North Bristol NHS Trust

NHS Blood and Transplant

Guideline on the investigation and management of acute transfusion reactions

Prepared by the BCSH Blood Transfusion Task Force

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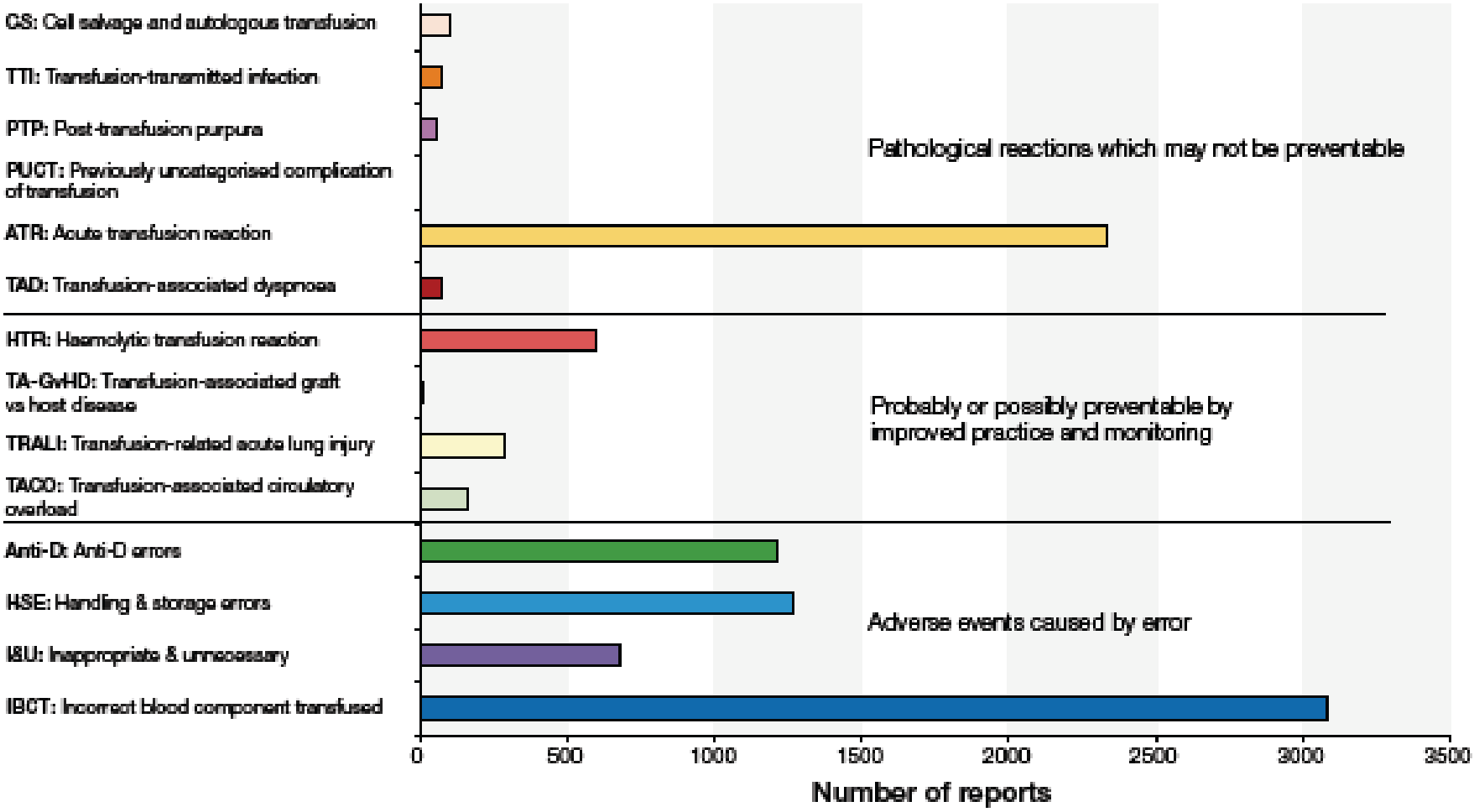
Cumulative data 1996/7-2011 for SHOT categories n=9925



