# FY1 PDP Programme

# Safe Transfusion Practice

# **Trainers Pack**

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- 4. Preparing for the training session

#### 1. Introduction

This trainer pack has been developed by members of The Yorkshire & Humber Regional Transfusion Practitioner Group. In particular, by the Transfusion Practitioners employed in Trusts where junior Doctors from the West Yorkshire Foundation School will be working in their foundation year one (FY1). See list of authors.

The aim being to build on transfusion knowledge gained as medical students, using real life case studies to assist junior doctors in the decision making process, to ensure appropriate transfusion.

#### 2. Why developed

The transfusion practitioners were concerned that junior doctors were receiving a number of training sessions in blood transfusion at various stages of their training, much of which was repetitive in the information given. In addition, The Serious Hazards of Transfusion haemovigilance scheme has demonstrated an increase in the number of incidents reported in the 'unnecessary & inappropriate' transfusion category year on year. Many of which, demonstrate 'transfusions were given as a result of poor understanding and knowledge of transfusion medicine, such that the decision to transfuse puts the patient at significant risk, or was actually harmful' *SHOT 2009*.

Final year medical students are taught blood transfusion and receive further teaching in the shadowing period. In addition, on qualifying, are taught transfusion safety on FY1 Day 4 of their PDP course. Many Trusts also incorporate transfusion safety training in their FY1 induction programmes, all of which has led to repetition in the information given, therefore not building on transfusion knowledge already gained.

Following discussions with Dr Oliver Corrado, Foundation School Director, West Yorkshire Foundation School, it was agreed to deliver <u>one</u> transfusion safety session on the FY1 PDP days, taking transfusion safety to the next level. The result being a more interactive, scenario based teaching session including "real life" case studies of adverse reactions/events, including inappropriate/unnecessary transfusions. The case studies also highlight the consequences of incomplete transfusion documentation, incorrect labelling of blood samples leading to 'wrong blood in tube incidents', poor clinical records and incorrect prescribing of blood/components.

The West Yorkshire Foundation School teaching takes place at two Trusts, Harrogate and Airedale. Training will be delivered by the transfusion practitioners employed in Trusts where junior doctors from the West Yorkshire Foundation School will be working

#### 3. Ownership and reviews

The authors are the owners of this training pack and as such, take responsibility for periodic reviews (minimum annual basis). The authors acknowledge The Serious Hazards of Transfusion organisation for the transfusion data used in this training and in providing the 2009 Annual SHOT Report - summary (handout).

#### 4. Preparing for the training session

The training pack sets out guide times for delivery of each exercise, equipment required and incorporates handouts/case studies and an accompanying PowerPoint presentation.

There are trainer 'notes' to guide the trainer through each session. However, the delivery is individual to the trainer(s) and is not intended to be prescriptive, therefore the approach to each activity may be modified to suit the needs of the audience and the trainer's personal preference.

It is recommended that handouts are prepared in advance of the training session and that a suitable room, with tables and equipment (as detailed in this pack), are used to enable 'break out' for the group activities.

If the training is to be delivered by a group of 'trainers', it is suggested the trainers agree in advance, which case studies they wish to lead on and to bring extra copies to give to the group of FY1's assigned to it. The remainder of the audience will be able to view the case study directly on the PowerPoint, during feedback as there are PPT slides for each case study.

Finally, there are a number of case studies in this training pack. It is not the intention to use all of the case studies at any one time, but for the trainer to select studies, according to the size of the audience and time available. However, the trainer needs to be aware that a number of case studies have accompanying PPT slides, to be used during the feedback exercise i.e. definition of TACO which accompanies case study 3.

Guide Timing	<u>Activity</u>	Equipment &
	**Room required with tables to allow group work activities.	Materials
2 mins	Introductions	
	1. Introduce the session and discuss Aims & Objectives	PPT 2 & 3
	<ol> <li>Explain the main focus of the session is to look at real case studies many of which, demonstrate a lack of knowledge or inability to apply knowledge meaningfully to a real clinical situation.</li> </ol>	
	3. It is also important to point out that clinical errors are made by all grades and levels of clinicians, including consultants.	
	SHOT has demonstrated through its 'inappropriate & unnecessary' transfusion category, whilst these errors are predominantly made by junior doctors, these also include locums, staff grade doctors and some consultants. Blood can save lives, but it can also be a dangerous thing to give, if given inappropriately! Therefore the aim of today is to raise awareness of errors and inappropriate transfusions and to look at what resources are available out there to assist you in making the right transfusion decision.	
5 mins	Activity 1. 'Serious Hazards of Transfusion'	
	Trainer note:	
	<ol> <li>Introduce the session by explaining the UK's haemovigilance scheme 'Serious Hazards of Transfusion'. Show slides PPT 4 &amp; 5, briefly pointing out the section in the pie chart relating to 'I&amp;U' transfusions category. Advise the group we will be issuing the 2009 SHOT summary at the end of the session which goes into more detail and explains the other SHOT categories shown on the slide.</li> </ol>	PPT 4 - 5
	<ol> <li>Show PPT slides 6 – 8 on 'Inappropriate &amp; unnecessary' transfusions and discuss.</li> </ol>	PPT 6 - 8
	Continued	

Guide Timing	<u>Activity</u>	Equipment &			
		Materials			
5 mins	Activity 2. 'Transfusion Case Studies'				
	<b>Trainer note:</b> Introduce the next session by informing the group this activity is to look at real life case studies of transfusion incidents/reactions.				
	Each group to be provided with one or two case studies, the SHOT definitions of transfusion reactions and indication codes on guidelines for the use of components (to help them decide on type of reaction, whether the transfusion was appropriate or not).				
	* It is not the intention to use all of the case studies in each training event. Case studies selected are at the discretion of the trainer on the day. This may be influenced by the size of the audience and also the complexity of the scenarios chosen (some are more straight forward than others!).				
	<b>**</b> Present case studies selected in numerical order as listed, clicking past the slides on the PPT not applicable etc.				
15 – 20 minutes	1. Divide the audience into groups (number of groups/group size) depending on size of the audience. Provide each group with one or two transfusion case studies and handouts 12 & 13 to assist with the activity etc.				
	Ask the groups to read through their case studies and consider the following points: (Show PPT 9)	PPT 9 Flip chart & pens			
	<ul> <li>What went wrong?</li> <li>Why?</li> <li>What should have happened?</li> <li>Consequences to the patient/clinician?</li> <li>What was the transfusion reaction?</li> </ul>	1. Issue case studies ( <b>See</b> Appendix 1 for case studies)			
	Ask the groups to list their responses/findings on flipchart and to nominate a spokesperson to feedback at the end of the	2. Handout 12: 'SHOT definitions			
	activity. Trainer(s) to go round each group and provide support/advice where required.	3. Hand out 13: Transfusion indication codes			
	Continued over				

