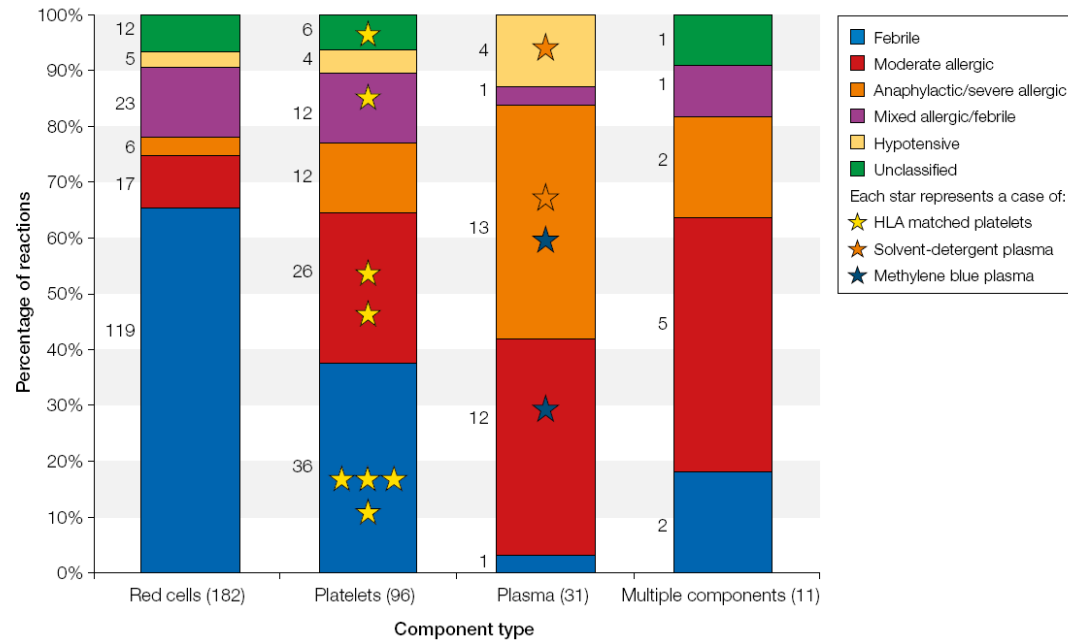


Managing patients who experience transfusion reactions





Have you ever managed patients who have experienced an adverse reaction to transfusion?

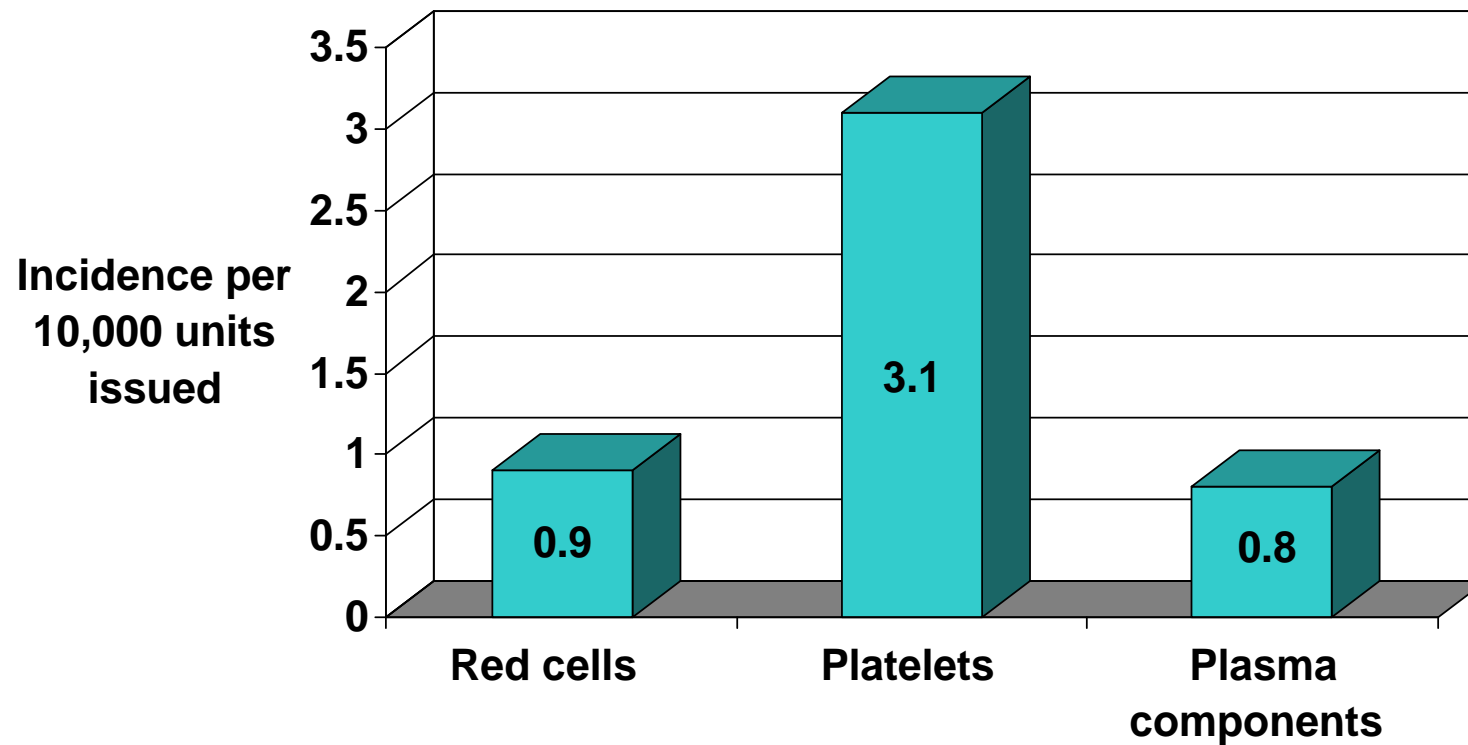
- A. Yes, often
- B. Yes, occasionally
- C. No



How common are ATRs in the UK?