Definition

Although acute transfusion reactions (ATR) are defined by the UK Serious Hazards of Transfusion group (SHOT) as those occurring within 24 hours of the administration of blood or blood components ***excluding*** cases of acute reactions due to transfusion of the incorrect component, haemolytic reactions, transfusion-related acute lung injury (TRALI), transfusion-related circulatory overload (TACO) and those due to bacterial contamination of the component (Davies, 2008), this guideline includes these additional complications in the initial recognition and management, and use of investigations sections. We have adopted the international definitions for ATR proposed by the International Haemovigilance Network (IHN) and the International Society for Blood transfusion (ISBT) (IHN, 2011). (see Appendix 3.

Initial recognition, management & investigation of *reaction*

Future management

- **Febrile non-haemolytic transfusion reactions (FNHTR)**
- **Allergic reactions**
- **Hypotensive reactions**

Recognition

- **Early identification**
  - direct observation in clinical area
  - local policy – to include reporting symptoms ≤24hrs
- **Initial assessment**
  - stop transfusion temporarily
  - airways, breathing and circulation
  - ID of patient, band and bag
  - visual inspection of bag

Management

Recommendation

Initial treatment of ATR is not dependent on classification but should be directed by symptoms and signs. Treatment of severe reactions should not be delayed until the results of investigations are available. (1C)

Recommendation

If a patient being transfused for haemorrhage develops hypotension, careful clinical risk assessment is required. If the hypotension is caused by haemorrhage, continuation of the transfusion may be life-saving. In contrast, if the blood component is considered the most likely cause of hypotension, the transfusion must be stopped or switched to an alternative component and appropriate management and investigation commenced. (1C)

Management- severe reactions

- **General support**
  - urgent medical attention/resuscitation team
  - iv saline
  - dyspnoea – airway patent, give O2, consider salbutamol
  - hypotensive – lie flat, recovery position if nausea
- **Shock + wheeze/stridor** +/- angioedema, urticaria
  - suggests anaphylaxis
  - im adrenaline 0.5ml of 1:1000
  - Supportive care – fluid, chlorphenamine, hydrocortisone
- **Shock without signs anaphylaxis or fluid overload**
  - ABO incompatibility – fluid resuscitation, renal and/or respiratory support, blood components for DIC with bleeding
  - Bacterial contamination – as above + blood cultures -patient & bag/s, broad spectrum iv antibiotics, withdraw associated components

Severe dyspnoea without shock

	TRALI	TACO
Patient characteristics	More frequently reported in haematology and surgical patients	May occur at any age, but characteristically age > 70
Type of component	Usually plasma or platelets	Any
Speed of onset	During or within 6 hours of transfusion, usually within 2 hours.	Defined as occurring within 6 hours of transfusion
Oxygen saturation	Reduced	Reduced
Blood pressure	Often reduced	Often raised
JVP	Normal	Raised
Temperature	Often raised	Usually unchanged
CXR findings	Often suggestive of pulmonary oedema with normal heart size: may be a "whiteout"	Cardiomegaly, signs of pulmonary oedema
Echo findings	Normal	Abnormal
Pulmonary wedge pressure	Low	Raised
Full blood count	May be fall in neutrophils and monocytes followed by neutrophil leucocytosis	No specific changes
Response to fluid load	Improves	Worsens
Response to diuretics	Worsens	Improves

Management – moderate reactions

- Seek medical advice
- **Moderate**

  differential diagnosis similar to severe ATR unless –

  – compatible with underlying condition

  – comparable, previously investigated, non-serious reaction

  – Reaction transient - recovery with symptomatic treatment

Recommendation

If a patient develops sustained febrile symptoms or signs of moderate severity (temperature ≥ 39°C OR a rise of ≥ 2°C from baseline AND/OR systemic symptoms such as chills, rigors, myalgia, nausea or vomiting), bacterial contamination or a haemolytic reaction should be considered. (1C)