Guide Timing	Activity	Equipment &
		Materials
	<u>Feedback:</u> Trainer notes: Some case studies have accompanying slides on the PPT presentation i.e. definition of the transfusion reaction in the case study presented.	
	In the trainer answers to each case study, it will state if there are additional slides to accompany the case study during feedback.	(See Appendix 2, trainer notes for each case study)
30 mins	Ask each group to feedback:	
(feedback approx. 5/10 minutes for each case study)	<ol> <li>Trainer to show each case study in turn, on screen, (starting with case study 1) so the audience can see the scenario for themselves.</li> <li>Ask the spokesperson from the group (given the case study) to feedback using their flip chart</li> <li>Show the corresponding 'answers' slide for each case study following the groups feedback</li> <li>Trainer to then invite questions/discussion from the audience &amp; pick up any points raised or omitted (see trainer notes)</li> <li>Repeat the above process, until all selected case studies have been reviewed.</li> <li>Trainer notes: pick up any procedural errors (if not done so by the groups) and emphasise importance of following correct procedures. Ask that they revisit their respective Trusts Blood Transfusion Policy.</li> <li>Closing the session:</li> <li>Trainer to present final PPT 34 showing the following statement:</li> </ol>	Case 1 PPT 10 - 14 Case 2 PPT 15 & 16 Case 3 PPT 17 - 19 Case 4 PPT 20 & 21 Case 5 PPT 22 - 24 Case 6 PPT 25 Case 7 PPT 26 - 27 Case 8 PPT 28 Case 9 PPT 29 & 30 Case 10 PPT 31 & 32 Case 11 PPT 33
	'The final responsibility in the vast majority of these cases lies with medical staff, who assess the patient both clinically and in the light of laboratory results, make the decision to transfuse, and decide upon the component, dose and rate of transfusion. In effective teams a form of friendly surveillance of others' decisions and actions means that there should be supportive input from nursing and biomedical staff, which may highlight problems and prevent errors – but ultimately the knowledge and experience of the doctor is the most important factor, and	PPT 34

with that rests the final responsibility for the decision'.	
(statement from 2008 SHOT report).	
Finally, trainer to advise the group, to ensure they are familiar with their Trust Transfusion Policies with regards transfusion triggers/appropriate use of blood/components etc.	PPT 35
Inform them the transfusion practitioners, transfusion laboratory and haematologists are available for advise/support. If in doubt – ask!	Issue Summary of SHOT report 2009
Thank you - any questions?	
CLOSE	
NB: If the number of FY1's attending is too few to split into groups.	
<ul> <li><i>Either:</i> <ol> <li>Keep them as one group and provide them with <u>two</u> of the case studies to work through.</li> <li>Or, split them into 2 or 3 groups with one or two case studies each.</li> </ol> </li> <li>**Trainer to go through additional case studies as per personal choice, inviting audience participation as you work through 'what went wrong'.</li> </ul>	

Appendix 1

# Transfusion Case studies &

## Handouts

Trainers Pack: Safe Transfusion Practice - FY1 PDP Programme V1.2 September 2010

#### 'Patient dies following transfusion reaction'

- Elderly man with chronic renal failure, anaemia and a history of falls attended A&E
- Symptomatically anaemic with an Hb 6.8 g/dL.
- Crossmatched using a blood sample taken in A&E
- On admission to ITU he was transfused
- After < 100 mL blood had been transfused he developed fever, hypotension, bronchospasm and died a few hours later

Patient's blood group O RhD negative, he received a unit of A RhD negative blood.

#### Activity:

- What went wrong?
- Why?
- What should have happened?
- Consequences to the patient/clinician?
- What was the transfusion reaction?

#### 'I want to go home'

- 67 year old gentleman diagnosed with Prostate cancer
- Recently visited GP having felt 'tired' for some time
- Hb found to be 7.6g/dl. Arrangements made for admission as a 'day case' for 3 unit blood transfusion in the next few days
- Arrives 9am on 'day unit' and informs staff he is the main carer for disabled wife, therefore anxious the transfusion is completed as soon as possible
- 11am group & cross match sample taken
- 2pm blood sample arrives in transfusion lab
- 4pm 3 units available in blood fridge for collection by ward staff
- 5.45pm 1<sup>st</sup> unit commenced and transfused within 2 ½ hours uneventful
- 8.15pm patient now very anxious to go home, however, 2 more units still to be transfused. Day unit due to close at 9pm

What would you do?

#### Activity:

- How would you deal with this situation?
- Why?

#### 'Failure to check patient history'

- Elderly patient with heart failure admitted for routine weekly transfusion
- No beds on haematology ward
- Transferred to surgical day ward
- Transfusion prescribed by haematology Dr (first day in post), no evidence of clerking/checking patient history/consent
- No diuretic cover prescribed (routine for this patient)
- Transfusion commenced on surgical day ward, however when day ward closed, transferred to private ward overnight to continue with transfusion
- Patient developed acute SOB within 2 hrs of completion
- Reviewed by on call team
- Received oxygen, bronchodilators and diuretics
- Chest x-ray and E.C.G performed
- Consultant haematologist informed following day completed adverse reaction form
- Patient recovered and discharged following day

#### Activity:

- What went wrong?
- Why?
- What should have happened?
- Consequences to the patient/clinician?
- What was the transfusion reaction?

Patient admitted acutely –GI bleed (witnessed & documented approx 200mls).

- 12.12 hrs Hb result 5.8g/dl repeated
- In the meantime, 5 units requested, 4 prescribed for transfusion same day
- 16:47hrs repeat Hb 11.1g/dl available on pathology system
- 17:00hrs endoscopy: no source of bleeding noted/food visible in stomach
- 23:00hrs patient reviewed by on call team during transfusion of 1<sup>st</sup> unit, to continue with transfusion overnight
- Hb result viewed on screen by on call team during the evening- no time documented presumed to be post transfusion
- Patient transfused 4 units blood (overnight- despite night nurse querying transfusion)
- Next day at 08.46 repeat Hb result noted
- Endoscopy repeated: no source of bleeding found.
- Comment in notes 'repeat Hb' presumed initial Hb low due to 'error'
- Hb on **day 3** 15.5g/dl
- Comment in notes no ill effects from over transfusion, however, diuretic given as BP slightly raised
- Hb on **day 4** 16.9g/dl
- Patient discharged 6 days later

#### Activity:

- What went wrong?
- Why?
- What should have happened?
- Consequences to the patient/clinician?
- What was the transfusion reaction?

#### 'What's the indication?'

- 34yr old man on ICU, removal of cerebral haematoma and respiratory arrest-3 days post surgery
- Ventilated and sedated
- INR 2.2
- No bleeding
- Condition stable
- Surgeon under the impression patient had 8 unit blood transfusion, but none given
- 2 units FFP administered why 2 units? Indication?
- Patient stable throughout transfusion

#### 15 minutes post transfusion

- Developed rash over neck, chest and abdomen
- Red face
- De-saturated to 86%
- Remained cardiovascularly stable

Seen by doctor immediately, antihistamine given. Lab informed, referred to Transfusion Practitioner for investigation. Patient settled- rash fading and O2 sats improved. Bloods taken for investigation.

#### Activity:

- What went wrong?
- Why?
- What should have happened?
- Consequences to the patient/clinician?
- What was the transfusion reaction?

#### SHOT case 2008

#### 'Smoke screen?'

- An elderly woman on warfarin for AF was admitted with a PR bleed
- She was found to have Hb of 6.8 g/dl and INR of 7.2
- Persistent hypotention
- She was given vitamin K 2 mg IV and 3 units of FFP requested
- All 3 units of FFP were taken at the same time and administered over 3 hours.
- Soon after completion of the third unit the patient developed an itchy erythematous rash and was given IV chlorpheniramine and hydrocortisone.
- Six hours later the patient was found collapsed and resuscitation was unsuccessful
- Post mortem examination showed fresh blood in the bowel and cause of death was given as haemorrhage from large bowel

#### Activity:

- What went wrong?
- Why?
- What should have happened?
- Consequences to the patient/clinician?
- What was the transfusion reaction?

