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## Transfusion reactions

### TYPE – DIAGNOSIS – ACTION – TREATMENT

A transfusion reaction may be defined as “any potentially adverse sign or symptom which occurs after the start of any transfusion of blood or blood products”. It stands to reason therefore that in order to notice any adverse effect, the patient’s condition prior to, during and after the transfusion must be monitored.

Bearing in mind that “caution saves lives”, it is good medical practice to be suspicious and to take action fast. The steps to be taken if there is any sign that a reaction may be occurring are simple and apply in all instances.

- Stop the transfusion immediately.
- Keep the vein open with normal saline in a new drip set.
- Contact the transfusion service for advice.

Whilst the investigation of the transfusion reaction proceeds, the vein should be kept open with crystalloid solution which allows venous access for:

- i. Further transfusion therapy if required.
- ii. Suitable therapy to combat the effects of the reaction.

### 1 MONITORING

The basic monitoring of the patient prior to the initial transfusion and during subsequent transfusion should cover:

- i. Pulse.
- ii. Blood pressure.
- iii. Temperature
  
- iv. Respiration rate.
- v. General visual observation.
- vi. Verbal enquiry as to the patient’s well being.

Any abnormal symptoms existing at the start of transfusion should be noted e.g. dyspnoea, chills, oliguria, etc. Changes in intensity of these symptoms may also indicate the potential for a transfusion reaction and should be assessed clinically. In cases of severe haemorrhage the rate of transfusion precludes monitoring individual

units at specific intervals, and the effect of one unit may only be seen at the time of the transfusion of the second or third unit. These patients are however usually closely monitored for changes in their primary condition and transfusion reactions are readily detected. Extra care must be taken in the unconscious patient to monitor and react to changes in vital signs. Excessive oozing from the operative site or venous access points and unexplained hypotension may indicate that a haemolytic transfusion reaction is occurring.

**Table 20: Signs and symptoms that are highly suggestive of a serious transfusion reaction**

Chills/rigors	Fever/sweating
Tachycardia/Bradycardia	Dyspnoea
Hypertension	Hypotension
Urticaria	Chest or flank pain
Nausea/vomiting	Haemoglobinuria
Oliguria/Anuria	Agitation

## 2 INVESTIGATION

The investigation of a reaction is primarily to exclude severe or life threatening situations. The transfusion service has a specific set of instructions for investigating reactions and it is the legal responsibility of the clinician to assist in this undertaking:

- i. Send appropriate samples, clearly labelled – a minimum requirement will include:
  - Clotted blood sample.
  - EDTA tube.
  - Post transfusion urine sample – depending on the nature of the reaction.
- ii. Return the suspect unit/s and drip set to the nearest blood bank. If it is suspected that the reaction is due to bacterial contamination ensure that blood bank is informed so that cultures and gram stains are performed. Obtain blood for blood culture from the patient.
- iii. Complete the reaction report form specifying patient details, reason for transfusion, pre- and post transfusion signs and symptoms.

### 3 TYPES OF REACTIONS

The list of potential reactions is lengthy, and there are many different ways of classification. Reactions include those due to incompatibility, transmissible disease, bacterial contamination and storage lesions due to the age of the transfused blood products. However, for most practical purposes, the following are the most serious or the most frequently observed and are described fully.

**Table 21: Potentially life threatening reactions**

<b>ACUTE HAEMOLYTIC REACTIONS</b>	<b>SIGNS / SYMPTOMS</b>	<b>MANAGEMENT</b>
<p>Caused by exposure of patient to incompatible donor red cells (usually mismatched ABO blood)</p> <hr/> <p><b>NOTE:</b> In the case of an acute haemolytic reaction, the Transfusion Service's medical officer on call will be informed and will immediately communicate with the patient's physician.</p>	<p>Usually abrupt in onset and within 15-20 minutes after initiation of any red cell containing blood product</p> <p>Tachycardia, fever, flushing, restlessness, chills, low back pain, dyspnoea, chest pain, followed by hypotension, oliguria, shock and DIC</p> <p>Abnormal bleeding and hypotension may be the only signs in the unconscious patient</p> <p>Further signs: Haemoglobinuria/anaemia</p>	<ol style="list-style-type: none"><li>1. Stop the transfusion, change the transfusion set and filter. Keep the vein open with normal saline</li><li>2. Notify the blood bank for (a) clerical check i.e. patient/donor ID numbers (b) send unit/tubing to laboratory with the urine specimen, blood samples and reaction report</li><li>3. Monitor vital signs, including in some instances the pulmonary artery pressure or CVP. Measure urinary output; observe for abnormal bleeding, especially if the patient is in post operative stage</li><li>4. Maintain intravascular volume and urinary output with crystalloid/colloid solutions. Prevent/treat renal failure with furosemide ivi 120 mg (and mannitol 1 gram). Monitor patient closely</li><li>5. Consult Renal physician with a view to starting haemodialysis to reduce plasma haemoglobin and prevent acute renal failure</li><li>6. Consult Haematological/Renal Dept. for further assessment of coagulation profile and renal functions</li></ol>
<b>BACTERIAL CONTAMINATION</b>	<b>SIGNS/SYMPTOMS:</b>	<b>MANAGEMENT</b>
<p>Caused by any contaminated blood product</p>	<p>Usually rapid onset, about one hour post transfusion. Chills, fever, abdominal cramps, vomiting or diarrhoea. Renal failure, flushed dry skin, hypotension and shock</p>	<ol style="list-style-type: none"><li>1. Stop the transfusion. Change filter and tubing. Keep vein open with crystalloid or colloid solution</li><li>2. Notify blood bank, send blood samples, unit and tubing/filter to the blood bank for gram stain and culture</li><li>3. Monitor vital signs and administer broad spectrum antibiotics, vasopressors, steroids, fluids and electrolytes</li></ol>