- A. 1 in 30 units?
 - B. 1 in 100?
 - C. 1 in 1000?
 - D. 1 in 10,000?
- SHOT collects reports on moderate and severe ATRs.
 - Incidence varies according to component type
 - Are all cases reported?

SHOT ATR reports, 2013





Case History

- An patient with myelodysplasia has a 2 unit red cell transfusion as a day case
- History of complex red cell antibodies
- With the second unit, she complains of feeling unwell, with mild nausea and chills
- Her temperature rises from 37.8 to 39 C, BP and pulse both increase
- The transfusion is stopped and symptoms and signs improve within 30 minutes



What is this most likely to be?

- A. A haemolytic transfusion reaction due to complex red cell antibodies
- B. A haemolytic reaction due to incorrect component transfused
- C. A febrile transfusion reaction
- D. Bacterial contamination of the unit

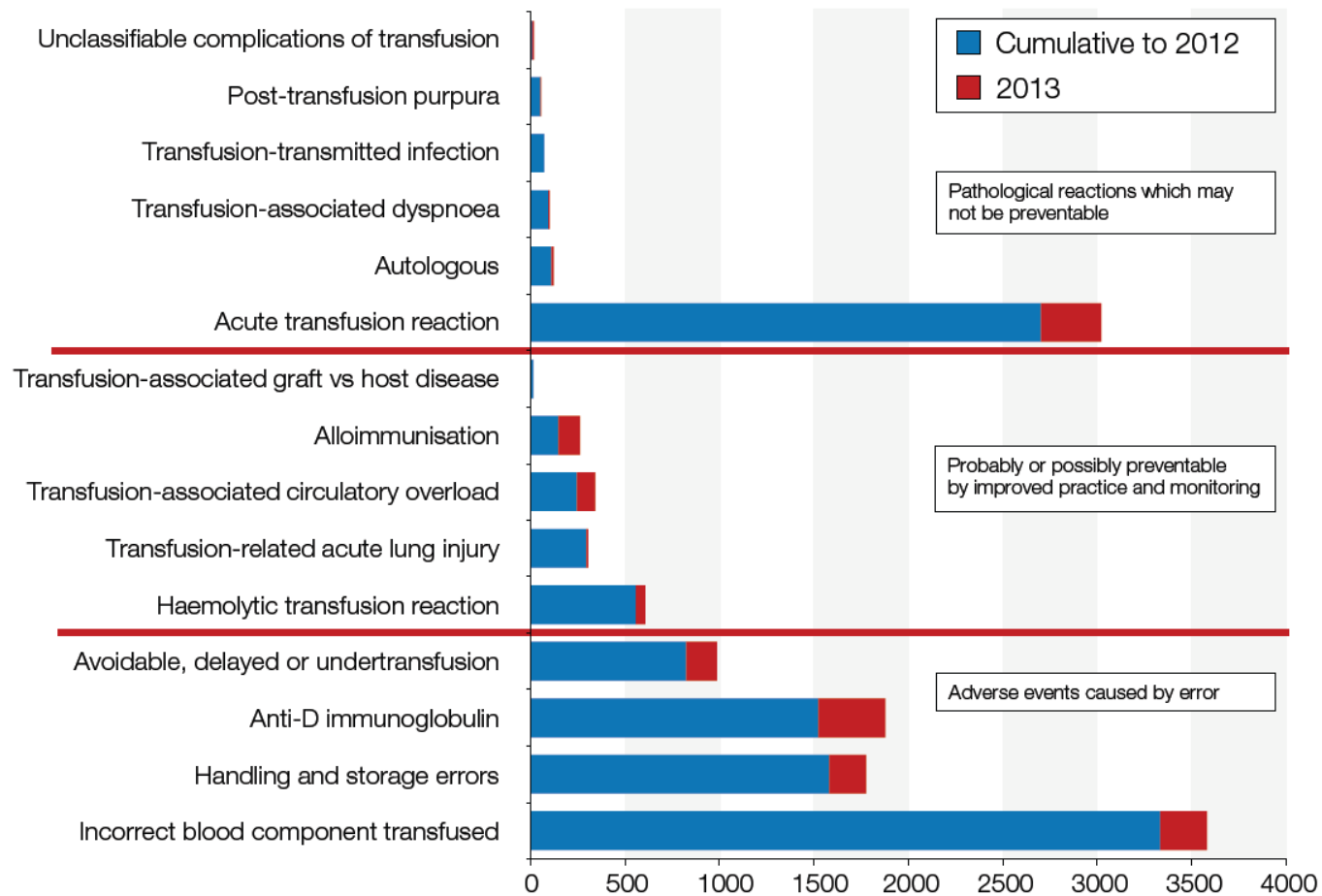



Figure 4.2:
Cumulative data for
SHOT categories
1996/7-2013
n=13141



So this is most likely to be a non-
haemolytic febrile reaction

BUT

Consider other causes




What clinical features suggest a patient is reacting adversely to a transfusion?

Symptoms

- Fever, chills, rigors
- Dyspnoea, stridor
- Itch, rash, swelling of lips
- Shock, collapse
- Nausea, general malaise
- Pain
- Feeling of impending doom

Signs

- Change in temperature
- Hypoxia
- Change in BP, pulse
- Raised venous pressure, pulmonary signs
- Reduced urine output, change in urine colour
- Change in conscious level



What clinical features suggest a patient is reacting adversely to a transfusion?