#### 'Listen to the Patient!'

66 year old patient prescribed blood transfusion for iron deficiency anaemia (diagnosis of iron deficiency anaemia documented in notes). Hb 6.9 g/l. All units prescribed over 4 hours each.

Day 1

**1**<sup>st</sup> **unit:** pre obs: BP 97/58, P 59, T36.9C, R 21

Post transfusion obs: BP 160/50, P 65, R 20, O2 sats 93% on 4L O2,

Day 1

Patient complained of a wheeze & agitation just for the duration of the transfusion.

Seen by Dr and given nebuliser, prednisolone 40mg & co-amilofruse with good effect.

Day 2

**2**<sup>nd</sup> **unit**: pre obs: BP 110/80, P 86, T 36.7C, R 18

15min obs: BP 114/76, P87, T 36.7C, R 19

Transfusion stopped after 1 ½ hrs, BP 141/74, P 42, T36.7C as patient complained of wheeze, sitting upright, no urticaria / angioedema. Furosemide given. Symptoms improved.

15.15hrs: transfusion re-started – symptoms returned - 15.20hrs: transfusion discontinued

Day 3

**3**<sup>rd</sup> **Unit:** pre obs: BP 97/54, P 62, T36.1C, R 23

15 min obs: BP 99/57, P 61, T 36.2C,

Approx. 2 hours into transfusion, patient complained of 'feeling funny'. Obs: BP 94/56, P 69, T35.9C, R 18

Transfusion speeded up to "ensure complete infusion". Post obs: BP 156/51, P 63, T31.3C, R 19

Day 3 - signs/symptoms reported to the lab for the first time

On investigation the patient described feeling wheezy (just for the duration of the transfusions not, pre or post), nauseous, loin pain and agitated.

#### Activity:

Please list your responses/findings on flipchart and nominate a spokesperson to feedback at the end of the activity.

1. What went wrong? 2. Why?

3. What should have happened?

4. Consequences to patient/clinician?

5. What was the transfusion reaction?

- 78 year old female under the c/o haematologist
- Admitted to day case unit for 2 unit transfusion for symptomatic chronic anaemia
- No recent transfusion history (last transfusion over 30 years ago)
- Alloantibody (anti-E) found. ABO and RhD compatible, C-, E- red cell units cross matched
- 1st unit commenced, 15 minute obs virtually unchanged from baseline
- 25 mins into transfusion c/o feeling unwell, was shaky and had pain in back radiating to neck. Was "feeling really dreadful"
- Obs still virtually unchanged from baseline
- Patient receiving no other treatment to account for symptoms
- Transfusion discontinued
- Evidence of haemolysis in urine and raised bilirubin
- Patient admitted to ward overnight for observation
- Condition settled patient described that "she thought she was going to die" she felt so dreadful.

#### Activity:

- What went wrong?
- Why?
- What should have happened?
- Consequences to the patient/clinician?
- What was the transfusion reaction?

#### 'Heed advice from laboratory!'

- 88 year old female due for discharge to nursing home
- 02.00hrs coffee ground vomit and malaena
- Hb 14.3g/dl, (previous Hb 14.7g/dl)
- haemodynamically stable
- Further IV fluids given
- 04.30hrs obs unrecordable
- 05.10hrs 2 units red cells given
- 06.10hrs small amount of malaena noted
- haemodynamically stable
- Further 4 units red cells requested.
- Lab staff asked for repeat Hb not taken.
- 08.30hrs Haemodynamically stable 2 units red cells given
- 12.00hrs Hb 16.6g/dl. (post transfusion) results not reviewed until 5 pm.
- Following day Hb 18.3g/dl, then 20.8g/dl.
- No action taken.

#### Activity:

- What went wrong?
- Why?
- What should have happened?
- Consequences to the patient/clinician?
- What was the transfusion reaction?

#### 'Whose life is it?'

- A young woman with iron deficiency anaemia, Hb 5.5g/dL, due to longstanding menorrhagia was sent to the ED by her GP.
- She was reluctant to have a blood transfusion and went home with a supply of iron tablets.
- The GP was not satisfied and sent her back.
- The transfusion practitioner discussed the patient's concerns with her and then requested the GP to reconsider the alternative options.
- The patient was sent back again, this time with a letter instructing that transfusion was needed.
- The request was not discussed at any point with a haematology consultant, and the patient was eventually, reluctantly, transfused.

#### Activity:

- What went wrong?
- Why?
- What should have happened?
- Consequences to the patient/clinician?
- What was the transfusion reaction?

- Female aged 29 years
- Admitted following sepsis due to necrotising fasciitis, following repeated IV drug use
- History of respiratory episode
- On ICU
- Intubated and ventilated
- DIC due to sepsis
- Transfused with 10 cryoprecipitate, 4 FFP, 2 pooled platelets, 2 red cells. Start time of these transfusions 16:20, end time 19:10. Blood/components given on haematologist's advice.
- 20:15, SpO2 dropped required oxygen increase from 35% to 60%.
- 20.45 given furosemide 50mg IV with excellent diuresis (2280 mls in the four hours following administration).
- PEEP on ventilator increased.
- 21:00 CXR showed bilateral pulmonary infiltrates. CVP stable pre-transfusion and post reaction.
- Total volume transfused : 2,227mL in 2hours 50 mins

**Outcome** –Improved after the incident, however, deteriorated over next few day's & died.

#### Activity:

- What went wrong?
- Why?
- What should have happened?
- Consequences to the patient/clinician?
- What was the transfusion reaction?