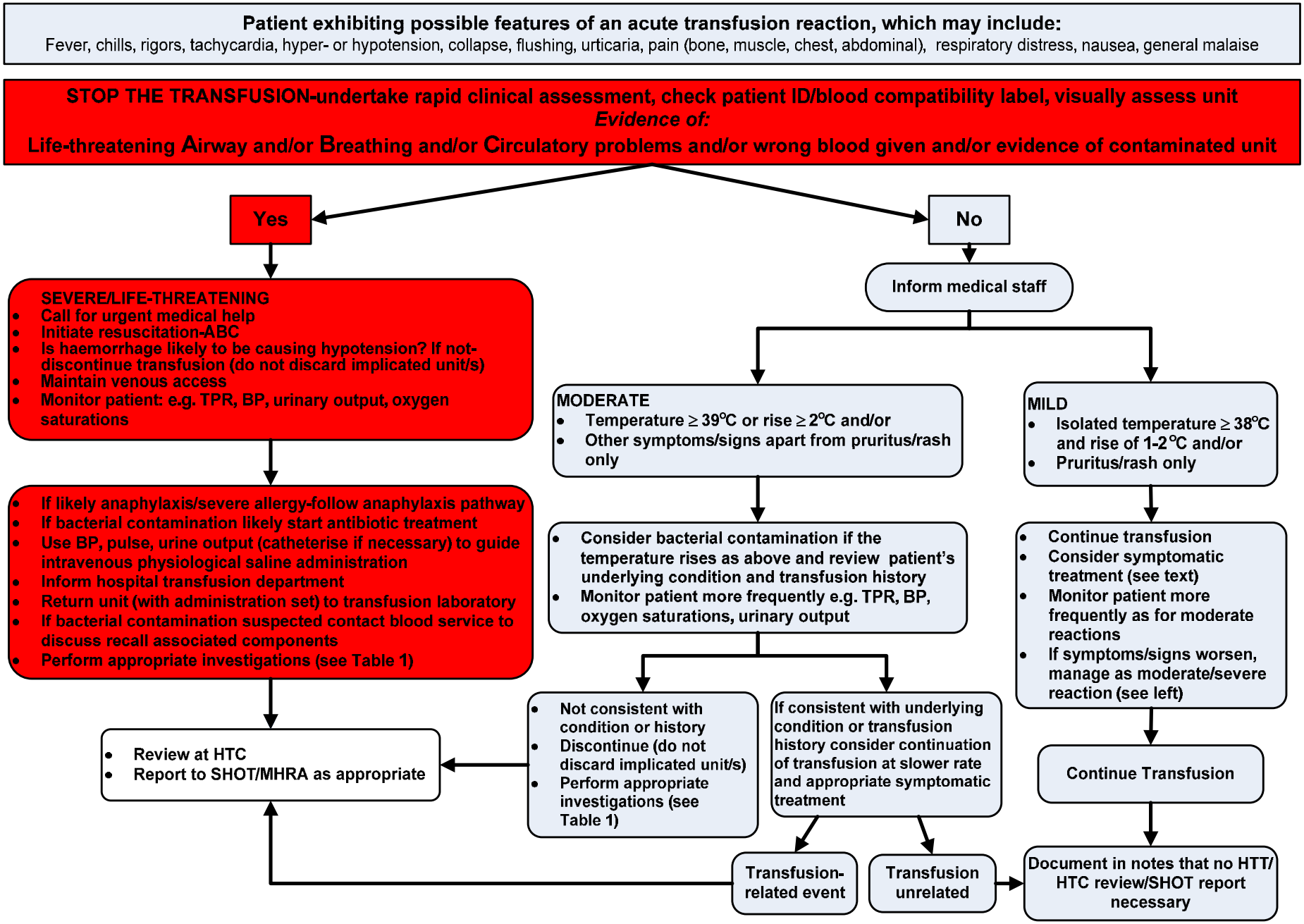
Management – mild reactions

Recommendation

For patients with mild reactions, such as pyrexia (temperature of ≥ 38°C AND rise of 1-2°C from baseline), and/or pruritus or rash but WITHOUT other features, the transfusion may be continued with appropriate treatment and direct observation. (2B)

