Chapter 24: Transfusion-Related Acute Lung Injury (TRALI)

Additional Tables – not included in the main 2012 report

Table 1: Patient and component details 2012

Case number	Sex/age	Diagnosis	Reason transfused	Transfused components				Implicated component	Interval between transfusion and symptoms
				RBC	Plt	FFP	Cryo/ other		
1	M/86	Bronchopneumonia, MRSA septicaemia	Pre central line insertion	0	1 pool	0	0	None	During (after 100mL)
2	M/56	New Hodgkin lymphoma	Thrombocytopenia	0	1 pool	0	0	BC contribution to pool	During
3	F/20	PV bleeding Hb 68 g/L	Symptomatic anaemia	4	0	0	0	RBCOA	30 minutes
4	M/3	Pilomyxoid astrocytoma	Chemo anaemia	1	0	0	0	None	During (after 140mL)
5	M//61	AML 14 x BC granulocytes	Neutropenic sepsis	0	0	0	0	BC granulocytes	During
6	F/69	End stage myeloma	Anaemia	2	0	0	0	None	During
7	F/24	ALL post allograft	Possible TTP	0	0	0	IVIg	Not testable	3 hours
8	M/31	Poisoning	Anaemia	1	0	0	0	RBCOA	4 hours
9	F/62	RA on methotrexate	Anaemia	2	0	0	0	None	3hours
10	F/27	Ruptured ectopic	Post-op anaemia	2	0	0	0	In progress	1 hour
11	F/29	Post partum haemorrhage	Acute blood loss	3	0	0	0	None	During

Table 2: Clinical and radiological features of cases reported as TRALI in 2012

TRALI case number	TRALI probability	Other risk factors	Symptoms/signs					
			Fever or rigors	Reduced blood pressure	Dyspnoea or tachypnoea	Signs of heart failure	Reduced pO2	Chest X ray
1	Unlikely	Pneumonia, septicaemia	NR	NR	Y	NR	NR	PM pulmonary oedema, extensive bronchopneumonia, histology gram pos cocci and bacilli with associated haemorrhage and oedema.
2	Probable	Sepsis	Y	Y	Y	N	Y	Bilateral pulmonary oedema
3	Probable	Overtransfused, ?sepsis	Y	N	Y	N	Y	CT angio extensive ground glass appearance, later in same day CXR There is bilateral mid and lower patchy consolidation in keeping with infection
4	Possible	Unwell with cough and cold before admission for transfusion	Y	N	Y	N	Y	extensive bilateral extensive ground glass opacification throughout both lungs
5	Highly likely	sepsis	Y	N	Y	N	Y	Pulmonary oedema
6	Unlikely	Ischaemic change on ECG after event. Treated for possible sepsis	Y	N	Y	Y	Y	Extensive air space shadowing bilaterally, this is perihilar. Likely to represent pulmonary oedema ARD would give similar appearance
7	Possible	Sepsis	NR	NR	Y	NR	Y	Bilateral white-out, no pre transfusion CXR
8	Probable	Multi organ failure	N	N	Y	Y	Y	Worsening of pulmonary infiltrates

9	Unlikely	Sepsis, ischaemic change on ECG	Y	N	Y	N	Y	Bilateral scattered patchy areas of air space opacification suggestive of infection. 2 days later generalised ground glass appearance bilaterally with some bronchial wall thickening, cardiac enlargement
10	Possible	Haemorrhage	N	Y	Y	N	Y	CTPA Extensive ground-glass opacity in the lungs highly suggestive of noncardiogenic pulmonary oedema=ARDS.
11	Unlikely	Haemorrhagic shock	N	Y	Y	N	Y	Bilateral infiltrates

Table 3: Treatment outcomes, investigation results and likelihood of case being TRALI 2012

	TREATMENT				TRALI INVESTIGATION RESULTS				
SHOT case number	**Treatment**	**ITU admission**	**Ventilation (number of days)**	**Outcome (imputability)**	**Donors**	**Patient**	**White Cell cross match**	**Reason given by reporter for suspecting TRALI**	**Likelihood of case being TRALI**
1	oxygen	N	N	Death (unrelated)	1 F buffy coat donor had non specific IgM granulocyte ab. All donors negative for HLA and HNA specific antibodies	N/A	ND	Lungs showed severe terminal oedema which may relate to sepsis and lung infection but possibility of TRALI cannot be excluded or definitely confirmed in the setting of co-existent infection *Note PM extensive bilateral bronchopneumonia with gram positive cocci and bacilli. MRSA septicaemia. Concluded death unrelated to TRALI*	Unlikely
2	Steroids, antihistamines	Y	N -CPAP	Full recovery	**1 F buffy coat donor had multiple HLA antibodies including concordant HLA class II antibodies anti-HLA-DR14 and –DQ5**	**Positive for HLA-DR14 and DQ5**	ND	Consultant couldn't rule it out	Probable