#### SERIOUS HAZARDS OF TRANSFUSION (SHOT) REPORTING CATEGORIES

Term	Definition
IBCT (Inappropriate Blood Component Transfused)	All reported episodes where a patient was transfused with a blood component or plasma product that did not meet the appropriate requirements or that was intended for another patient. This category currently includes: 'Wrong blood' events where a patient received a blood component intended for a different patient or of an incorrect group, including components of incorrect group given to BMT/SCT or solid organ transplant patients. Transfusion of blood of incorrect specification or that did not meet the patient's special requirements.
Inappropriate and unnecessary transfusion	These are cases in which the intended transfusion is carried out, and the component itself is suitable for transfusion and for the patient, but where the decision making is faulty. Prescription of components that are not required, or where another component or therapy would have been more clinically appropriate or prescription at an incorrect dose or rate, or for an inappropriate indication.
Near Miss events	Any event that, if undetected, could result in the determination of a wrong blood group, or issue, collection or administration of an incorrect, inappropriate and unsuitable component, but that was recognised before transfusion took place.
Acute Transfusion Reaction	<ul> <li>Reactions occurring at any time up to 24 hours following a transfusion of blood or blood components. These include:</li> <li>Isolated febrile rise in temperature &gt;1oC +/- minor rigors and chills</li> <li>Minor allergic skin +/- rash</li> <li>Anaphylactic hypotension with one or more of: urticaria, rash, dyspnoea, angioedema, stridor, wheeze, pruritus, within 24 hrs of transfusion</li> <li>Severe allergic severe allergic reaction with risk to life occurring within 24 hours of transfusion, characterised by bronchospasm causing hypoxia, or angioedema causing respiratory distress</li> <li>Hypotension a drop in systolic and/or diastolic pressure of &gt;30mm Hg occurring within one hour of completing transfusion, provided all other adverse reactions have been excluded together with underlying conditions that could explain hypotension</li> </ul>
	<b>Febrile with other symptoms/signs</b> rise in temperature >1°C, with no features of an allergic reaction, but with one or more of myalgia, nausea, change in blood pressure or hypoxia.
Haemolytic Transfusion Reaction: <i>Acute</i>	Acute HTRs are defined as fever and other symptoms/signs of haemolysis within 24 hours of transfusion; confirmed by a fall in Hb, rise in LDH, positive DAT and positive crossmatch
Haemolytic Transfusion Reaction: Delayed	Delayed HTRs are defined as fever and other symptoms/signs of haemolysis more than 24 hours after transfusion; confirmed by one or more of: a fall in Hb or failure of increment, rise in bilirubin, positive DAT and positive crossmatch not detectable pre-transfusion. Simple serological reactions (development of antibody without positive DAT or evidence of

	haemolysis) are excluded.
TRALI	Acute dyspnoea with hypoxia and bilateral pulmonary infiltrates during or within six hours of transfusion, not due to circulatory overload or other likely cause.
	Suspected cases should be discussed with a Blood Service consultant, and reported if there is a high index of suspicion, even if serological investigation is inconclusive.
Post-Transfusion	Thrombocytopenia arising 5-12 days following transfusion of red cells associated with the
Purpura	presence in the patient of alloantibodies directed against the HPA (human platelet antigen) systems. Cases where the platelet count drops more than 50% following transfusion should be investigated and reported if complete or partial serological evidence is available.
Transfusion-	Characterised by fever, rash, liver dysfunction, diarrhoea, pancytopenia and bone marrow
Associated	hypoplasia occurring less than 30 days after transfusion. The condition is due to engraftment
Graft-versus-	and clonal expansion of viable donor lymphocytes in a susceptible host.
Host Disease	All cases where diagnosis is supported by skin/bone marrow biopsy appearance or confirmed by the identification of donor-derived cells, chromosomes or DNA in the patient's blood and/or affected tissues.
	Cases with very high index of clinical suspicion.
Transfusion-	Included as a TTI if, following investigation, the recipient had evidence of infection post-
Transmitted	transfusion, and there was no evidence of infection prior to transfusion and no evidence of an alternative source of infection
Infections	<b>And either</b> at least one component received by the infected recipient was donated by a donor who had evidence of the same transmissible infection; <b>or</b> at least one component received by the infected recipient was shown to contain the agent of infection.
	Cases of bacterial transmission from blood components, where cultures from the patient's blood match cultures from the component bag and/or from the donor.
	Transmissions of viruses, whether routinely tested for by the blood services or not.
	Transmissions of other agents such as prions, protozoa and filaria.
Anti-D events	Events relating to administration of anti-D immunoglobulin.
	Reports in this section include:
	Omission or late administration
	<ul> <li>Anti-D given to a D positive patient or a patient with immune</li> </ul>
	anti-D
	Anti-D given to mother of D neg infant
	Anti-D given to wrong patient
	Incorrect dose given
	• Anti-D given that was expired or out of temperature control.

ΤΑϹΟ	Any 4 of the following occurring within 6 hours of transfusion:			
(Transfusion- Associated	Acute respiratory distress			
Circulatory Overload)	• Tachycardia			
	Increased blood pressure			
	<ul> <li>Acute or worsening pulmonary oedema</li> </ul>			
	• Evidence of positive fluid balance.			
TAD	Respiratory distress within 24 hours of transfusion that does not meet the criteria of TRALI,			
/ <b>-</b> - ·	TACO or allergic reaction.			
(Transfusion-				
Associated	Respiratory complications of transfusion of unknown cause.			
Dyspnoea)				
Autologous	Transfusion of a patient's own blood or blood component back to themselves, which may be			
Transfusion	either after pre-storage (+/- manipulation of component), during periods of acute blood loss,			
	or during the specialist management of haematological disorders.			
	Adverse events or reactions related to:			
	intraoperative or postoperative cell savage			
	preoperative autologous deposit			
	acute normovolaemic haemodilution			
	other autologous components			

Table adapted from SHOT 2008 report

The indications for transfusion provided below are taken from UK national guidelines for the use of blood components (see references). Although it is accepted that clinical judgement plays an essential part in the decision to transfuse or not, the purpose of drawing available transfusion guidelines together into one short document is to help clinicians decide when blood transfusion is appropriate and to facilitate documentation of the indication for transfusion.

Each indication has been assigned a number, which may be used by clinicians when requesting blood or for documentation purposes. Specific details regarding the patient's diagnosis and any relevant procedures to be undertaken should also be provided. These are current guidelines and may change depending on new evidence.

CODE	Red cell concentrates			
R1.	Acute blood loss			
	< 30% loss of blood volume (< 1500ml in an adult): transfuse crystalloids. Red cell			
	transfusion is unlikely to be necessary.			
	30-40% loss of blood volume (1500-2000ml in an adult): rapid volume replacement is			
	required with crystalloids. Red cell transfusion will probably be required to maintain			
	recommended Hb levels.			
	>40% loss of blood volume (>2000ml in an adult): rapid volume replacement including			
	red cell transfusion is required.			
R2.	<b>Peri-operative transfusion</b> Hb concentration below 7g/dl.			
R3.	Hb concentration below 8g/dl in a patient with known cardiovascular disease, or those			
	with significant risk factors for cardiovascular disease (e.g. elderly patients, and those			
	with hypertension, diabetes mellitus, peripheral vascular disease).			
R4.	Critical Care Transfuse to maintain the Hb >7g/dl, and >8g/dl in elderly patients and			
	those with known cardiovascular disease.			
R.5	Post-chemotherapy			
	There is no evidence-base to guide practice. Most hospitals use a transfusion threshold			
	of an Hb of 8 or 9g/dl.			
R.6	<b>Radiotherapy</b> Transfuse to maintain the Hb >10g/dl.			
R.7	Chronic anaemia Transfuse to maintain the haemoglobin concentration to prevent			
	symptoms of anaemia. Many patients with chronic anaemia may be asymptomatic with			
	all HD Zog/UL			
	(Dose 12-15ml/Kg body weight equivalent to 4 units for an adult)			
F1	Replacement of single coagulation factor deficiencies, where a specific or combined			
	factor concentrate is unavailable e.g. factor V.			
F2.	Immediate reversal of warfarin effect, in the presence of life-threatening bleeding. FFP			
	only has a partial effect and is not the optimal treatment; prothrombin complex			
	concentrates are preferred.			
F3.	Acute disseminated intravascular coagulation (DIC) in the presence of bleeding and			
	abnormal coagulation results			
F4	Thrombotic thrombocytopenic purpura (TTP), usually in conjunction with plasma			
	exchange			
F5.	Massive transfusion; local protocols for serious bleeding should be followed and may			
	recommend empirical use of FFP and a specific ratio of FFP to red cells.			
	Otherwise, the use of FFP should be guided by timely tests of coagulation including near			
	patient testing. Guidelines suggest the PT and APTT should be maintained at <1.5. This is			
	likely to occur, and FFP to be required, after replacement of 1 1.5 x the patient's blood			
56	Volume.			
F0.	Liver disease; patients with a PT within 4 seconds of the control value are unlikely to			