Symptoms

- Fever, chills, rigors
- **Dyspnoea, stridor**
- Itch, rash, swelling of lips
- **Shock, collapse**
- Nausea, general malaise
- **Pain**
- **Feeling of impending doom**

Signs

- Change in temperature
- **Hypoxia**
- Raised BP, pulse
- **Hypotension**
- **Raised venous pressure, pulmonary signs**
- **Reduced urine output, change in urine colour**
- **Change in conscious level**

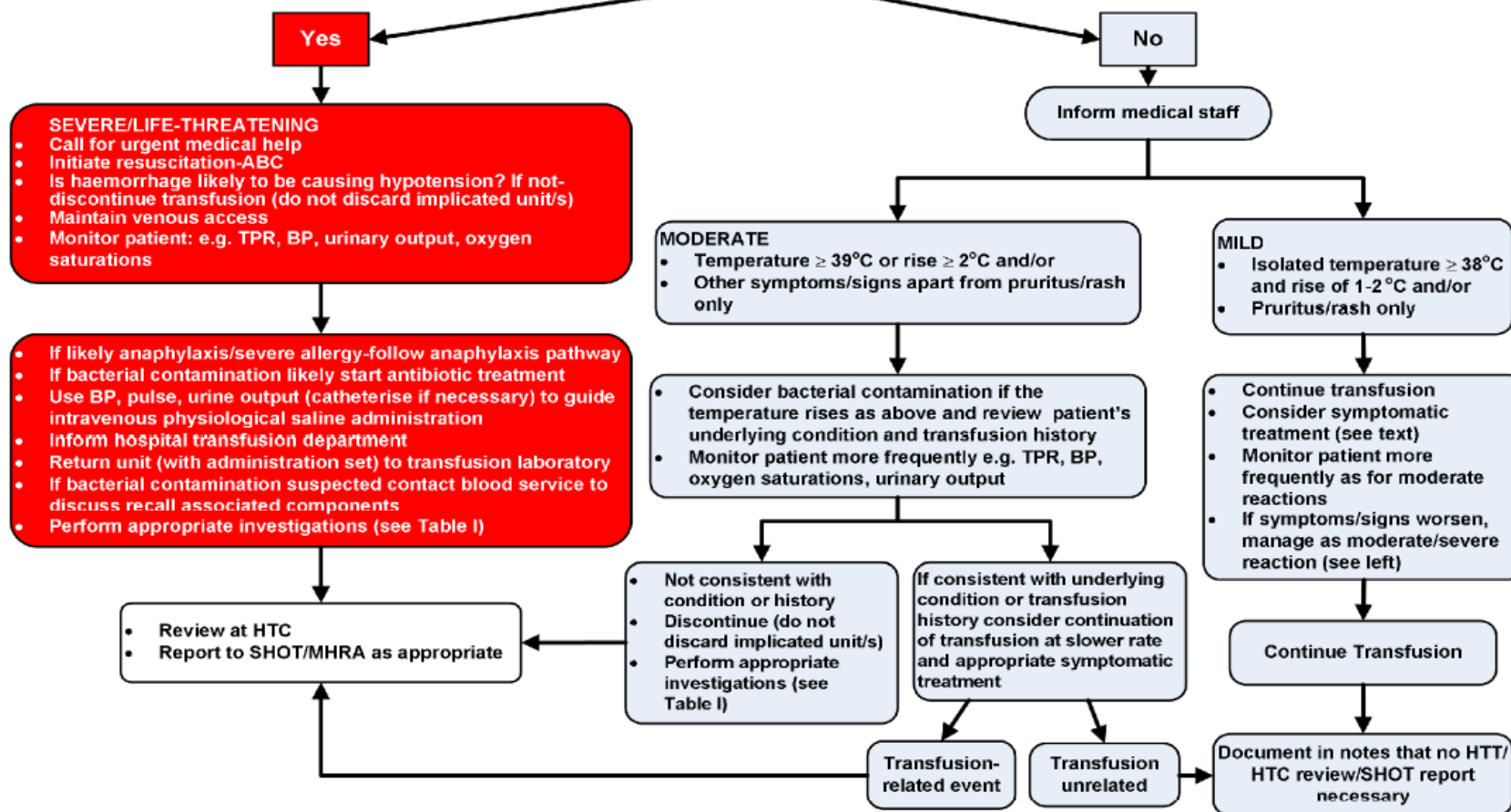
Patient exhibiting possible features of an acute transfusion reaction, which may include:

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





Immediate management

- Recognise patient experiencing adverse reaction
- Stop transfusion, keep line open, retain component
- Airway, Breathing, Circulation and Bag, Band, Blood
- How severe is this reaction?
 - Minor-e.g. itch. Should you restart the transfusion?
 - More serious. Do not restart the transfusion. Establish most likely cause



Fever



Fever, chills and rigors during or soon after transfusion: possible causes

- Febrile non-haemolytic transfusion reaction
- Acute haemolytic reaction
- Bacterial contamination
- Underlying condition



Case history from SHOT

- Patient with haematuria being transfused with platelets
- 20 minutes into transfusion:
- 2.2C rise in temperature, vomiting, tachycardia, chest pain
- Hypoxia
- Rigors prevented BP measurement
- Urine positive for haemoglobin but patient has haematuria



Which investigations would you do?

- A. Blood cultures of the patient, send the platelet unit for culture
- B. Repeat group and antibody screen the patient
- C. All the above
- D. None of the above



Culturing the platelet unit:

- A. Perform culture in hospital lab, refer to blood service if positive result
- B. Contact nearest blood service to discuss next steps
- C. Perform culture locally but at the same time inform blood service



Culturing the platelet unit:

