BCSH Guidelines for the Investigation and Management of Non-Haemolytic Transfusion Reactions
One possible definition

• An undesirable response or effect in a patient, temporally associated with the administration of blood or blood component (excluding cases due to incorrect component being transfused, haemolytic reactions, TRALI or those due to bacterial contamination of the component.)
Why do we need a guideline?

• Ensure focus is on the right aspects
  – recognition, initial assessment and management, and differential diagnosis
• Advice on treatment of symptoms
  – Is there any role for prophylaxis?
• Guidance on investigations
• Help standardise reporting
• Aid hospitals in production of protocols
**Symptoms/signs of acute transfusion reaction**
- Fever, chills, tachycardia, hypotension, collapse, rigors, flushing, urticaria, bone, muscle, chest and/or abdominal pain, shortness of breath, nausea, generally feeling unwell, respiratory distress.

**Stop the transfusion and call a doctor**
- Measure temperature, pulse, blood pressure, respiratory rate, O₂ saturation.
- Check the identity of the recipient with the details on the unit and compatibility label or tag.

**Febrile non-haemolytic transfusion reaction**
- If temperature rise less than 1.5°C, the observations are stable and the patient is otherwise well, give paracetamol.
- Restart infusion at a slower rate and observe more frequently.

**ABO incompatibility**
- Stop transfusion.
- Take down unit and giving set.
- Return intact to blood bank.
- Obtain crossmatch/FBC, coagulation screen, biochemistry, urinalysis.
- Monitor urine output.
- Give furosemide if urine output 30 mls in 30 minutes.
- Treat any DIC with appropriate blood components.
- Inform hospital transfusion department immediately.

**Haemolytic reaction/bacterial infection of unit**
- Stop transfusion.
- Take down unit and giving set.
- Return intact to blood bank along with all other used/unused units.
- Take blood cultures, repeat blood group/ABO/typing/RF, coagulation screen, biochemistry, urinalysis.
- Monitor urine output.
- Commence broad-spectrum antibiotics if suspected bacterial infection.
- Commence oxygen and fluid support.
- Seek haematological and intensive care advice.

**Fluid overload**
- Give oxygen and frusemide 40-60 mg iv.

**Suspected ABO incompatibility**
- Yes
- Yes
- Yes

**Severe allergic reaction**
- Bronchospasm, angio-oedema, abdominal pain, hypotension.
- Stop transfusion.
- Take down unit and giving set.
- Return intact to blood bank along with all other used/unused units.
- Give chlorpheniramine 10 mg slow iv.
- Commence O₂.
- Give salbutamol nebuliser.
- If severe hypotension, give adrenaline (0.5 ml of 1 in 1000 intramuscular).
- (“IV THORACIC ASSESSMENT LUNG”) - Saline wash future components (equivalent to 0.5 mg/m²).

**Other haemolytic reaction/bacterial contamination**
- Yes
- Yes
- Yes

**Acute dyspnoea/hypotension**
- Monitor blood gases.
- Perform CVP (pulmonary capillary pressure).

**TRALI**
- Clinical features of acute LVF.
- Tachypnoea.
- Oliguria.
- Severe respiratory failure and hypotension.
- Give 100% O₂.
- Treat as ARDS – ventilate if hypoxia indicates.
First Steps

• Focus on recognition, initial assessment and management, and differential diagnosis
  – Patient easily observable
  – Staff educated about features of adverse reactions
  – Possibility of other cause for symptoms
First Aid

• Stop transfusion
• Check details on bag and patient
• Check vital signs
  – Need to move patient?
  – Good IV access?
  – Need for oxygen, inotropes etc?
• Quickly consider other serious causes of symptoms
  – Underlying condition
  – Bacterial sepsis
  – Haemolytic reaction
  – TRALI
  – TACO
• Can you restart the transfusion?
  – Isolated pyrexia <1.5°C
Recognition

Initial management

Differential Diagnosis

Assessment

Classification

Reporting

Review

Stop Transfusion

Not a transfusion reaction

Clinical

Laboratory
Clinical findings

• Symptoms
  – Agitation
  – Pain in chest, loin or abdomen, IV site
  – general myalgia, headache
  – Rigors, chills, flushing
  – Nausea and vomiting
  – Dyspnoea, wheeze
  – Itch

• Signs
  – Skin changes
    • Urticaria, flushing, hives, rash
  – Temperature
    • May rise (≥1.5°C)
    • May fall
  – Blood pressure changes
    • May drop or be raised
  – Tachycardia
  – Increased respiratory rate
  – Reduced oxygen sats
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Why perform investigations?