	Cryoprecipitate
	(Dose 1 unit/5Kg body weight equivalent to 10 units for an adult)
C1.	Acute disseminated intravascular coagulation (DIC), where there is bleeding and a
	fibrinogen level <1g/l.
C2.	Advanced liver disease, to correct bleeding or as prophylaxis before surgery, when the
	fibrinogen level <1g/l.
C3.	Bleeding associated with thrombolytic therapy causing hypofibrinogenaemia.
C4.	Hypofibrinogenaemia (fibrinogen level <1g/l) secondary to massive transfusion
C5.	Renal failure or liver failure associated with abnormal bleeding where DDAVP is
	contraindicated or ineffective.
C6.	Inherited hypofibrinogenaemia, where fibrinogen concentrate is not readily available.
	Platelet concentrates
	(Dose - 15 ml/kg body weight for children <20kg; 1 adult therapeutic dose for adults and
	older children)
	Bone marrow failure
P1.	To prevent spontaneous bleeding when the platelet count <10 x 109/l.
P2.	To prevent spontaneous bleeding when the platelet count <20 x 109/l in the presence of
	additional risk factors for bleeding such as sepsis or haemostatic abnormalities.
P3.	To prevent bleeding associated with invasive procedures. The platelet count should be
	raised to >50 x 109/l before lumbar puncture, epidural anaesthesia, insertion of
	intravascular lines, transbronchial and liver biopsy, and laparotomy, and to >100 x 109/L
	before surgery in critical sites such as the brain or the eyes.
P4	Critical care/surgery Massive blood transfusion. The platelet count can be anticipated to
	be <50 x 109 /l after 2 xblood volume replacement. Aim to maintain platelet count >/5 x
	109 /I, which allows a margin of safety to ensure platelet count >50 x 109 /I. Keep the
D5	platelet count >100 x 109 / If multiple, eye or CNS trauma.
P5.	Bleeding, not surgically correctable, and with associated acquired platelet dysfunction
	e.g. post-cardiopulnionary bypass, possibly combined with the use of potent anti-
DG	A cute discominated intravaccular congulation (DIC) in the process of blooding and
F0.	severe thrombocytopenia
D7	Inherited platelet dysfunction disorders e.g. Glanzmanns thromhasthenia with bleeding
F7.	or as prophylaxis before surgery
	Immune thrombocytonenia
D8	Autoimmune thrombocytopenia in the presence of major baemorrhage
PQ	Post-transfusion nurnura in the presence of major haemorrhage
P10	Neonatal alloimmune thrombocytonenia to treat bleeding or as prophylaxis to maintain
1 10.	the platelet count >50 x 109 /l
L	

#### References

Association of Anaesthetists of Great Britain and Ireland (2008). Blood transfusion and the anaesthetist: red cell transfusion (www.aagbi.org).

British Committee for Standards in Haematology (2001). Guidelines for the clinical use of red cell transfusion. *British Journal of Haematology*, **113**, 24-31.

British Committee for Standards in Haematology (2006). Guidelines on the management of massive blood loss. *British Journal of Haematology*, **135**, 634-641.

British Society of Gastroenterology Endoscopy Committee (2002). Non-variceal upper gastrointestinal haemorrhage: guidelines. *Gut*, **51** (suppl IV), iv1-iv6.

Scottish Intercollegiate Guidelines Network (2001). Perioperative blood transfusion for elective surgery (www.sign.ac.uk).

Scottish Intercollegiate Guidelines Network (2008). Management of upper and lower gastrointestinal bleeding (www.sign.ac.uk).

British Committee for Standards in Haematology (2003). Guidelines for the use of platelet transfusions. *British Journal of Haematology*, **122**, 10-23.

British Committee for Standards in Haematology (2004). Guidelines for the use of fresh-frozen plasma, cryprecipitate and cryosupernatant. *British Journal of Haematology*, **126**, 11-28.

Schiffer CA *et al* for the Amercian Society of Clinical Oncology (2001). Platelet transfusion for patients with cancer: clinical practice guidelines. *Journal of Clinical Oncology*, **19**, 1519-1538.

#### MFM/JW/JB 5/3/09

**Appendix 2** 

## Trainer Answers to Transfusion Case Studies

#### 'Patient dies following transfusion reaction'

Show slides 11 – 14 on Positive Patient ID - following group feedback.

#### What went wrong?

There had been no checking of the patient's ID at the bedside, either with the patient himself or with the wristband. The patient received ABO incompatible blood and died.

It was discovered that the wrong patient had been bled by a doctor in A&E resulting in a 'wrong blood in a tube' incident. The sample was labelled for the intended patient

#### Why?

The transfusion sample protocol had not been followed.

#### What should have happened?

All patients being sampled must be positively identified and the sample bottle labelled **<u>before</u>** leaving the patients side.

**Positive patient identification**: whenever possible <u>ask</u> the patient to state their full name and date of birth. For patients who are unable to identify themselves, e.g. paediatric, unconscious or confused patients, or where there is a language barrier, verification of the patient's identification should be obtained from a parent or carer (if present). This information must match exactly the information on the patient's identification band (or equivalent). All paperwork relating to the patient must include, and be identical in every detail to, the minimum patient core identifiers contained on the patient's identification band).

The collection of the blood sample from the patient into the sample tubes and the sample labelling should be performed as one continuous, uninterrupted event, involving one patient and one trained and competent healthcare worker only. Sample tubes should not be prelabelled. The request form should be signed by the person drawing the sample.

#### **Consequences?**

#### Patient died as a result of ABO incompatible transfusion

#### In summary:

- Always ensure positive patient ID with:
- Label sample tube <u>BEFORE</u> leaving the patients side

#### Reaction: Acute Haemolytic Transfusion Reaction.

#### Additional notes:

Rupture & breakdown of intact red cells in the blood stream by complement activiation, resulting in release of haemoglobin into the plasma. This occurs with relatively small volumes of ABO incompatible blood transfused. Classic signs/symptoms include: burning sensation along course of vein used for transfusion, flushing of the face, fever,

headache, lower back pain and frequently an oppressive feeling in the chest. Shock may be the predominant feature, followed on (rare) occasions by renal failure & DIC. If death occurs, it is usually due to intractable shock & hypotension.

Phil Learoyd.

#### 'How would you deal with this situation?'

Show slide 16 following group feedback, on what happened in this case.

#### What went wrong?

Decision made to transfuse both units, one in each arm, simultaneously.

#### Why?

Delays in taking G&X blood samples lead to delays in obtaining blood for this patient. A decision should have been made to readmit the patient to complete the transfusion at a later date. There was no urgency to transfuse this patient. Although patients Hb 6.7, he was otherwise well in himself, there was no 'urgency' to transfuse all the units that day.