- A. Perform culture in hospital lab, refer to blood service if positive result
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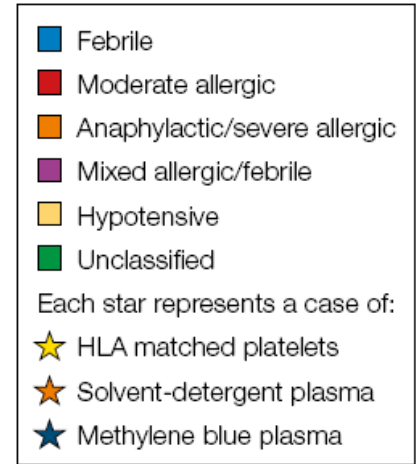
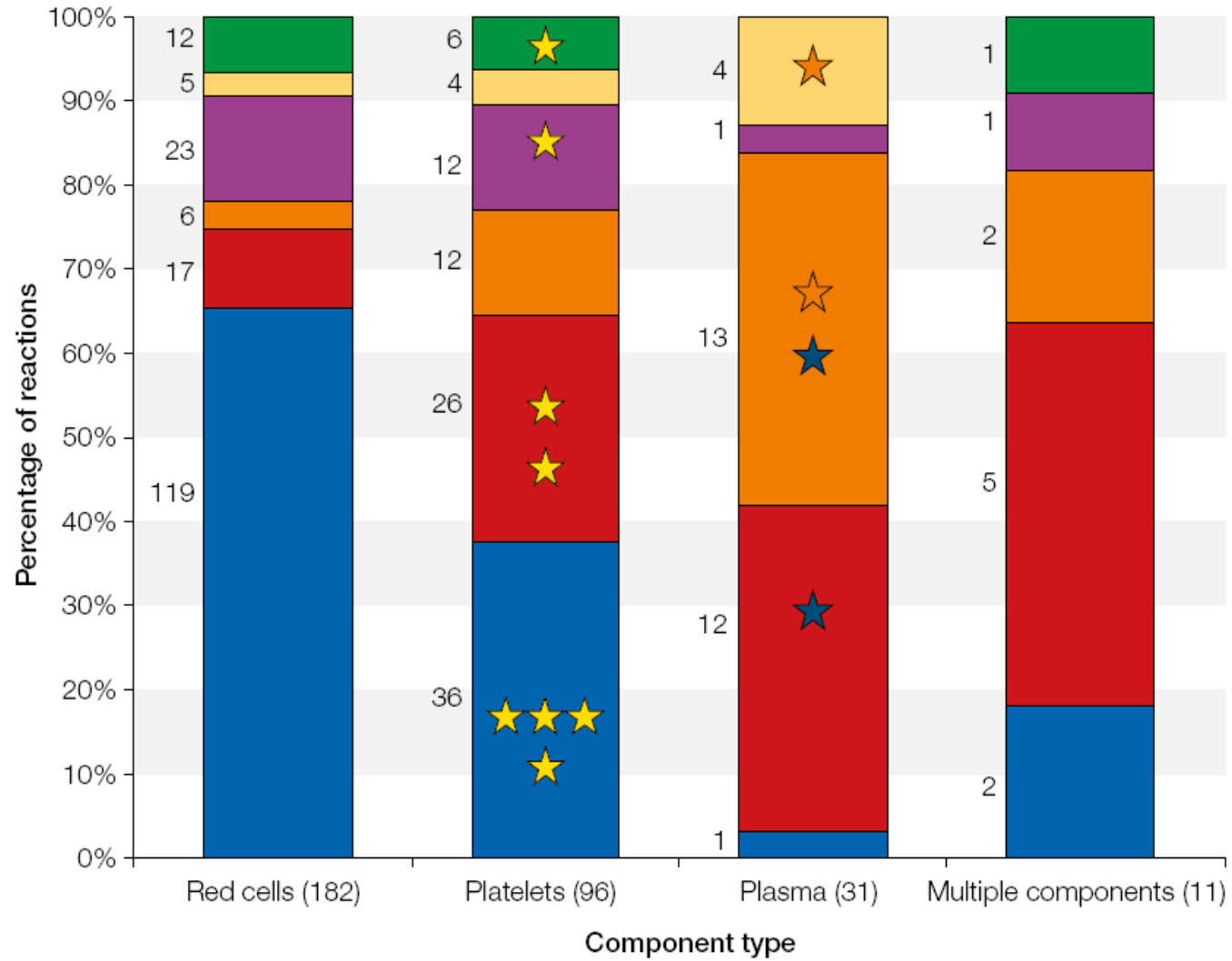
Learning point

- With a severe febrile reaction such as this, the most important step is to **contact the blood service**
- Any associated components can be withdrawn from issue
- Unit sampling and culture requires expertise



