMWH) as bridging for a low INR (anticoagulated for an artificial heart valve). On admission his BP at 11:17 was 97/57 falling to 89/52 at 12:34 with a raised EWS (10) and he was drowsy. He was covered in bruises and Hb had reduced from 139g/L, taken 2 days earlier, to 86g/L on admission; 77g/L at 16:43 and later to 62g/L. His INR was 3.7 and was not reversed. After 12 hours in the ED at 22:08 he was found unresponsive (last seen at handover at 19:30); at 22:10 noted to be in asystole. CPR was started. The MHP was called at 22:33, but he died at 23:11. He had extensive flank bruising and was thought to have had a catastrophic intra-abdominal bleed.

The ED had been exceptionally busy. There was no recognition of his deterioration despite repeated raised EWS nor escalation to the medical team. The incident report noted 'an overcrowded department will have contributed to staff fatigue, stress and distraction with consequent negative impact on cognitive biases'.

Case 11.2: Failure to respond to ongoing GI bleeding in a timely manner

An elderly man was admitted with melaena on a Wednesday with a Hb of 49g/L and was treated with two units of red cells. Repeat Hb was 68g/L and 2 days later a further unit was given. He was not reviewed by the appropriate team nor were blood components prescribed to treat signs of ongoing bleeding and hypovolaemia over a 4-day bank holiday weekend. The on-call doctor noted his BP was 90/50, and heart rate 90bpm but stated the patient was haemodynamically stable. The nursing team had identified clinical deterioration and attempted to escalate this concern to the medical team. The Hb remained low and the MHP was activated in the evening of the first normal working day (Tuesday). Despite transfusion he had ongoing bleeding and was too unstable for endoscopy. Treatment was withdrawn and he died the following day (7 days after admission).

Review noted the patient was an outlier due to operational pressures and lack of beds. The medical team was stretched having to review patients across multiple wards. Bank holiday weekend staffing levels were lower than normal working week levels.

Learning points

- Recognition of covert bleeding, such as GI bleeding, and its prompt management will improve outcome
- Early activation of major haemorrhage protocols is essential for patient safety
- Streamlined communication helps reduce delays

Conclusion

Patients are at risk of death from major haemorrhage, and this is exacerbated by poor communication and delays. Staffing shortages must be escalated and addressed by good capacity planning.

There is a need to improve education of all clinical staff about anaemia due to haematinic deficiency so that it is managed appropriately, and unnecessary transfusion avoided. Excessive transfusion in severe anaemia carries risks of TACO and death (Case 11c.3 in Chapter 11c, Under or Overtransfusion and Case 17a.1 in Chapter 17a, Transfusion-Associated Circulatory Overload (TACO)).

Human factors

Human factors questions for reporters were modified for 2021. In answer to the question ‘To what extent was there a mismatch between workload and staff provision around the time of the incident?’, 99 reports noted this as ‘fully’, ‘a lot’ or ‘some’, and the majority, 53/99 (53.5%) were in reports of delayed transfusion, including deaths; 1 probably (imputability 2) and 2 possibly (imputability 1) related to the transfusion error (Table 11.1).

Poor communication was noted to worsen the situation in 171 reports including 110 delays: 6 where death was possibly (imputability 1) and 2 probably (imputability 2) related to the delay (Table 11.2).

Table 11.1: To what extent was there a mismatch between workload and staff provision around the time of the incident?

	Delays	Avoidable	Under or overtransfusion	PCC	Total
Fully	4	3	1	1	9
A lot	21	13	2	1	37
Some	28	20	4	1	53
Total	53	36	7	3	99

Table 11.2: To what extent did poor written, or verbal communication worsen the situation?

	Delays	Avoidable	Under or overtransfusion	PCC	Total
Fully	24	7	0	3	34
A lot	42	28	2	2	74
Some	44	16	0	3	63
Total	110	51	2	8	171

Chapter 11a: Delayed Transfusions

Additional analysis and case studies not included in the main 2022 Annual SHOT Report.