#### What should have happened?

GP could have taken G&S sample, advising transfusion lab patient due to be admitted in next couple of days (so sample still viable within 7 days – ask group how long G&S samples last). This would enable the units to either be available on patient's arrival, or at least a quicker cross match time. Arrangements could have been made earlier to collect G&X match sample. Nursing staff could have telephoned transfusion and asked if it could be X matched asap.

It might have been better to arrange patient's admission to haematology day unit as they are experienced in organising transfusions for day case patients.

#### Consequences to the patient/clinician?

The decision, nor the reaction were documented (and poorly documented in nursing notes) in the medical notes. This potentially could lead to both clinical & nursing staff being 'open' to litigation/clinical negligence if the patient had deteriorated as a consequence. Particularly if this resulted in a 'Serious untoward Event' (SUI) which could compromise the integrity of the Trust. All transfusion reactions/adverse events MUST be reported to the transfusion lab. Legal requirement to report incidents (although technically, this is not reportable to MHRA).

The incident caused unnecessary anxiety to the patient and his wife) and resulted in arrangements having to be made for an overnight carer. Finally, no observations recorded overnight by nursing staff (admitted to a very busy MAU). The doctor involved in the incident was a locum (SpR called to review patient).

#### In summary:

- Poor documentation
- Rationale to transfuse both units simultaneously inappropriate
- Not reporting adverse reaction/events (legal requirement)
- Poor communication between nursing & medical staff on patients care
- Potential for adverse publicity & litigation

Reaction: Rapid, bilateral transfusion in a haemodynamically stable patient.

#### 'Failure to check patient history'

Show slides 18 & 19 re definition of TACO & SHOT report - following group feedback.

#### What went wrong?

Patient with a history of heart failure, not prescribed diuretic cover for transfusion.

#### Why?

#### A number of issues:

1. Patient was a regular attendee for transfusion, known to have heart failure and always had diuretic cover with transfusion.

Nursing staff on haematology ward did not communicate this information to staff in surgical day ward when patient transferred.

2. No beds on haematology ward - patient transferred to surgical ward arranged by bed manager, *again, poor communication on the needs of this patient between haematology ward staff and bed manager*.

3. Transfusion prescribed by haematology Dr (first day in post) he was not covering the surgical ward but did go to prescribe blood. Dr did not check patient records for transfusion history and clerk patient. When asked this question – his response was that no one asked him to clerk patient, he was only asked to prescribe the transfusion – where would accountability lie in this case?

4. Nursing staff on surgical day ward, commenced transfusion did not notice that patient was not clerked in or consented to transfusion.

5. Patient had history of heart failure yet no diuretics prescribed failure to properly assess patient prior to commencing transfusion.

6. Adverse event form (clinical incident) not completed until following day when consultant haematologist became aware of incident.

#### What should have happened?

1. The patient was a regular attendee for transfusion on the haematology ward. Even though there were no beds available, there should have been clear instructions on what this patient 'requirements' were to bed manager and also on hand over to surgical ward.

2. As clinicians and in particular when covering a number of wards (or even specialities for colleagues) etc. if you are prescribing care, you assess the patient and are satisfied what you are prescribing is appropriate and not just 'acting on' what you have been 'told' to do. The final responsibility would be with the clinician prescribing the transfusion and the consequences of that.

3. All transfusion adverse events/reactions are reportable. In particular, if a patient has a transfusion reaction, any remaining blood needs to be recalled back to the transfusion laboratory to confirm compatibility/suitability.

#### **Consequences?**

Patient suffered a transfusion reaction due to no diuretic cover.

#### ΡΤΟ

In summary:

- Poor communication between ward staff on haematology ward and surgical day ward
- Failure by doctor to properly assess and manage of patient
- Documentation lacking -clerking, verbal consent transfusion history
- Poor communication between nursing & medical staff on patients care

Reaction: TACO (reported as SAR to MHRA).

#### 'Is that Hb correct?!'

#### What went wrong?

Patient had <u>one</u> episode of GI bleed, she was otherwise <u>stable</u>, Hb a couple of days earlier had <u>been 11.3g/dl</u>. Bleed was witnessed and documented as being approximately **200mls**.

Hb 5.8g/dl. prescribed 5 units blood, 4 to be administered same day. *No one questioned the accuracy of the Hb result after only ~ 200mls bleed.* However, it was repeated and available on pathology results viewer as 11.1g/dl later that day. Patient reviewed at 23:00hrs by 'on call team' whilst 1<sup>st</sup> unit transfusing, the Hb result was also viewed during that evening (time not known – but was presumed to be post transfusion Hb), however, the transfusion was not stopped (even though a nurse questioned the transfusion). Only the following day, was the Hb result of 11.1g/dl. noted.

#### Why?

Doctor who acted upon 1<sup>st</sup> result felt he had communicated the need to check the repeat Hb to his colleagues. He requested 5 units and prescribed 4 units to be given that day, <u>after</u> the review of the second Hb result- *this did not happen and was not documented on prescription chart to alert colleagues.* 

The nurses caring for the patient were also not aware that a second Hb had been taken.

#### What should have happened?

Clinician should have waited for the results of the repeat Hb and from that, taking into account the full clinical picture (does the patient look that anaemic, are they bleeding?) and the results of the endoscopy, patient clinically stable, should have concluded a transfusion was not required. The transfusion was inappropriate. Always question results that do not 'fit the clinical picture'.

Endoscopy found no source for bleeding. A repeat endoscopy was requested the next day because of drop in Hb. However, the repeat Hb result was available at that time, why was this not reviewed?

Patient reviewed by on call team 23.00 hrs during transfusion of 1<sup>st</sup> unit. To continue with transfusion overnight despite patient being stable with no further evidence of bleeding. Why wasn't the Hb results checked as part of the review?

Nurse also questioned the need for transfusion, this should have raised alarm bells and made someone review the case.

Following day, patient recorded as having no ill effects from 4 unit transfusion yet steady rise in BP recorded and diuretic prescribed due to rise in BP.

Incident was reported by ward doctor as "lab error-faulty result"

Night time transfusions – only in medical emergencies!

#### **Consequences?**

Patient was admitted acutely within 2 weeks of the episode with signs of a stroke Hb 17.1g/dl. PTO....

In summary:

- Poor communication between ward doctor and on call team re management of this patient
- Incomplete documentation
- Poor communication between nursing & medical staff on patients care
- Potential for detecting Hb inaccuracies missed on numerous occasions

**Reaction:** Inappropriate transfusion. Reported as SAR to MHRA.

#### 'What's the indication?'

**Following group feedback**, show slide 23 indication codes for FFP and slide 24 SHOT data showing reactions by component type highlighting FFP/Platelets a greater risk of allergic/ anaphylactic reactions.

#### What went wrong?

Surgeon under the impression patient had received 8 units red cells – 8 had been ordered but none given.

- Assumption of transfusion history notes not checked.
- Decision to give 2 units FFP
- Why 2 FFP? didn't want to bring INR down too much!
- Sub-therapeutic FFP dose (adults/children dose 12-15ml/Kg body weight = 4 units in an adult)
- No documentation in notes as to what the rationale was for FFP
- No advice sought
- No real idea of why INR slightly raised

#### Why?

?lack of understanding of indications for use of FFP

Not checking medical notes

#### What went right?

Given vitamin K – INR following day 1.6 (normal levels 1.0 – 1.5)

- Documentation complete and accurate
- Treatment prompt and effective
- Reporting prompt and appropriate

#### **Consequences/reaction?**

#### Patient had an acute transfusion reaction - allergic reaction.

#### **Additional notes:**

**INR: International normalised ratio:** A system, commonly called the INR, established by the World Health Organisation (WHO) and the International Committee on Thrombosis and Hemostasis for reporting the results of blood coagulation tests. All results are standardised using the international sensitivity index for the particular thromboplastin reagent and instrument combination utilized to perform the test.