Learning points

- Febrile reactions are more commonly seen with red cell transfusions



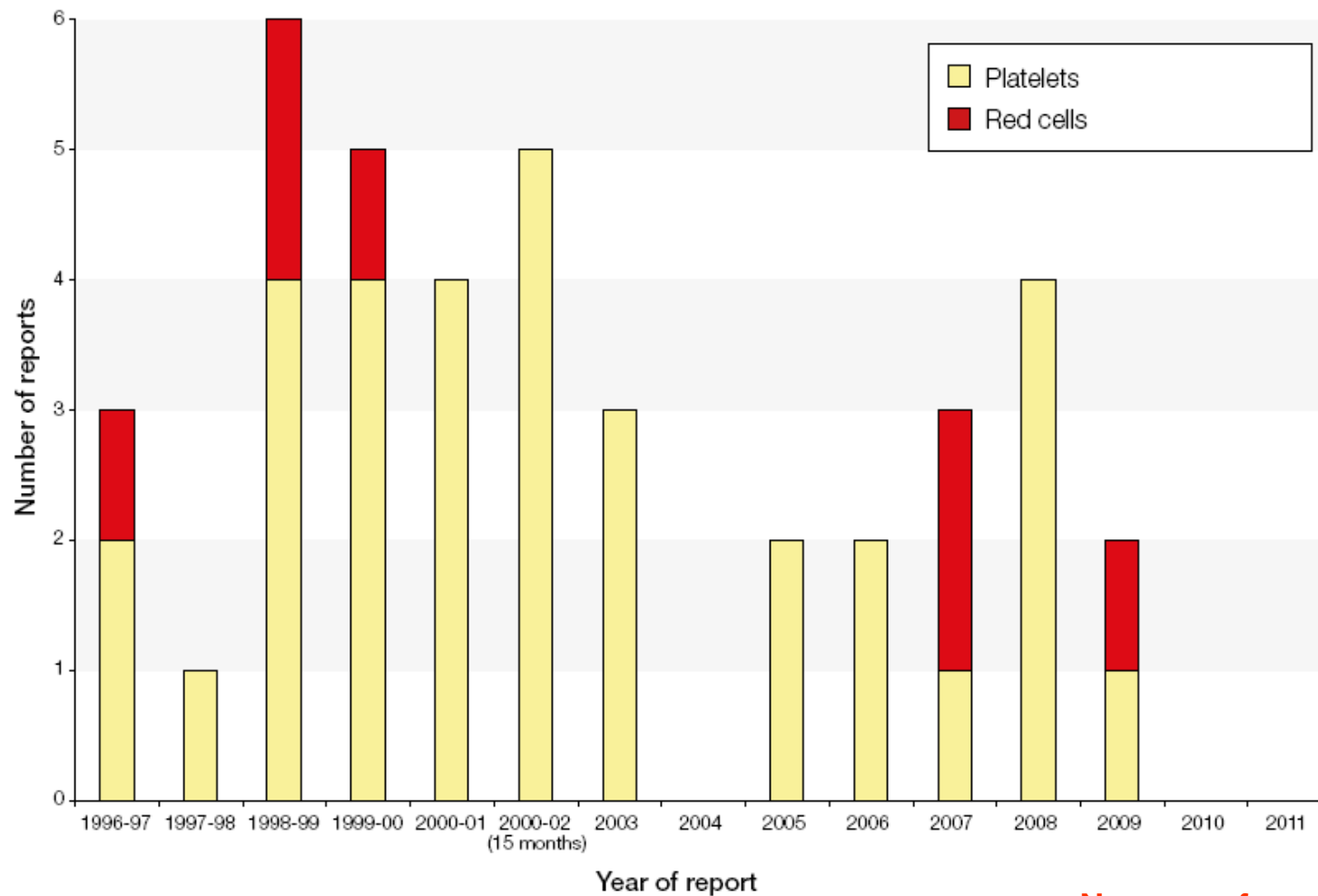


Learning points

- Febrile reactions are more commonly seen with red cell transfusions
- The incidence has been reduced since universal leucodepletion
- Less severe reactions can be treated with paracetamol or anti-inflammatory medication
- In severe reactions the most important differential diagnosis is transfusion-transmitted infection although very uncommon



Figure 20.1
Number of bacterial
TTI incidents, by
year of report
and type of
unit transfused
(Scotland included
from 10/1998)



**No cases from
2010-2014**



SHOT cases from 2008

- Patient with AML received a unit of apheresis platelets
- Developed chills, nausea and feeling of impending doom
- Recall: one other apheresis unit
 - Transfused to young male with ALL
 - Had also had symptoms



SHOT cases from 2008

- Patient with AML received a unit of apheresis platelets
- Developed chills, nausea and feeling of impending doom
- Recall: one other apheresis unit
 - Transfused to young male with ALL
 - Had moderate allergy-like symptoms
- Packs sent to NBL
- Both packs and donor showed Lancefield group G streptococcus



Fever 2: SHOT 2012

- Patient receiving red cell transfusion
- felt unwell with temperature rise of 2.8C to 39.4C
 - Rigors
 - Increased respiratory rate
 - Tachycardia
 - O₂ fell from 97% to 75%



What do you think this is?

- A. Severe febrile transfusion reaction
- B. Bacterial contamination
- C. Severe haemolytic reaction
- D. I don't know!



ABO incompatibility

- Post-transfusion group not interpretable
- DAT positive
- Patient was group O pos, unit was A pos
- Failure of two person bedside check
- Both staff already competency assessed



Respiratory symptoms



Case from SHOT 2013

- 67 year old female with myelodysplasia
- Transfused 3 units as a day case
- Felt ill on her journey home and returned immediately to A and E
- Had respiratory arrest



Most likely cause?

- A. Transfusion Related Acute Lung Injury (TRALI)
- B. Allergic reaction
- C. Transfusion Associated Circulatory Overload (TACO)
- D. Unrelated to transfusion

Outcome

- Chest X Ray appearances consistent with left ventricular failure
- Probable TACO
- Patient made a full recovery with treatment

