Avoidable Transfusions n=99

Definition:

Where the intended transfusion is carried out, and the blood component itself is suitable for transfusion and compatible with the patient, but where the decision leading to the transfusion is flawed.

Key SHOT messages

- Group O D-negative units are being used when D-positive would be appropriate in more than 50% of cases
- Poor communication resulted in avoidable use of D-negative units when crossmatched or group specific units were available
- Haematinic deficiencies continue to be poorly recognised and managed inappropriately
- Take time to identify patients and label the sample correctly. This avoids the need for repeat samples

Recommendations

- Hospitals should review their use of O D-negative units and ensure that group O D-positive units are used in emergencies in older patients as advised by guidelines (NBTC 2019)
- Hospitals should promote the Choosing Wisely recommendations related to transfusion and note the NHS Commissioning for Quality and Innovation (CQUIN) safety indicators for preoperative anaemia prior to major surgery

Action: Hospital transfusion committees

Introduction

In addition to the 99 cases, there were 3 cases counted under 'delays' with avoidable transfusion, and 4 cases of avoidable PCC administration.

Death n=0

There were no deaths related to the transfusion in this category.

Major morbidity n=0

Avoidable transfusions

Many avoidable transfusions result from wrong results and poor communication. Hospital policies for use of O D-negative units need updating. Note that 23 patients developed transfusion-associated circulatory overload where they received excessive red cell volumes (more appropriately calculated according to weight) and they are reported in the Chaper 17b, Transfusion-Associated Circulatory Overload (TACO).



11b



Avoidable use of group O D-negative units n=31

More than half of these patients (23/31, 74.2%) were adult men and women over 50 years of age. Twenty-two required urgent or emergency transfusion and could therefore have received group O D-positive units.



Learning point

 Group O D-negative red cells are in short supply. Hospitals should use the available toolkit, and transfusion policies should ensure that group O D-positive units are used in emergencies in older patients as advised by guidelines (NBTC 2019)

Crossmatched or group-specific units

In 10 cases crossmatched units were available, and in 5 cases group-specific units could have been given.



Learning point

• It may be useful to have a standard operating procedure for the issue of emergency blood that involves a check of previous pre-transfusion testing in all but the most dire emergencies. This may identify instances where crossmatched units were available

In 5 cases group O D-negative units were used because of delays obtaining crossmatched units due to earlier errors, particularly labelling errors leading to sample rejection and need for repeat samples. One preoperative crossmatch was missed due to failures of communication.

Case 11b.1: Panic at low haemoglobin (Hb) level results in avoidable use of group O D-negative blood

A patient in her 60s was readmitted with bleeding from arthroscopy sites. Her Hb had fallen to 67g/L from 87 four days previously. Her international normalised ratio (INR) was 7.7 (on warfarin for mitral and aortic valve replacements). She was not hypotensive or decompensated. The junior staff gave emergency O D-negative units against the advice of haematology staff. A sample was available in the laboratory and she could have received group-specific units. The INR was corrected using intravenous (IV) vitamin K.

Haematinic deficiencies n=9

Six patients (all female) with iron deficiency and 3 with vitamin B12 and/or folate deficiency received avoidable transfusions. One patient received an unnecessary unit of emergency O D-negative blood. Iron deficiency is common in pregnancy and could be detected as a result of the first blood test taken at the booking visit.

A woman with symptomatic iron deficiency, Hb 59g/L, had a delay in transfusion for several hours while the medical team tried to obtain intravenous iron from pharmacy, but this was not available out-of-hours. (This case is counted in delays). A single unit given in timely fashion would have been appropriate followed by IV iron.

Two men with anaemia and minimal symptoms were transfused inappropriately (one prescribed by a consultant) for B12 deficiency. In contrast one symptomatic woman in her 80s with B12 deficiency, Hb 32g/L, had a delay in transfusion of nearly 16 hours.

Five 'choosing wisely' recommendations have been published recently which promote a reduction in unnecessary transfusion (The Royal College of Pathologists 2020).

The NHS England CQUIN scheme for 2020-21 (NHS England 2020) will include a patient safety indicator focusing on the management of preoperative anaemia in patients awaiting major surgery. The overall aim is to ensure that at least 60% of patients are treated in accordance with National Institute for Health and Care Excellence (NICE) guidelines (NICE 2015). 'Major surgery' in this CQUIN includes cardiac surgery, colorectal resection, cystectomy, hysterectomy, hip and knee replacement, and open arterial surgery.

In order to qualify, there is an expectation that within 6 weeks prior to surgery patients will have:

- 1. Hb measurement to screen for anaemia AND
- 2. If anaemic, serum ferritin measurement AND

3. If iron deficiency anaemia diagnosed, appropriate oral or IV iron therapy started

Learning points

- Medical staff, particularly those working in emergency departments, need better education about anaemia, in particular how to recognise iron, B12 and folate deficiency which can often be treated with the missing vitamin alone, but when an elderly patient has severe symptoms a limited (usually single unit) transfusion may be indicated
- Primary care physicians have a responsibility to understand and manage haematinic deficiencies appropriately
- The transfusion-related 'choosing wisely' recommendations should be widely promoted, and patients should be encouraged to discuss the appropriateness of their transfusions

Platelet transfusions n=16

Five patients received inappropriate platelet transfusions after low counts were reported without film review. All had platelet clumping. Another patient received an unnecessary platelet transfusion prior to surgery as she was thought to be on clopidogrel, but this had been stopped 4 years previously.

