22 Cell Salvage and Autologous Transfusion (CS)

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Definition:

Any adverse event or reaction associated with autologous transfusion including intraoperative and postoperative cell salvage (washed or unwashed), acute normovolaemic haemodilution or pre-operative autologous donation.

Additional specific definitions for cell salvage incidents are as follows:

- **Adverse incidents due to operator error or machine failure where the event impacts on the care of the patient**
- **Non-availability of trained staff precluding the use of cell salvage or which has other impact on the patient**
- **Adverse intra-operative clinical incidents during the cell salvage process**
- **Pathological reactions to *reinfused* blood**

DATA SUMMARY
Total number of cases: 11

Implicated components		Mortality/morbidity	
Red cells	11	Deaths due to transfusion	0
FFP	0	Deaths probably/likely due to transfusion	0
Platelets	0	Deaths possibly due to transfusion	0
Cryoprecipitate	0	Major morbidity	0
Granulocytes	0	Potential for major morbidity (Anti-D or K only)	0
Anti-D Ig	0		
Multiple components	0		
Unknown	0		

Gender		Age		Emergency vs. routine and core hours vs. out of core hours		Where transfusion took place	
Male	6	≥18 years	11	Emergency	1	Emergency department	0
Female	5	16 years to <18 years	0	Urgent	0	Theatre	0
Not known	0	1 year to <16 years	0	Routine	9	ITU/NNU/HDU/Recovery	0
		>28 days to <1 year	0	Not known	1	Wards	0
		Birth to ≤28 days	0			Delivery Ward	0
		Not known	0	In core hours	8	Postnatal	0
				Out of core hours	2	Medical Assessment Unit	0
				Not known/Not applicable	1	Community	0
						Outpatient/day unit	0
						Hospice	0
						Antenatal Clinic	0
						Unknown	11

Twenty four cases were reviewed and 13 were withdrawn. One case was transferred from the Near Miss report category.

This year we have concentrated on adverse clinical incidents following reinfusion of salvaged blood.

Withdrawn cases

There were no adverse clinical outcomes in the 13 withdrawn cases. Reports in this category were as follows:

- 5 cases of operator error where 2 of these could have potentially caused patient harm if not recognised: use of Hartmann's solution to rinse swabs, collection of blood intraoperatively following the use of Fibrillar™, a topical cellulose-based haemostatic agent. Haemostats have the potential to cause clotting within the reservoir
- 3 cases where clots or particulate matter were observed in the reservoir prior to reinfusion
- 5 case reports classified as machine error. On review two of these could have been due to operator error

Specialty involved

Of the 11 cases that were reviewed the following specialties were involved:

- Orthopaedics 8
- Vascular surgery 1
- Obstetrics 1
- Not stated 1

One adverse event concerned acute normovolaemic haemodilution (ANH).The collected blood was stored in a blood refrigerator rather than kept with the patient. The benefits of ANH are not proven.

Adverse reactions n=5

There were five adverse reactions. Two occurred in postoperative reinfusion systems leading to minor morbidity. In both cases the patients experienced low-grade pyrexia and mild rigors. Three reactions occurred during intraoperative cell salvage, leading to minor morbidity. There was one case of hypotension, which occurred during reinfusion of cell salvage blood through a leucodepletion filter. The anticoagulant was acid-citrate-dextrose. A further hypotensive episode was noted without a leucodepletion filter, but the patient was on an angiotensin-converting enzyme (ACE) inhibitor. The third case is described below:

Case 1: Hypovolaemia in a young person

A patient with known posterior placenta praevia, with no previous uterine scar, was having an elective caesarian section. There was a 2000 mL blood loss and intraoperative cell salvage was used. 500 mL of cell salvage blood was ready for reinfusion at the end of the procedure. After 5 minutes of reinfusion via a leucodepletion filter, the patient complained of feeling unwell with nausea and retrosternal chest heaviness. On examination she had a rash across shoulders and a heart rate of 100 to 120 bpm. She remained normotensive. Reinfusion was stopped after approximately 50 mL. The patient felt well again within 5 minutes.

The explanation of this reaction is unclear, but it was temporally associated with the reinfusion of the cell saved blood. Cardiac ischaemia seems unlikely in a fit young woman who apart from a mild tachycardia seemed to be compensating well for a 2000 mL blood loss. The associated skin rash may suggest a form of allergic response but there was no documented hypotension.

This case has been included to remind clinicians to be vigilant for similar adverse reactions and to encourage reporting to SHOT if they occur.

Adverse events n=6

There were six reports in this category (one associated with ANH is described above). Two involved the use of inappropriate intravenous (IV) fluids. One fluid was sterile but non IV saline. In the other case Ringer's lactate was administered immediately following the reinfusion of salvaged red cells. Black particulate matter was found in the filter post reinfusion. (Ringer's lactate should not be administered simultaneously with blood through the same administration set because of the risk of coagulation). Another event was a reported malfunction with the intraoperative system where the staff were told not to reinfuse the blood. However, the salvaged red cells were reinfused and the patient had no adverse outcome.

There were two cases where reinfusion took place beyond the specified expiry time written on the label.

COMMENTARY

There are continued reports of hypotension following the reinfusion of red cells collected by cell salvage, but the relationship with the use of filters remains unclear.

Learning points

- Adequate knowledge and training is required for all involved in the use of both intra and postoperative cell salvage systems
- Staff need to know which solutions/surgical products can safely be used with intraoperative cell salvage

Recommendation

- All organisations should develop a robust system for reporting all adverse incidents/reactions during the use of autologous blood techniques, preferably reporting to the hospital transfusion committee and onward to SHOT

Action: Hospital Transfusion Committee, Hospital Transfusion Teams