**Table 21 continued: Potentially life threatening reactions**

### **ANAPHYLACTIC REACTIONS**

Severe, usually due to antibodies to IgA immunoglobulin or severe reactions to other plasma proteins

### **SIGNS/SYMPTOMS:**

Sudden onset, symptoms include dyspnoea, hypotension/shock, facial and/or glottal oedema plus explosive GI symptoms. May lead to cardiac arrest/death

### **MANAGEMENT**

1. Stop the transfusion. Keep vein open; maintain IV volume and BP with crystalloid or colloid solutions
2. Give adrenaline, dopamine, steroids and oxygen
3. Monitor vital signs

#### **Prevention:**

Patients may be IgA deficient and require assessment of immunoglobulin profile. Further therapy must be with washed red cells that are plasma free

### **TRANSFUSION RELATED ACUTE LUNG INJURY**

Severe, usually caused by Leucoagglutinins in the plasma of the donor.

### **SIGNS/SYMPTOMS:**

Dyspnoea, hypotension, Fever Bilateral pulmonary oedema usually occurring within 4 hours of a transfusion.

### **MANAGEMENT**

Should be initiated as soon as possible and consists of fluid support to maintain blood pressure and cardiac output. Ventilation support. Diuretics should not be used as they may have a deleterious effect.

### **DELAYED TRANSFUSION REACTION Extravascular Haemolytic Reaction**

Caused by exposure to incompatible red cells in the presence of an atypical IgG antibody such as anti Kell, anti Duffy etc. Severity variable from ranging from mild to severe

### **SIGNS/SYMPTOMS:**

Signs and symptoms may appear within hours in a severe reaction (often anti Kell) and is characterised by a drop in haemoglobin and Jaundice. In some cases there may be additional complications such as renal failure and DIC. However most cases are mild and are only noticed some 2 to 10 days after the transfusion with mild jaundice and anaemia. Often the "reaction" goes unnoticed.

### **MANAGEMENT**

The severe reactions should be managed with supportive measures appropriate to the patients condition. In cases with renal failure measures such as haemodialysis should be implemented and most cases resolve completely. If there is a bleeding diathesis then appropriate transfusion therapy should be given. In most cases the reaction is mild and no particular interventions are required.

### **TRANSFUSION ASSOCIATED GRAFT VS HOST DISEASE (TA GVHD)**

This extremely rare condition results from the Transfusion of lymphocytes that share an HLA haplotype with the recipient. Characteristically the donor lymphocytes are homozygous for a particular HLA haplotype whereas the recipient is a heterozygote. The condition is more likely to occur in situations where blood relatives of the patient are the donors and can be prevented by irradiation of the blood at 25-30 Gy. Leucodepletion is not considered to be adequate to prevent TAGVHD

### **SIGNS/SYMPTOMS:**

The reaction is often florid and occurs 10 to 14 days after the transfusion. The patient presents with severe Jaundice, a maculo papular rash, pancytopenia and diarrhoea

### **MANAGEMENT**

This condition carries an extremely high mortality rate. Therapy is directed at eliminating the clone of engrafted lymphocytes by chemotherapy. This should be done by a specialist oncology unit if possible.

### **POST TRANSFUSION PURPURA**

This rare condition results from recipient alloantibodies directed against donor platelet antigens. The antibodies are usually directed against HPA1a or HPA 5a and since most individuals have these antigens antibodies are rare. In most cases the recipient is female.

### **SIGNS/SYMPTOMS:**

This condition is characterised by a florid pancytopenia occurring some 9-10 days after transfusion. The recipients own platelets appear also to be destroyed in this reaction by unknown mechanisms

### **MANAGEMENT**

This potentially lethal reaction is treated ideally with Intravenous Gammaglobulin(2g/Kg over 2 to 5 days) Platelet support (if possible HPA compatible) may be necessary but this often requires high doses in the presence of appropriate immunosuppressive therapy (e.g. Steroids) In some cases plasma exchange may be successful

**Table 22: Less serious reactions**

FEBRILE	SIGNS/SYMPTOMS:	MANAGEMENT
<p><i>Cause:</i> Usually recipient leucocyte or platelet antibodies to transfused donor cells</p>	<p>Onset usually with 1-2 hours after start of transfusion. Headache, myalgia, malaise, fever, chills, tachycardia and hypertension. Commonly found in multiparous or multi-transfused patients</p>	<ol style="list-style-type: none"><li>1. Stop the transfusion. Keep vein open with crystalloid/colloid solution. Notify blood bank and send urine, post transfusion samples and pack to blood bank. Must be differentiated from early acute haemolytic transfusion reaction</li><li>2. Administer antipyretics</li><li>3. Further management. If repeated on further transfusion then transfuse with leucocyte depleted blood. If latter not available, then given antipyretics and filter red cell products through a 20-40 micron filter</li></ol>
ALLERGIC	SIGNS/SYMPTOMS:	MANAGEMENT
<p><i>Cause:</i> Allergens to plasma proteins</p>	<p>Usually mild. NO FEVER. Itching, hives, urticaria, erythema. Limited to skin only</p>	<ol style="list-style-type: none"><li>1 Stop the transfusion. Keep IV open. Notify blood bank and send post transfusion samples, urine and packs</li><li>2. Administer antihistamines. Commence transfusion with a new unit once blood bank has ascertained that this is not a haemolytic transfusion reaction</li></ol>