# 8. ACUTE TRANSFUSION REACTIONS

**Definition**
Acute transfusion reactions were defined in this report as those occurring at any time up to 24 hours following a transfusion of blood or blood components excluding cases of acute reactions due to an incorrect component being transfused as these are covered in Chapter 7.

This category accounted for 14% of non-infectious hazards reported.

Thirty initial reports (28 new) were received and 26 completed questionnaires returned. Due to the change in reporting of cases by date when the initial report was received rather than the date of incident (for an explanation please refer to chapter 6) 2 cases reported in the 1996/97 Annual Report are also reported here. The data collated from the returned questionnaires are shown in Appendix 9.

This chapter highlights the main findings from the 26 completed questionnaires.

Overall there were 6 deaths in this group , 1 following FFP and 5 following platelets, but all deaths were from underlying causes and none were attributable to complications of transfusion.

| Sex (30 reports) | |
|---|---|
| Males | 17 |
| Females | 13 |

| Age | |
|---|---|
| Age range | 3 days - 92 years |
| Median age | 65 years |

| Components implicated | No. of cases |
|---|---|
| Red cells (RBC) | 13 |
| Fresh frozen plasma (FFP) | 8 |
| Platelets | 5 |

## 1. Reactions in which red cells were implicated

There were 13 cases and all survived without long term sequelae. Reactions could be broken down into 4 categories as follows:

| Reaction type | Number of cases |
|---|---|
| Haemolytic | 3 |
| Non-haemolytic febrile | 8 |
| Hypotensive | 1 |
| Anaphylaxis | 1 |

**Haemolytic reactions and their clinical sequelae**

There were 3 cases in this group as follows:

- A 77 year old female with known auto immune haemolytic anaemia, who suffered a febrile reaction and exacerbation of auto immune haemolysis during the transfusion.

- A 72 year old female with known cold haemagglutinin disease (CHAD), who suffered an exacerbation of haemolysis less that 2 hours after a transfusion of red cells filtered at the bedside. Complement activation as a result of fresh plasma transfusion or other mechanisms may exacerbate haemolysis in CHAD.
- A neonatal top-up transfusion of leucodepleted red cells was associated 8-24 hrs later with a rising bilirubin level and poor haemoglobin increment. No specific cause was found and the hospital queried whether the age of the red cells may have been implicated. British Committee for Standards in Haematology guidelines state red cells for small volume top-up transfusions may be used at any time throughout the approved shelf life[10].

**Non-haemolytic febrile transfusion reactions (NHFTR)**

SHOT does not specifically set out to gather data on uncomplicated NHFTRs as these generally are not classified as serious transfusion complications. However 8 reports fell into this category and all survived without sequelae. Reactions occurred during the transfusion in 4 cases, less than 2 hours after the end of transfusion in 2 cases and between 2 and 7 hours after in 2 cases. Following investigation, 4 patients were found to have leucocyte/HLA antibodies, in 2 patients no antibodies were found, and results were not available for the remaining 2 cases.

**Hypotension**

A 34 year old male bone marrow transplant donor suffered a hypotensive reaction during transfusion of autologous whole blood through a bedside leucodepletion filter. The reaction recurred after stopping and re-starting the transfusion. This case was referred to in the SHOT Annual Report 1996/97. Hypotensive reactions to platelets, associated with the use of negatively charged bedside filters and treatment with ACE (angiotensin converting enzyme) inhibitors as anti-hypertensive therapy is a recently recognised transfusion complication[11]. The patient reported here was not receiving treatment with ACE inhibitors. Recent reports of this condition have included patients receiving red cells, as in this case[12].

**Anaphylaxis**

An 86 year old female suffered hypotension, dyspnoea and fever during transfusion and was treated with adrenaline in addition to steroids and antihistamines. Investigation revealed antibodies to plasma proteins (anti Gm) and subsequent transfusion with washed red cells was well tolerated.

## 2. Reactions in which fresh frozen plasma (FFP) was implicated

**There were 8 reports in this group with one death from the underlying condition unrelated to the transfusion reaction. Reactions, which all occurred during the transfusion, could be broadly broken down into 3 categories:**

- Anaphylaxis/anaphylactoid
- Allergic (not anaphylaxis)
- IgA antibodies

**Anaphylaxis/anaphylactoid reactions**

There were 4 patients in this category and their reactions were characterised by the development of hypotension in association with a rash and/or pruritis with respiratory complications in 2 (dyspnoea in 1 patient and increasing ventilatory pressure in another, anaesthetised, patient). All cases were treated with steroids and antihistamines and 2 patients received adrenaline.

**Allergic reactions (not anaphylaxis)**

Three patients were deemed to have suffered allergic reactions. One patient with thrombotic thrombocytopenic purpura treated by plasma exchange developed a cough and restlessness and was diagnosed as having anaphylaxis. However, as there was no evidence of hypotension the authors considered this to be an allergic reaction, not anaphylaxis. A second patient developed a rash and pruritis. The third patient who received several units of FFP following an obstetric haemorrhage developed dyspnoea and swelling of her tongue.

All 3 patients were treated with steroids and antihistamines. In addition adrenaline and bronchodilators were given in the first case.

**IgA antibodies**

One patient developed fever and unspecified pain during FFP infusion and was found to be IgA deficient with antibodies to IgA. He was treated with steroids and antihistamines. He died from underlying pathology (bladder cancer).