3	Antibiotics, prednisolone	N	N	Full recovery	**1 F donor multiple HLA class I and class II antibodies including anti-HLA-A2,-A24,-B60,-C9,-C10,-DR4,-DR13,-DQ6**	**Positive for HLA-A2,-A24,-B60,-C9,-C10,-DR4,-DR13,-DQ6.**	ND	Not provided-	Probable
4	Oxygen, antibiotics, antihistamines	N	N	Full recovery	Male donor negative for HLA and granulocyte antibodies	N/A	ND	No evidence of volume over load, only 10mlslKg of blood given	Possible
5	Furosemide, salbutamol, hydrocortisone	Y (already on ITU)	N - CPAP	Full recovery	**1 F donor anti-HNA-2 and 1 F donor with anti-HLA-A2**	**HNA-2 and HLA-A2 positive** **No HLA or granulocyte antibodies**	ND	Not reported	Highly likely
6	Oxygen, antibiotics, steroids	N	N	Full recovery	2 male donors negative for HLA and granulocyte antibodies	N/A	ND	No previous cardiac history, consultant cardiologist thought it was not cardiac	Unlikely
7	Steroids, antihistamines, Oxygen	Y	Y (7)	Full recovery	IVIg- not testable	N/A	N/A	There were no clinical features of fluid overload, temperature and CRP was normal. There were residual features of TTP	Possible
8	Oxygen increased	Y (already on ITU)	Y (duration not reported)	Full recovery	**1 F donor multiple HLA class I and class II antibodies including anti-HLA-A24,-B8, -DR4**	**Positive for HLA-A24,-B8, -DR4 and -DR17**		Probable TRALI as otherwise unexplained deterioration and subsequent resolution	Probable

					and -DR17				
9	Nebuliser, steroids, diuretics	N	N	Full recovery	2 female donors 1 had non concordant HLA-A30 and A31, other donor no HLA or granulocyte antibodies	Negative for HLA-A30 and -A31		Impression - pulmonary oedema with little evidence of volume overload so most likely non-cardiogenic	Unlikely
10	Steroids, salbutamol	N	N	Full recovery	2 donors investigation in progress	N/A		Young patient, previously well, negative fluid balance, no evidence of sepsis	Possible
11	diuretics	Y	Y (1)	Full recovery	No significant HLA or granulocyte antibodies.	N/A	Cross match done for 1 donor with indeterminate results, negative	Clinicians felt that the volume of fluid given to the patient was not excessive compared to the volume of blood the patient had lost and continued to lose. Diuretics did not help.	Unlikely

Transfusion-Related Acute Lung Injury (TRALI) - Previous Recommendations

Year first made	Action	Recommendation
2011	**Hospital Transfusion Teams (HTTs)**	If it has been concluded, following hospital case review, that a case reported to SHOT as transfusion related acute lung injury (TRALI) would be better categorised in an alternative category (e.g. transfusionassociated circulatory overload (TACO), transfusion-associated dyspnoea (TAD), acute transfusion reaction (ATR) please inform the SHOT office
2010	**UK Blood Services**	Robust systems must be put in place to prevent issue of female FFP or platelet pools suspended in female donor plasma
2010	**UK Blood Services**	A risk assessment should be conducted of screening existing female platelet apheresis donors for HLA and granulocyte antibodies, and for retesting for these antibodies after subsequent pregnancies
2010	**HTTs**	Transfusion-related respiratory events that occur later than the accepted 6-hour definition for TRALI should be reported to SHOT in another category (e.g. TAD).
2008	**UK Blood Services**	UK Blood Services that have not yet achieved 100% male FFP and plasma to platelet pools must make this a priority. Exchange of male FFP for previously issued female FFP should be undertaken whenever feasible.
2006	**UK Blood Services**	UK Blood Services should continue to investigate and apply methods to reduce the continuing risk of TRALI associated with apheresis donations, reducing the number of female donors on the panel, and testing those remaining for HLA antibodies. This year only 1 case involved an apheresis donor with a concordant antibody but this recommendation remains relevant.
2005	**HTTs**	Hospital staff should continue to be aware of TRALI and report possible cases to the local Blood Centre to facilitate investigation. Detailed clinical information is needed to allow accurate clinical assessment of these cases. Blood samples (clotted and EDTA) from affected patients should be sent promptly for laboratory investigation. Continued education of all relevant staff about this condition is encouraged.

2005	**Clinical users of blood and consultant haematologists with responsibility for transfusion**	Cases should be evaluated early by the consultant(s) involved and prompt discussion with the Blood Service is helpful. A team approach including the haematologist and chest physician and/or ITU consultant is recommended.
2005	**Blood Services, clinical users of blood and consultant haematologists with responsibility for transfusion**	Case 3 from the 2005 report emphasises the importance of avoiding transfusing whole blood