Additional reports of deaths due to delay

A case of haemorrhage where delay probably contributed to death

Case 11a.7: Delayed transfusion for GI bleeding contributes to death

A woman in her 70s on anticoagulants for AF suffered GI haemorrhage. Her Hb of 97g/L had reduced over 4 days to 63g/L and at 00:41 the Hb on the blood gas machine was 40g/L. The decision to transfuse was made several hours earlier at 16:00. A sample sent to the laboratory got lost in transit. Following repeat sampling, crossmatched units were issued for collection at 20:30. The first unit was collected at 00:38. The MHP was activated at 00:50 as the first unit was set up. There were multiple delays: with decision and prescription; there were staffing issues, and a sample lost in transit.

This was investigated by the vascular surgical governance lead who noted concerns about the delayed transfusion but overall her outlook was going to be palliative and this GI bleed did not influence that. There was never a requirement for initiation of the MHP protocol when the bleed became apparent because she was not compromised at that stage. Her death was a compound effect of the bleed and ongoing general decline with advancing co-morbidities and not a consequence of the bleed in isolation.

Cases where delay possibly contributed to death

Case 11a.8: Delayed transfusion in GI bleeding with confusion over the arrest call

A cardiac arrest call was made at 01:39 for a patient in his 40s with acute severe upper GI haemorrhage. The doctor asked nursing staff to make an 'adult cardiac arrest call' and 'major haemorrhage protocol' activation, however this resulted in only the cardiac arrest call. The major haemorrhage call was put out 20 minutes later. The patient had antibodies and needed confirmation from a haematologist about which components to issue. Resuscitation continued for 20-25 minutes, with ongoing bleeding and was discontinued at 02:08. Blood arrived at 02:15. The blood was packed and ready at 02:07 so took 16 minutes from time of activation ready. The clinical team identified 2 delays that resulted in the patient not receiving urgent components in a timely manner - the delay in the call being put out and in receiving the blood from the laboratory.

The incident review noted:

- The need for education about activation of the MHP
- New information was added to the internal online learning modules to ensure staff are aware how to activate and distinguish the MHP from a cardiac arrest call
- The hospital's administration course has been updated to ensure this information is always relayed to new staff
- The components were issued within 16 minutes even after finding antibodies so the laboratory did everything that they could within a reasonable time scale

Case 11a.9: Delayed transfusion of platelets following head injury

A middle-aged male alcoholic fell and suffered subdural haemorrhage. His platelet count was $35 \times 10^9/L$ and he required platelet transfusion prior to transfer to another hospital. There were communication problems about the urgency, and group A platelets were provided an hour after the initial request. After transfer he was not fit for surgery, having fixed dilated pupils and was declared dead.

Case 11a.10: Delayed recognition of postoperative bleeding contributes to death

An elderly woman was admitted with a tibial plateau fracture. On admission her Hb was 134g/L. Three days later her Hb was 87g/L. Early the next day at 03:05 the MHP was activated. There was clinical evidence of bleeding and concern about vacant episodes. Two units of red cells were given to the patient as part of the MHP activation. She showed mild improvement but developed severe metabolic acidosis and died the following day.

The review noted failure to identify postoperative bleeding with failure to provide timely transfusion support contributing to death.

Case 11a.11: Delayed transfusion with lack of knowledge about policies

An elderly woman with multiple medical problems was reviewed at 08:30 for melaena with hypotension. Her Hb was 65g/L; adequate blood pressure was restored with fluids. The plan for transfusion was delayed by misunderstandings and poor communication. The ward staff wrongly thought a second sample was needed but it was not required. Although a group and screen was requested at 11:43 this did not include red cells. She was found unresponsive and hypotensive at 13:11 when red cells were requested but she died before any blood was transfused. The use of emergency group O units was not considered, and the urgency of transfusion had not been communicated to laboratory staff.

Review concluded that although there were several reasons for delay and there was a need for education about the transfusion policy, earlier transfusion may not have affected the outcome.

Major morbidity case study**Case 11a.12: Delayed transfusion associated with myocardial infarction and irregular antibodies**

A patient with Hodgkin lymphoma and recurrent anaemia on chemotherapy required urgent transfusion, Hb 76g/L. However, due to a lack of beds this was planned for 4 days later. The Hb the day before the planned transfusion was 52g/L with atypical antibodies. She attended the ED at 19:46 for urgent transfusion requiring irradiated, and crossmatched red cells from the Blood Centre. She developed chest pain and had a myocardial infarction at 04:29 the following morning. She was transfused at 10:15 (waiting for crossmatched components for more than 12 hours). The patient had autoimmune haemolysis requiring admission to the coronary care unit.