The INR test result is given as a number. There are no units of measurement because the number is a ratio: the ratio of the sample's Prothrombin Time (PT – a measure of clotting), to the Prothrombin Time of a normal sample of blood. A result of 1.0, up to 1.5, is therefore normal.

Patients on warfarin treatment will have different target INR ranges to aim for with warfarin treatment, depending on the reason for anticoagulation. One example is a range of 2.0 to 3.0 for DVT. An INR lower than the desired range means the blood is "not thin enough" or clots too easily. An INR result higher than the desired range means the blood is "too thin".

There are many medications that can affect the INR, and even a change in diet can result in changes to the INR – either raising or lowering it.

Allergic reaction: immune reactions - mild - fairly common reaction

Transfusion of an antigen i.e. dust/pollen, in donor plasma to a recipient with a preformed corresponding IgE (anti allergen antibody) antibody in their circulation.

Anaphylaxis: IgA anti-plasma protein antibody causing severe reaction - rare

Rapid infusion of plasma is one cause.

A small number of allergic responses have been recorded due to passive transfer of high titre 'reaginic antibody' in donor plasma to the patient. In these cases, the reaction may be delayed until the patient is exposed to the antigen (atopen). To avoid this problem, NHSBT do not accept blood donors for donation during periods when the donor produces their highest antibody response in their blood i.e. summer months when pollen counts are high (if donor suffers with hay fever).

Phil Learoyd.

See trainer answers -Case Study 7 for additional information on the above.

#### SHOT 2008 case study

'Smoke screen?'

#### What went wrong?

This patient was inadequately managed and collapsed and died from gastrointestinal haemorrhage with which she had been admitted during this episode. This was the first case reported to SHOT (2008 report) where <u>under</u> transfusion was main thrust of the report, although inappropriate transfusion FFP and a mild allergic transfusion reaction were also part of the story.

This patient was not adequately assessed or monitored clinically, and did not undergo appropriate management of her high INR or her acute blood loss.

Did the group highlight inappropriate use of FFP?

#### Why?

Focus appeared to be on reducing INR.

#### What should have happened?

FFP was inappropriate and is not indicated for reversal of warfarin (Vit K correctly prescribed). Patient required blood transfusion, cessation of warfarin (restart when INR <5.0) and prothrombin complex concentrates e.g. Beriplex/Octoplex.

#### **Consequences?**

#### Patient died.

Inappropriate management of gastrointestinal haemorrhage. In spite of blood results and persistent hypotension, this patient received no intravenous therapy apart from the FFP, and no blood transfusion was given, though 4 units had been cross matched.

#### 'Listen to the Patient!'

Following group feedback, show slide 27

#### What went wrong?

Allergic reaction to RBC

Patient described feeling wheezy (just for the duration of the transfusions not pre or post), <u>nauseous, loin pain and agitated</u> all of which are classic symptoms of severe allergic transfusion reaction. Took three days to report reaction!

#### Why?

Most likely a reaction to the residual plasma within the bags of red cells.

#### What should have happened?

Transfusion aborted - reported to the transfusion laboratory - re - crossmatched.

To prevent anaphylaxis, all future transfusions must therefore be of washed red cells and the patient must be treated with a 'pre-med' of hydrocortisone & piriton before each transfusion. **All future transfusions must be administered under clinical trial conditions** - ask group if they understand what this means, explain if not.

1) ANY transfusion symptoms such as rise in temp>1.5C from the baseline +/- life threatening symptoms (e.g. wheeziness) MUST be reported immediately. The transfusion discontinued and no further units transfused until the patient has been re-crossmatched.

2) All staff must familiarise themselves with signs/symptoms of transfusion reaction and with what action to take –

#### 3) Iron deficiency anaemia should not be treated with blood transfusion

#### Additional notes:

#### Anaphylaxis

A rare but life-threatening complication usually occurring in the early part of a transfusion.

**Rapid infusion of plasma is one cause.** Signs consist of hypotension, bronchospasm, periorbital and laryngeal oedema, vomiting, erythema, urticaria and conjunctivitis. Symptoms include dyspnoea, chest pain, abdominal pain and nausea.

Anaphylaxis occurs when a patient who is pre-sensitised to an allergen producing IgE antibodies is re-exposed to the particular antigen. IgG antibodies to infused allergens can also cause severe reactions.

A few patients with severe IgA deficiency develop antibodies to IgA and may have severe anaphylaxis if exposed to IgA by transfusion. If the patient who has had a reaction has to have further transfusion, it is essential to seek advice from the blood bank as there is a real risk of a repeat reaction unless blood components are specially selected.

#### Less severe allergic reactions

Urticaria and/or itching within minutes of starting a transfusion are quite common, particularly with components including large volumes of plasma, e.g. platelet concentrates and FFP. Symptoms usually subside if the transfusion is slowed and antihistamine is given (e.g. chlorpheniramine 10 mg, by slow intravenous injection or intramuscular injection in patients who are not thrombocytopenic).

**Management:** The transfusion may be continued if there is no progression of symptoms after 30 minutes. Chlorpheniramine should be given before transfusion if the patient has previously experienced repeated allergic reactions. If signs and symptoms fail to respond to this, seek advice from haematologist. Saline-washed blood components should be considered: these are RBC's freed of plasma or serum by repeated centrifuging through fresh volumes of saline.

Handbook of Transfusion Medicine 4<sup>th</sup> Ed.

#### "Feeling dreadful"

#### Lessons learned

- No one did anything wrong in this case study
- Listen to the patient
- Observations may not change from baseline during a transfusion reaction
- Involve the lab
- Return the implicated unit
- No additional \*alloantibodies detected by IAT or enzyme techniques
- No antibodies were detected in an eluate prepared from the patients red cells
- The returned unit was found to be compatible
- Reportable to SHOT and MHRA (non-immunological haemolysis)

This case study has been included to demonstrate how patients can experience 'impending doom' as a consequence of transfusion. In this case, observations were stable but the patient felt 'dreadful' and that clinical staff acted correctly in aborting the transfusion, regardless of the lack of signs/symptoms of a transfusion reaction at that time.

#### Additional notes:

\*An antigen present only in some individuals (as of a particular blood group) of a species and capable of inducing the production of an alloantibody by individuals which lack it.

#### 'Heed advice from laboratory!'

Following group feedback, show slide 29 'SHOT Case Study'

SHOT 2009 reported 5 cases in which requests for repeat blood samples, made by haematology laboratory BMS, were ignored. In addition, there was one case in which a non-validated haematology result was viewed on the computer system and acted upon, while the lab were in the process of checking it for a clot following an erroneous result.

#### What went wrong?

Not repeating Hb sample as requested by lab.

#### Why?

There was no obvious clinical need for any of the red cell transfusions, following the first 2 units. There was no documentation of the rationale for the decision to transfuse.