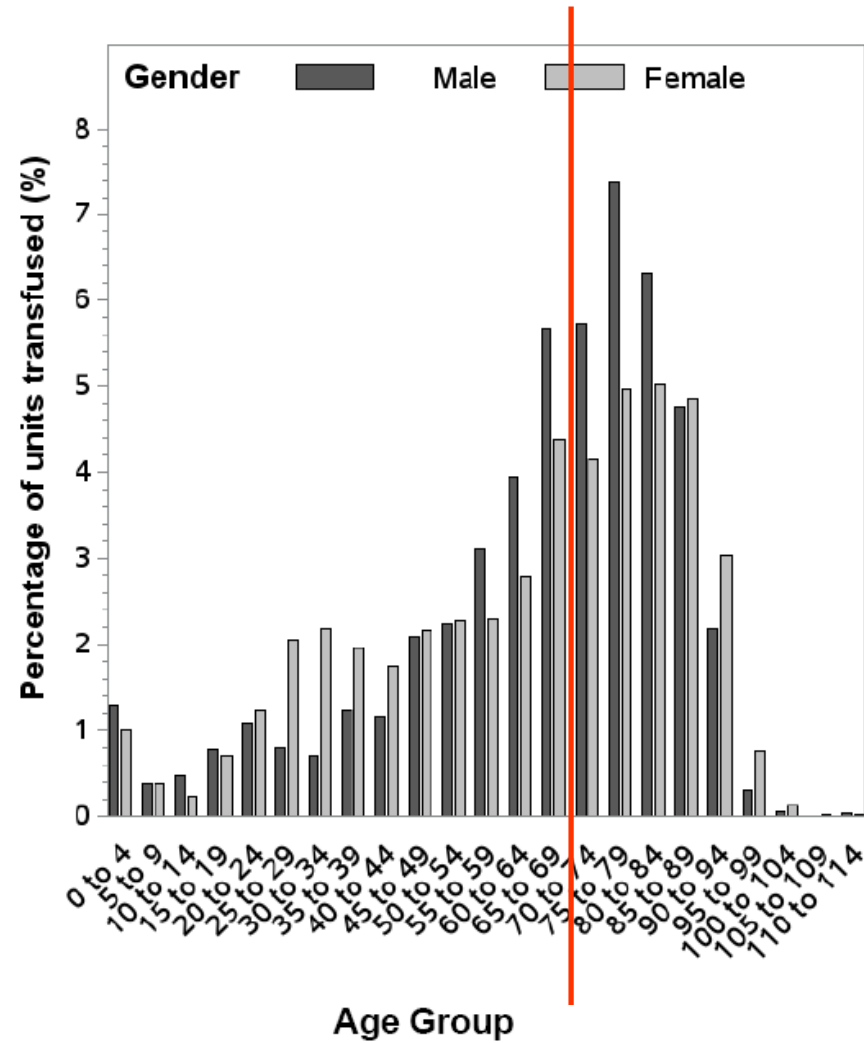




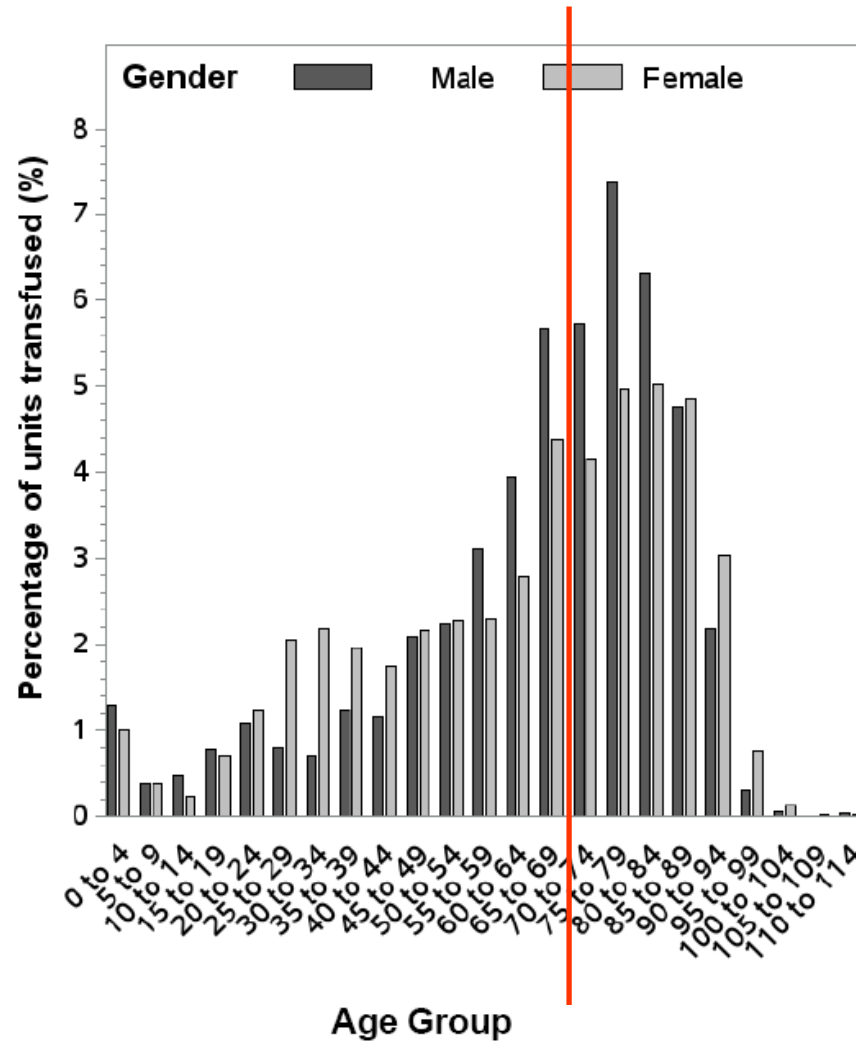
TACO

- Acute respiratory distress, tachycardia, hypertension, acute or worsening pulmonary oedema, evidence of positive fluid balance
 - At least 4 of the above features
 - Occurring within 6 hours of transfusion
- Tends to be seen in over 70s
- Almost certainly under-reported
 - Recent series of 8/247 transfusions in this age group (3%) Bartholomew and Watson, 2014

Age and gender distribution: national figures



Age and gender distribution: national figures



3% of all those to the right of the line!!



Respiratory symptoms 2

- Teenage boy with history of liver disease transfused with female apheresis platelets for an elective surgical procedure
- Developed hypoxia, hypotension and pyrexia within 30 minutes of transfusion. Hb increased from 8g/dl before procedure to 18 after
- Required cardio-respiratory support on ITU
- When ET tube inserted, developed fountain like pulmonary oedema