Of the reactions to FFP only 3 were reported to the local Blood Centre although 6 were reported to the local Hospital Transfusion Committee. In general, investigations as to the causes of the reactions appeared lacking. It is concluded that such reactions could be better characterised and investigated since the symptoms encountered were in some cases severe, requiring treatment with adrenaline, a potentially hazardous therapy. Also it is conceivable that some of the respiratory reactions could have been a result of transfusion-related acute lung injury (see Chapter 10) but could not be attributed to this cause in the absence of appropriate investigations.

## 3. Reactions in which platelets were implicated

- There were 5 cases in this group, 3 of which occurred during the transfusion, one 2-7 hours after and one 24 hours after transfusion of platelets. All 5 patients died from underlying pathology. All cases were reported to the local Blood Centre and 4 were reported to the local Hospital Transfusion Committee.

- Results of investigations were generally lacking although in all but one case post-reaction blood samples had been taken.

- A 55 year old group A patient developed acute haemolysis 24 hours after receiving 2 units of group O apheresis platelets. Anti A was eluted from the red cells and was attributed to passive transfer. Although transfusion of platelets across the ABO barrier is permissible, BCSH guidelines state that if group O donors are used for group A, B or AB patients it is important to ensure that the donors do not have high titre anti A or anti B[13]. It is not known whether this guideline was applied in this case.

- A second patient suffered severe pruritis between 2 and 7 hours after transfusion of platelets through a bedside leucodepletion filter. The reaction was not investigated but loosely attributed to “cytokine

release". It was recommended that future platelet transfusions be washed or given through a neutrally-charged leucodepletion filter.

- The 3 reactions which occurred during transfusion of platelets could not be easily categorised. Two reactions were characterised by the development of chest pain. The first of these occurred in a 70 year old male with haematological malignancy who was given platelets via a bedside leucodepletion filter. Although no features of the previously described "platelet-filter interaction" [11] were seen, the future use of washed platelets or neutral-charge filters was recommended. The second patient, a 40 year old male also with haematological malignancy, in addition suffered lower limb pains, tachycardia, drowsiness and hypotension. The third reaction, in an acute surgical patient with disseminated intravascular coagulation, consisted of hypotension during the transfusion of unfiltered pooled platelets.

**Response times**

In general the medical officer informed of the reaction attended the patient promptly and took appropriate action. including contacting a haematologist where necessary.

**Observations**

Nursing observations showed quite wide variation, however every 15 minutes appeared to be the most popular interval (see Table 13)

**Table 13**

**Frequency of nursing observations**

| **Frequency of observations** | **Number of cases** |
|---|---|
| 5 minutes | 1 |
| 10 minutes | 1 |
| 15 minutes | 8 |
| 30 minutes | 2 |
| 60 minutes | 3 |
| Continuous (high dependency patients) | 4 |
| Nil | 2 |
| No information available | 5 |
| **Total reporting** | **26** |

**Reporting to Blood Centres and Hospital Transfusion Committees**

This was highly variable, as can be seen from the following table:

**Table 14**

**Reporting of reactions to local Blood Centre (BC) and Hospital Transfusion Committees (HTC)**

| **Reported to:** | **Number** |
|---|---|
| HTC only | 3 |
| BC only | 11 |
| HTC and BC | 9 |
| Neither | 3 |
| **Total** | **26** |

## Comments

- 8 reports of non-haemolytic febrile transfusion reaction, comprising the majority of reported reactions to red cells, were received. It was not the original intention of the SHOT scheme to seek data on reactions of this type which are not generally regarded as serious. However it is essential that clinicians feel able to report all reactions which they may consider serious.
- Hypotensive reactions have previously been described in patients who are being treated with angiotensin converting enzyme (ACE) inhibitors and who are transfused with platelets via a negatively-charged bedside leucodepletion filter. The reactions are attributed to activation of the kallikrein system and inability to break down bradykinin which is highly vaso-active[11]. Whilst the reactions described in the current report do not strictly fit this description, it is important that a mechanism exists to report all serious and unusual reactions. In this way, previously unrecognised complications of transfusion may be brought to light. This is particularly relevant given that from later this year all blood in the UK will be leucocyte depleted, and new unexpected symptoms might arise. This was seen in the USA, when a particular type of filter caused an unusual and severe iritis and visual impairment ('Red Eye syndrome') which came to light after sporadic reports were centrally collated by the Food and Drugs Administration.
- Reactions to FFP showed greater prominence in this report in comparison to 1997. These reactions, in common with some of those to platelets, were in general incompletely characterised and investigated.
- There was considerable variation in nursing observations. The forthcoming BCSH Guideline on blood handling will provide a recommended scheme (see Appendix 8).
- There continues to be variation in the investigation of acute transfusion reactions.

## Recommendations

- Clinicians should continue to report all serious and unusual reactions as only in this way will previously unrecognised complications of transfusion, and particularly of novel components, be brought to light.
- Reactions to FFP could be better characterised and investigated since the symptoms encountered may be severe, requiring treatment with adrenaline, a potentially hazardous therapy. Some respiratory reactions attributed to FFP could represent transfusion-related acute lung injury but can only be attributed to this cause if appropriately investigated.