Human factors

Table 11a.1: Human factors identified in reports of delayed transfusion

Human factors question	Some	A lot	Fully	Total (% of 205)
To what extent did poor written, or verbal communication worsen the situation?	44	42	24	110 (53.7%)
To what extent is the cause of this incident due to any failures in team function?	41	18	3	62 (30.2%)
To what extent was there a mismatch between workload and staff provision around the time of the incident?	28	21	4	53 (25.9%)
To what extent were there reasons that this incident was more likely to occur to this particular patient?	25	14	1	40 (19.5%)

Chapter 11b: Avoidable Transfusions

Additional case studies not included in the main 2022 Annual SHOT Report.

Additional case studies

Case 11b.6: Transfusion authorised for the wrong patient

A junior doctor was singlehanded on an unfamiliar ward with no consultant support. Two patients had the same first name. The doctor assessed Patient 1 and made the clinical decision that a red cell transfusion was required. He then contacted the hospital transfusion laboratory and ordered red cells using the hospital number for Patient 2 and then prescribed on Patient 2's chart. The red cell unit was collected, and administration commenced. The doctor then realised the error and immediately stopped transfusion. Stressed from workload, the doctor did not communicate clearly with nursing staff who may have identified the error if they were aware of the planned transfusion.

The report cited COVID-19 pressures, high numbers of inpatients, and difficulty with discharging well patients because there were no community beds.

Case 11b.7: Avoidable transfusion to a Jehovah Witness

A man in his 80s was transfused following surgery for fractured neck of femur despite an advance directive specifying no transfusions. The decision was made to transfuse a stable patient based on a Hb of 79g/L (the patient had a minor cardiac history) by an on-call team who did not know the patient. The patient also had a plan documented the day before that he was not for transfusion.

Chapter 11d: Prothrombin Complex Concentrates (PCC)

Additional case studies not included in the main 2022 Annual SHOT Report.

Additional case studies

Case 11d.7: Delay in treatment of ICH due to PCC request made for wrong patient

PCC was ordered using the wrong patient's demographics and resulted in a delay of 3 hours before PCC was requested for the correct patient. The wrong case notes were selected by a doctor who was unfamiliar with the ward. The correct case notes were in the X-ray department where the patient had been for a scan.

Case 11d.8: Delayed administration of PCC in a man with ICH

An elderly man admitted the previous evening with a raised INR and had ICH identified on a CT scan. A decision was made to reverse warfarin at 09:00, and a request sent at 09:25. The PCC was issued, and porters contacted at 09:40, collected at 11:07, and given at 12:10, more than 12 hours from admission. The ED was very busy and poorly staffed. The patient died 16 days later unrelated to the delay.

Case 11d.9: Inappropriate and delayed administration of PCC

An elderly woman on apixaban experienced a small rectal bleed. PCC was requested at 20:35 but not collected until 03:30. It was then given over 9 hours instead of 40 minutes. This treatment was not necessary as well as being delayed. There was a lack of knowledge about PCC in medical and nursing staff.

Case 11d.10: Underdose of PCC treatment due to lack of adequate stock

A man in his 60s was admitted to the ED with new right sided weakness. He had AF and was anticoagulated with apixaban. A CT scan demonstrated ICH. Haematology staff recommended 2000IU of PCC from the transfusion laboratory in accordance with the organisations guideline for treating major haemorrhage in patients taking DOACs. However, only 500IU of PCC were available with another 1000IU transferred from a linked hospital, so the patient ultimately received a total of 1500IU.

As a result of this incident these linked hospitals have increased their stocks and improved their mechanisms for re-order.

Case 11d.11: Delayed and underdosing of PCC for ICH

An elderly woman with suspected subarachnoid haemorrhage was recommended to receive 3000IU PCC to reverse anticoagulation at 17:06. This was collected from the transfusion laboratory at 17:45, but administration of 1500IU was not finished until 05:00 the next day. There was no documentation of the start time. The full dose was not given. The remaining three vials were not found until a week later. Staff infrequently used PCC, and did not appear fully aware of its indications and the requirement to be given promptly.

Case 11d.12: Delay in treatment of ICH

An elderly woman with ICH had a 2-hour delay in PCC administration due to poor communication. It was not clear if this would have changed the outcome. She deteriorated and died.