Recommendation

Patients with mild isolated febrile reactions may be treated with oral paracetamol (500-1000 mg in adults). Patients with mild allergic reactions may be managed by slowing the transfusion and treatment with an antihistamine. (2C)


Patient exhibiting possible features of an acute transfusion reaction, which may include:
Fever, chills, rigors, tachycardia, hyper- or hypotension, collapse, flushing, urticaria, pain (bone, muscle, chest, abdominal), respiratory distress, nausea, general malaise
STOP THE TRANSFUSION-undertake rapid clinical assessment, check patient ID/blood compatibility label, visually assess unit
Evidence of:
Life-threatening Airway and/or Breathing and/or Circulatory problems and/or wrong blood given and/or evidence of contaminated unit
Yes
No
SEVERE/LIFE-THREATENING
Call for urgent medical help
Initiate resuscitation-ABC
Is haemorrhage likely to be causing hypotension? If not-discontinue transfusion (do not discard implicated unit/s)
Maintain venous access
Monitor patient: e.g. TPR, BP, urinary output, oxygen saturations
If likely anaphylaxis/severe allergy-follow anaphylaxis pathway
If bacterial contamination likely start antibiotic treatment
Use BP, pulse, urine output (catheterise if necessary) to guide intravenous physiological saline administration
Inform hospital transfusion department
Return unit (with administration set) to transfusion laboratory
If bacterial contamination suspected contact blood service to discuss recall associated components
Perform appropriate investigations (see Table 1)
Review at HTC
Report to SHOT/MHRA as appropriate
Inform medical staff
MODERATE
Temperature ≥ 39°C or rise ≥ 2°C and/or
Other symptoms/signs apart from pruritus/rash only
MILD
Isolated temperature ≥ 38°C and rise of 1-2°C and/or
Pruritus/rash only
Consider bacterial contamination if the temperature rises as above and review patient's underlying condition and transfusion history
Monitor patient more frequently e.g. TPR, BP, oxygen saturations, urinary output
Continue transfusion
Consider symptomatic treatment (see text)
Monitor patient more frequently as for moderate reactions
If symptoms/signs worsen, manage as moderate/severe reaction (see left)
Not consistent with condition or history
Discontinue (do not discard implicated unit/s)
Perform appropriate investigations (see Table 1)
If consistent with underlying condition or transfusion history consider continuation of transfusion at slower rate and appropriate symptomatic treatment
Continue Transfusion
Transfusion-related event
Transfusion unrelated
Document in notes that no HTT/HTC review/SHOT report necessary

Investigation of Moderate or Severe ATRs

Standard investigations – FBC, renal & LFT's, urine assessment

Symptoms	Investigations
Fever (≥2°C rise or ≥39 °C), and/or chills, rigors, myalgia, nausea or vomiting and/or loin pain	Standard investigations* Take samples for repeat compatibility testing, DAT, LDH and haptoglobin Take blood cultures from patient Coagulation screen Do not discard implicated unit **If febrile reaction sustained,** return unit to laboratory, repeat serological investigations (compatibility testing, antibody screen and DAT), haptoglobin and culture unit **If loin pain,** perform serological investigations as above
Mucosal swelling (angio-oedema)	Standard investigations* measure IgA level (EDTA sample)- if <0.07g/L , and no generalised hypogammaglobulinaemia, perform confirmatory test with sensitive method and check for IgA antibodies
Dyspnoea, wheeze, or features of anaphylaxis	Standard investigations* Check oxygen saturation or blood gases. Chest X-ray (mandatory if symptoms severe) If severe or moderate allergy suspected measure IgA level. If severe allergy/anaphylaxis suspected, consider measurement of serial mast cell tryptase (plain tube) (immediate, 3 h and 24 h)
Hypotension (isolated fall systolic of ≥30 mm resulting in level ≤80mm)	Investigate as for fever If allergy suspected measure IgA level. If severe allergy/anaphylaxis consider measurement of serial mast cell tryptase, as above