Learning point

 Unexpected low platelet counts should prompt film review and consideration of the possible diagnosis before platelet transfusion is triggered

Prescription for avoidable red cell transfusion based on wrong Hb results n=27

A variety of causes were described. Two patients were transfused on the basis of other patients' results due to 'wrong blood in tube' errors. Erroneous results from blood gas analysers were reported in 5 cases. In 1 instance the point-of-care haemoglobin machine gave a wrong result due to faulty control material. Causes included diluted samples and malfunction of a machine which required cleaning. In 1 case the blood gas printout was wrongly read taking the result for O_2 Hb instead of the total Hb. The O_2 Hb of 47% was misinterpreted by medical staff as a low Hb of 47g/L. The elderly patient had haematemesis. As a result of the erroneous interpretation, the MHP was activated but stood down when it was realised that the correct Hb was 134g/L (see Annual SHOT Report 2018 page 81 for a similar report last year (Narayan et al. 2019)).

Figure 11b.1:
Example of a
blood gas result
illustrating the
difference between
total Hb (A) and
O2Hb (B) (not
the actual case
described above)

	Results				Crit.	Refe	rence	Crit.
					Low	Low	High	High
	Measured (37.0°C)							
	рН		7.37		[7.20	7.35	7.45	7.60]
	pCO ₂	↑	6.8	kPa	[2.6	4.3	6.4	9.3]
	ρO_2	↓	9.0	kPa	[6.0	11.0	14.4]
	Na⁺	↓	135	mmol/L	[120	136	145	160]
	K⁺		4.2	mmol/L	[2.8	3.5	5.1	6.5]
	CI-		99	mmol/L	[80	98	107	120]
	Ca++		1.19	mmol/L	[0.75	1.15	1.33	1.60]
	Hct	↓	35	%	[18	37	50	60]
	Glu	↑	14.4	mmol/L	[2.5	3.6	5.3	25.0]
	Lac	↑	2.3	mmol/L	[0.3	2.0	4.0]
	CO-Oximetry							
Α	tHb	↓	110	g/L	[70	117	174	200]
В	O ₂ Hb		92.5	%	[90.0	95.0]
	COHb		1.3	%	[0.0	3.0	10.0]
	MetHb		0.8	%	[0.0	1.5]
	HHb	↑	5.4	%	[1.0	5.0]
	sO ₂		94.5	%	[94.0	98.0]
	Derived							
	BE(B)	↑	3.1	mmol/L	[]	-2.0	3.0]
	BE(B) HCO ₃ *std	↑	3.1 27.3	mmol/L mmol/L	[[10.0	-2.0 21.0	3.0 28.0] 40.0]



Learning point

 Healthcare staff should ensure that they know how to read point-of-care test results from blood gas analysers where CO-oximetry results give several different haemoglobin (Hb) variants (e.g. methaemoglobin, carboxyhaemoglobin and reduced haemoglobin as 'HHb'). None of these are the correct or relevant Hb results. If a point-of-care result must be used the correct line is the total Hb, tHb

Plasma and cryoprecipitate transfusions n=6

Fresh frozen plasma (FFP) continues to be given inappropriately either for procedures that do not need it, or at levels of INR that do not need correction (4/6 cases). In 1 case cryoprecipitate was ordered but FFP given without prescription.

Case 11b.2: Use of the wrong haemorrhage protocol leads to inappropriate transfusion of cryoprecipitate

A woman in her 70s bled following an insertion of an intramedullary nail. Thromboelastography results were interpreted using the postpartum haemorrhage protocol and she received cryoprecipitate. The laboratory fibrinogen level was 2.2g/L. A level 2.0 to 3.0g/L would trigger replacement in postpartum bleeding but not in other non-obstetric bleeding. The transfusion was also not properly recorded.

Near miss cases n=7

Reasons included mix up of names (in 1 case the doctor was noted to be exhausted), asking for emergency O D-negative units when crossmatched units were available, failure to check Hb between units and requesting transfusion based on a diluted sample.

The most serious of these was failure to consider sickle cell disease or trait in an Afro-Caribbean child requiring surgery for a fractured femur. Staff had failed to follow their protocols, but transfusion was avoided, and a diagnosis of sickle trait made.

Conclusion

Many transfusions are unnecessary as illustrated above. All staff using point-of-care machines, particularly blood gas analysers, should ensure they understand the results.

Hospitals should follow Blood Service guidelines in relation to use of D-negative units:

The National Blood Transfusion Committee (England) recommends that 'D-negative adult males or women >50 years old with no known anti-D antibodies undergoing major haemorrhage and requiring a significant number of units (>8 units), may receive O D-positive red cells'. Also, 'hospitals should consider usage of O D-positive red cells for unknown adult male patients and women >50 years. The risk of an adverse outcome is likely to be low in this emergency setting and helps conserve O D-negative supply'. A toolkit and other resources are available (NBTC 2019; Carter-Graham et al. 2019).



References

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