• Exclude other adverse reactions where indicated
  – Cultures of bag and patient
    • Decide if need to escalate by sending bag to NBL
  – Red cell serology
  – Brain natriuretic peptide in case of TACO
  – CXR-TRALI and TACO

• Guide future blood component use
  – IgA level and antibodies
  – HLA type and antibodies

• Assist with classification
  – Mast cell tryptase

• Sample storage
What about HLA, HPA, granulocyte antibodies?
Diagnostics, Development and Research Directorate

The Investigation of Severe Non-haemolytic Febrile Transfusion Reactions
An Audit of Adherence to NBS Guidelines

Philip Robson, Geoff Lucas, Fran Green, Rita Bourn and Edwin Massey

Clinical Audit & Effectiveness 2008
Severe febrile non-haemolytic transfusion reaction

Bacterial Contamination

Yes
- Contact local blood centre for medical consultant advice
  - If bacterial contamination likely seek advice from national transfusion microbiology laboratory

No
- If temperature rises less than 1.5°C, the observations are stable and patient is otherwise well, give paracetamol. Re-start transfusion at slower rate and observe more frequently
  - Reaction persists or temperature rises more than 1.5°C
    - Yes
      - Contact local blood centre for medical consultant advice
      - Alter specification of component, i.e. plasma-reduced/washed
    - No
      - Reaction persists
        - Yes
          - Test for HLA, HNA, HPA antibodies
          - Positive
            - Provide better matched products
          - Negative
          - No
    - Nothing further
What about HLA, HPA, granulocyte antibodies?

- HLA antibodies are common, and not always of clinical relevance
- Audit shows HLA testing rarely influences choice of component—depends on clinical situation
- Before further testing, discuss with NBS consultant
- Trial of washed red blood cells or platelets in suspension medium
- If agree to test further, tests should be done sequentially, with HLA first
Specific treatment for ATRs—what works best?

• Treatment of “symptoms”
  – Role of paracetamol, antihistamine, steroids, salbutamol, adrenaline, (pethidine)
• What is the rationale behind treatment?
  – Available studies
• Prophylaxis
  – “In the absence of definitive evidence-based studies, premedications should not be encouraged” Tobian 2007
• Does treatment influence outcome?
• Any adverse effects?
## Classification

<table>
<thead>
<tr>
<th>SHOT</th>
<th>ISBT</th>
<th>AABB</th>
<th>Sanders et al</th>
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</table>
| • Isolated febrile  
• Minor allergic  
• Anaphylactic/ anaphylactoid/ severe allergic  
• Hypotension  
• Febrile with other symptoms/signs | • FNHTR  
• Allergic reactions, graded  
• Hypotensive reaction | • Fever and/or chill nonhemolytic  
• Urticarial  
• Anaphylactic | • Febrile asymptomatic  
• Allergic  
• Inflammatory  
• Mixed allergic and/or inflammatory  
• Hypotension |
Acute transfusion Reactions reported to SHOT

[Bar chart showing the number of acute transfusion reactions from 1996/97 to 2007, with a significant increase in the year 2001/02 (15 months)].

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What to report to SHOT

• Currently, reporting is variable
• In 2007:
  – ATR reports were contributed by 55/308 hospitals
  – 54 of the total of 114 cases (46%) were reported by nine transfusion teams, including several from small hospitals
• Need consensus as to type of reaction to report.
  – What about isolated febrile?
• Anaphylaxis or “hypersensitivity” needs to be reported to SABRE
Benefits of reporting

• Assist with understanding

• Identify risks
  – Components
  – Patient groups?

• Trends
  – Salvage techniques
  – (Bedside filtration)
  – Changes in processing
Recognition → Initial management → Differential Diagnosis → Assessment → Classification → Reporting → Review

Not a transfusion reaction → Stop Transfusion

Clinical → Laboratory
Hospital Review

- How well was incident managed?
- Was right diagnosis made?
- Was transfusion justified?
- Has incident been reported?
- What components should be used in the future?
- What lessons can be learned?
Thanks

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  – Derek Norfolk, Sue Knowles, Edwin Massey, Neil Smith, Angus Wells, Richard Haggas, Debbie Pinchon, Sandra Gray

• To the writing group for the audit of investigations of FNHTRs
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• To all who continue to submit reports to SHOT