Management of repeat febrile or mild allergic reactions

Recommendation

For patients with recurrent febrile reactions, we recommend a trial of premedication with oral paracetamol given one hour before the reaction is anticipated (or non-steroidal anti-inflammatory drugs in patients with predominant chills or rigors - but an assessment of the risks of medication against the severity of reaction should be made in each case). Patients who continue to react should have a trial of washed blood components. (2C)

Recommendation

For recurrent mild allergic reactions, there is no evidence to support routine prophylaxis with antihistamines or steroids. Alternative causes such as allergy to drugs or latex gloves should be excluded. (2C)

Management of previous moderate or severe allergic reactions

- No IgA deficiency
  - washed red cells or platelets or pooled FFP
  - standard components, resuscitation available, consider antihistamine
- IgA deficiency (<0.07g/l)
  - Occasional patient with H/O allergic reaction to blood BUT ↑ group with deficiency (coeliac disease screen) & no transfusion or reaction
  - No good evidence to guide care if no previous transfusion reaction
  - Management
    - confirmed reaction – preference IgA deficient donors, then washed BUT life-saving transfusion should not be denied
    - no reaction consider – urgency, reason for test, allergic symptoms.

Recommendation

Patients who have experienced an anaphylactic reaction associated with transfusion must be discussed with an allergist or immunologist, in keeping with UKRC guidelines. (1C)

Classification of ATRs

	1 = Mild	2 = Moderate	3 = Severe
Febrile type reaction	A temperature ≥ 38 °C and a rise between 1and 2°C from pretransfusion values, but no other symptoms/signs	A rise in temperature of 2°C or more, or fever 39 °C or over and/or rigors, chills, other inflammatory symptoms/signs such as myalgia or nausea which precipitate stopping the transfusion	A rise in temperature of 2°C or more, and/or rigors, chills, or fever 39 °C or over, or other inflammatory symptoms/signs such as myalgia or nausea which precipitate stopping the transfusion, prompt medical review AND/OR directly results in, or prolongs hospital stay.
Allergic type reaction	Transient flushing, urticaria or rash	Wheeze or angioedema with or without flushing/urticaria/rash but without respiratory compromise or hypotension	Bronchospasm, stridor, angioedema or circulatory problems which require urgent medical intervention AND/OR, directly result in or prolong hospital stay, or **Anaphylaxis** (severe, life-threatening, generalised or systemic hypersensitivity reaction with rapidly developing airway and/or breathing and/or circulation problems, usually associated with skin and mucosal changes
Reaction with both allergic and febrile features	Features of mild febrile **and** mild allergic reactions	Features of both allergic and febrile reactions, at least one of which is in the moderate category.	Features of both allergic and febrile reactions, at least one of which is in the severe category.
Hypotensive reaction		Isolated fall in systolic blood pressure of 30 mm or more occurring during or within one hour of completing transfusion **and** a systolic blood pressure 80 mm. or less in the absence of allergic or anaphylactic symptoms. No/minor intervention required.	Hypotension, as previously defined, leading to shock (e.g., acidaemia, impairment of vital organ function) without allergic or inflammatory symptoms. Urgent medical intervention required.

Summary

- Initial management of ATR not dependant on classification but directed by symptoms & signs
- Often little evidence to direct practice
- Guideline written to provide practical advice
- Flow diagram designed to highlight decision making process and facilitate timely and appropriate treatment