None of the transfusions were challenged by the nurses administering them.

#### What should have happened?

Initial assessment correct, IV fluids and observe condition. Noted condition stable despite bleed.

Following further bleed and deterioration. Given 2 units prior to receiving a repeat sample result but understandable as the clinical picture indicated a severe bleed.

Following further <u>small bleed</u>, **still no repeat sample**, haemodynamically stable but **gave further 2 units when not indicated**. No rationale given for transfusion in medical notes.

Another 2 units given even though no FBC sample sent and patient stable. Again no rational given for transfusion.

When repeat FBC sent, it was not reviewed until 5 hours later and no action was taken despite obvious over transfusion.

#### **Consequences?**

#### Patient died of Myocardial infarction the following day.

This case highlights the difficulties that junior doctors may have in assessing the actual degree of bleeding/haemorrhage in a patient, which may be at variance with the history given by the patient or other staff. Clinical assessment of severity of bleeding is notoriously difficult and requires experience of similar situations and a calm approach. A degree of unfamiliarity with the situation, and possible anxiety over the signs may mean that a careful clinical examination and scrutiny of the laboratory results does not take place in a timely fashion.

#### <u>Summary</u>

- Inappropriate transfusion
- Inadequate documentation of decision making process
- Not following transfusion process, re repeat testing prior to proceeding.

Trainers Pack: Safe Transfusion Practice - FY1 PDP Programme V1.2 September 2010

#### 'Whose life is it?'

Following group feedback show slide 31 'Chronic Anaemia' depicting dangers of transfusing such patients.

SHOT 2009. Two cases reported where patients were referred for transfusion by GP's and where no senior physician or haematologist was involved in the decision. It seems wholly inappropriate for referrals to emergency department to be made, demanding in any circumstances, but especially so in cases of chronic iron deficiency anaemia.

#### What went wrong?

The patient was transfused despite her reluctance. The underlying cause of the anaemia needed to be addressed. The iron supplements in this situation was correct, provided the symptoms of anaemia were not severe.

#### Why?

No advice was sought from the consultant haematologists. Early involvement by a senior colleague may have been persuaded the GP rather than junior medical staff and nurses.

#### What should have happened?

Advice sought from senior colleague. Who were we treating, the GP or the patient!

Patient consent is a fundamental aspect of the health care process. If a competent patient wishes to refuse a transfusion it must be upheld. The clinician's responsibility is to ensure the patient is aware of the implications of their decision, not to overrule their decision. Once the clinician is convinced the patient has all the facts and the patient continues to refuse, then it must be upheld.

The crucial aspect in consent is ensuring the patient is competent to make the decision and it is informed consent. In this case, the patients wishes were not considered and the transfusion went ahead.

Appropriate and available alternative treatments must be explored before exposing the risks of transfusion to the patient.

#### **Consequences?**

There are financial implications for the treatment. The cost of the red cells, staff time, bed costs when compared to sending the patient home and the cost of iron tablets.

#### <u>Summary</u>

- Inappropriate transfusion
- Consent issue
- Referral failure
- Financial implications

#### Case Study 11

#### 'What's the problem?'

#### What went wrong?

Transfusion of multiple blood/components (18 units) in 2hrs 50 minutes leading to TACO, in a patient not actively bleeding.

#### Why?

Patient was not actively bleeding, blood/components should have been administered over a longer period of time with diuretic cover. Treatment of DIC should be guided by platelet count and coagulation tests (as in all cases for transfusion). The cornerstone of the management of DIC is the treatment of the underlying disease. Patients are more likely to die from the underlying disease than from thrombosis or bleeding.

#### Common causes of DIC:

Infections Malignancy – disseminated carcinoma or acute leukaemia Obstetric emergencies – septic abortion, abruption placenta Shock – surgical trauma, burns Severe haemolytic transfusion reaction Liver disease

#### What should have happened?

Difficult situation with a patient already severely ill. No question on blood/components prescribed, however, the <u>rate</u> at which they were transfused was not appropriate to the clinical situation.

#### **Consequences?**

#### Patient's condition deteriorated due to TACO

#### PEEP = positive end-expiratory pressure (PEEP)

In mechanical ventilation, a positive airway pressure maintained until the end of expiration. A PEEP higher than the critical closing pressure holds alveoli open until the end of expiration and can markedly improve the arterial  $Po_2$  in patients with a lowered functional residual capacity (FRC), as in acute respiratory failure.

Condition later improved, however, unfortunately patient died a few days later. The reaction was initially thought to be TRALI (due in part to CXR) and was reported as such. NHSBT were involved in the investigation (implications for donor if confirmed TRALI). **It was later re categorised as TACO.** 

#### Additional trainer notes:

#### FBC: before, at time of and after reaction

Date	Time	Hb	WBC	Platelets
17/2/	15.45	7.4	7.9	37
17/2/	20.15	8.6	7.7	117

18/2/	07.00	9.1	6.1	100

#### Coagulation profile before, at time of and after reaction

Date	Time	РТ	ΑΡΤΤ	Fibrinogen
17/2/	15.45	15.7	49.0	0.8
17/2/	20.15	11.7	34.5	1.9
18/2/	07.00	12.4	36.4	2.2

#### Reasons why transfusion associated circulatory overload felt unlikely

- 1. Measured CVP rose because PEEP rose
- 2. Lung compliance dropped (or lung stiffness increased)
- 3. Chest X-ray showed bilateral pulmonary infiltrates
- 4. Timing within 6 hours of transfusion if TACO, possibly quicker

#### • Any underlying risk factors for Acute Lung Injury e.g. sepsis

Sepsis: 4 x 2 pairs of blood cultures sent, in 6 of the 8 bottles grew gram+ coccus.

#### **Summary**

• Transfusion of large volumes needs to be managed carefully in a stable patient.

#### Additional notes:

#### **SHOT 2009**

#### **Pulmonary complications of transfusion**

There are a number of different physiological mechanisms through which patients may suffer pulmonary compromise following transfusion of blood components. The existing categories are transfusion-associated acute lung injury (TRALI), transfusion-associated circulatory overload (TACO), allergic and anaphylactic reactions causing bronchospasm, and transfusion-associated dyspnoea (TAD). There are always additional cases reported to SHOT undoubtedly affecting the respiratory system, that are likely to be transfusion-related, but which are very hard to categorise within the definitions used by SHOT, based on ISBT definitions. **14** Cases that otherwise broadly fit the criteria for pulmonary complications of transfusion (TRALI, TACO and TAD) are not currently reported to the EU but cannot be included because they occur after the 6-hour cut-off post transfusion. However, SHOT is striving towards capture of the true rate of transfusion are the most important considerations when defining a transfusion complication. Pulmonary complications of transfusion complication. Pulmonary complications of transfusion in particular TRALI and TACO, result in a high rate of major morbidity and mortality.

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The West Yorkshire Foundation School



Incorporating NHS organisations in: Airedale, Bradford,, Calderdale, Dewsbury, Harrogate, Huddersfield, Leeds, Pontefract & Wakefield

## Certificate of Attendance

This is to certify that

Dr .....

Attended

### 'Safe Transfusion Practice'

On.....

At.....

Signed on behalf of The Yorkshire & Humber Regional Transfusion Practitioner Group

.....