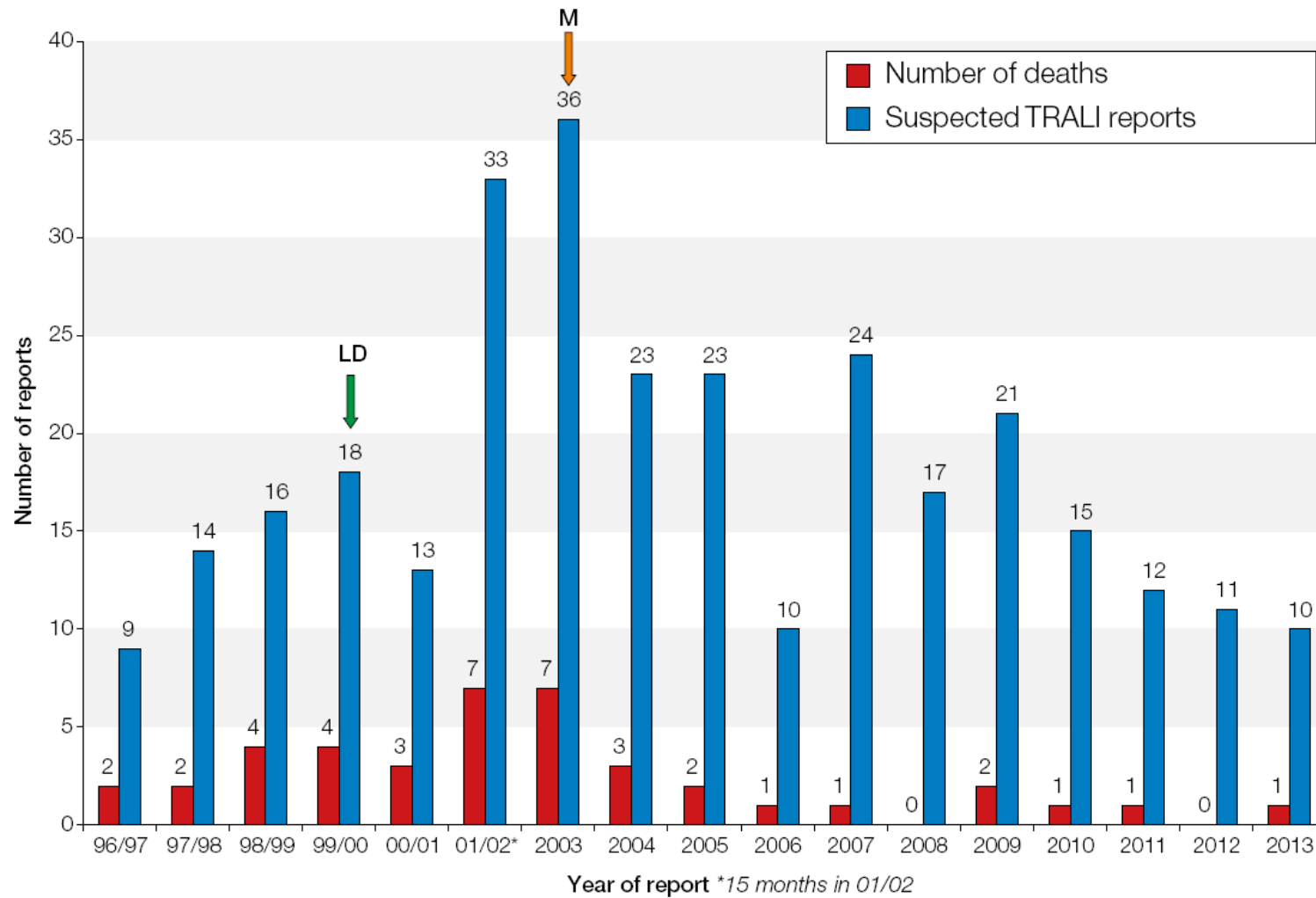
What is the most likely diagnosis?

- A. TACO (Transfusion Associated Circulatory Overload)
- B. Chest infection
- C. Acute myocardial infarction
- D. TRALI (Transfusion-Related Acute Lung Injury)



TRALI

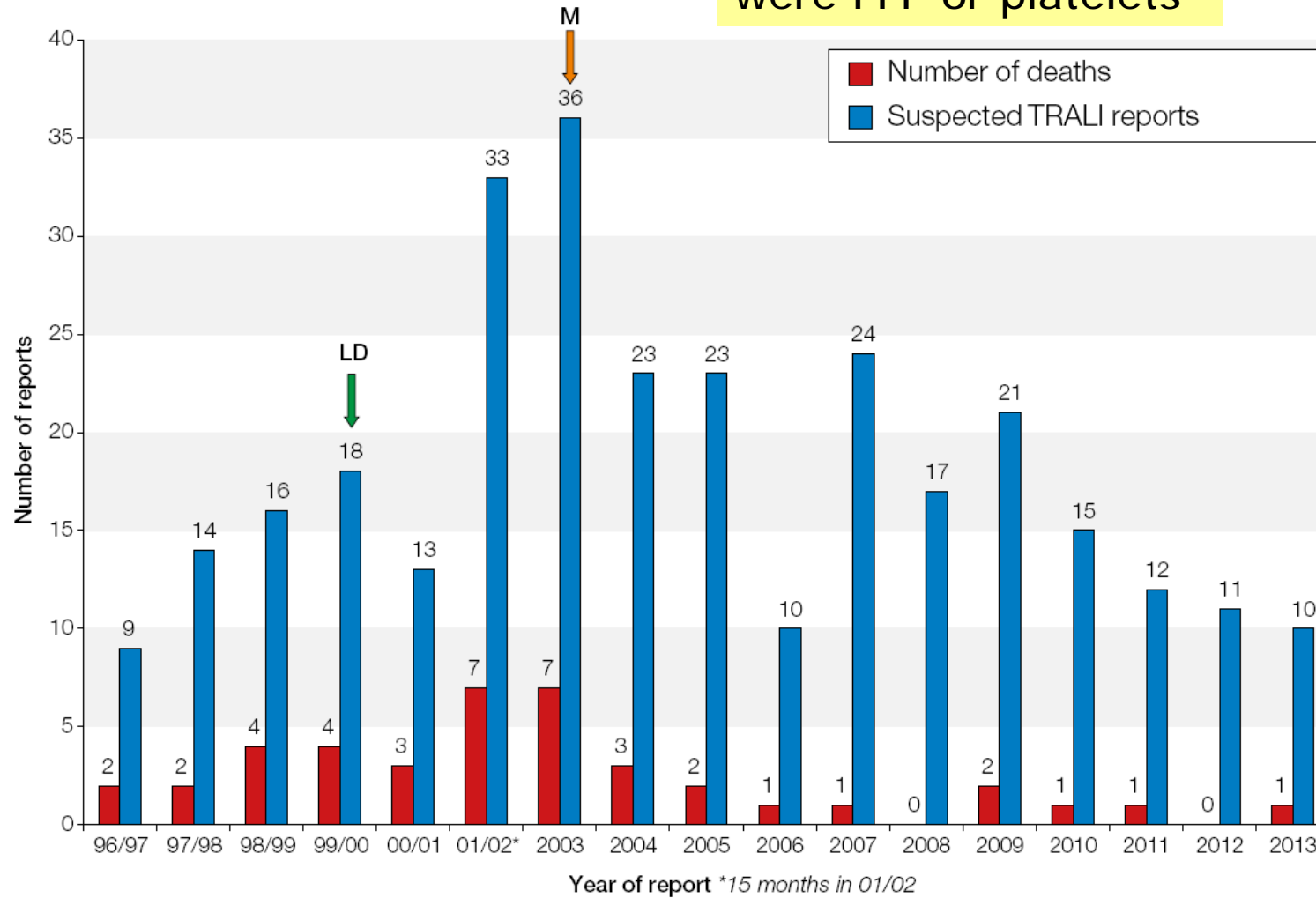
- Serious complication of transfusion, almost always with plasma rich components
- Donor has antibody to recipient leucocytes
 - HLA or HNA
- Reduced incidence
 - Universal leucodepletion
 - Male donors for FFP and the plasma used to resuspend platelet pools
 - Female apheresis donors screened for HLA and HNA antibodies
- Dyspnoea, hypoxia (pyrexia) usually within 6 hours
- Commoner in certain groups of patients-"two-hit" hypothesis



LD marks the date when universal leucodepletion was introduced (during 1999). M marks the date (from September 2003) when National Health Service Blood and Transplant (NHSBT) introduced use of male donor plasma only for FFP and preferential use of male plasma for suspending pooled platelets. Hospital stocks of female FFP were not recalled.



9 cases in 2014-none were FFP or platelets



LD marks the date when universal leucodepletion was introduced (during 1999). M marks the date (from September 2003) when National Health Service Blood and Transplant (NHSBT) introduced use of male donor plasma only for FFP and preferential use of male plasma for suspending pooled platelets. Hospital stocks of female FFP were not recalled.

Features of TACO and TRALI

	TRALI	TACO
Type of component	Usually plasma or platelets	Any
BP	Often reduced	Often raised
Temperature	Often raised	Normal
Echo	Normal	Abnormal
Diuretics	Worsen	Improve
Fluid loading	Improves	Worsens



Respiratory symptoms 2



Case from SHOT 2013

- Patient with PPH received a unit of FFP
- Previously, 3 units red cells and 1 FFP transfused without problems
- 8 minutes into transfusion, she began to cough and had swollen eyes, lips and throat
- Bronchospasm
- Oxygen saturation dropped
- Blood pressure unrecordable and briefly lost consciousness
- Responded well to treatment



What was the reaction likely to be?

A. TRALI

B. TACO

C. Moderate allergic reaction

D. Anaphylaxis



What was the reaction likely to be?

A. TRALI

B. TACO

C. Moderate allergic reaction

D. Anaphylaxis



What is the immediate management?

- A. Call the haematologist
- B. Hydrocortisone and antihistamine
- C. Antihistamine only
- D. Adrenaline



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- A. Call the haematologist
- B. Hydrocortisone and antihistamine
- C. Antihistamine only
- D. **Adrenaline**



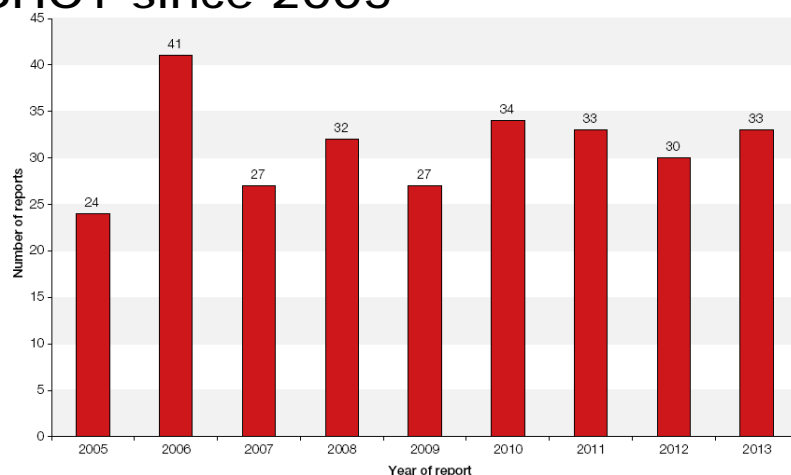
Learning point

- Anaphylaxis is characterised by
 - rash and/or mucous membrane involvement
 - followed rapidly by respiratory and/or circulatory distress
- A medical emergency
- Treatment is adrenaline: IM unless you are an anaesthetist or intensivist

Learning point

- Although anaphylaxis is rare, patients should only be transfused when and where there is the ability to recognise and manage a reaction

Cases of anaphylaxis reported to SHOT since 2005



Management of patients who have reacted before

- A female patient with bone marrow failure and epistaxis has regular (appropriate) platelet transfusions
- With last two transfusions, she complained of itch
- Now has urticaria





How can you avoid future reactions?

- A. Give HLA matched platelets
- B. Give antihistamine premed
- C. Give washed platelets
- D. Give apheresis platelets rather than pooled



How can you avoid future reactions?

- A. Give HLA matched platelets
- B. Give antihistamine premed
- c. Give washed platelets
- D. Give apheresis platelets rather than pooled



Learning points

- 25% of women, and at least 10% of multitransfused male patients have HLA antibodies
- No evidence that reactions are reduced with HLA matched platelets
- Washed platelets do reduce reactions
- IV Hydrocortisone takes 8 hours to act!!
- Little evidence for antihistamine but if washed platelets do not work, worth trying
- No reduction in ATRs with apheresis platelets



And finally, reporting

Internal

External to SHOT and SABRE



Internal reporting

- How well was the incident managed?
- Appropriately documented?
- Review investigations
- Is there a management plan for future transfusions in this patient?
- Was the transfusion appropriate?
- Does the incident need to be reported externally?



External reporting: the benefits of SHOT reporting are:

- Learn about unexpected or undesirable effects from transfusion
- Identifying trends in reactions and events, including effects of new components
- Identifying areas for improvement
- Informing transfusion policy



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A new component in 2015:
plasma reduced platelets