Transfusion reactions in the elderly
What do we mean by “transfusion reaction”?

- Febrile and allergic reactions?
- All adverse reactions to transfusion?
Cases reviewed in 2011 (excluding near miss and instances where the patient received a correct component despite errors having occurred – RBRP)
n=1815

- HSE: 325 (17.9%)
- I&U: 149 (8.2%)
- Anti-D: 249 (13.7%)
- IBCT: 247 (13.6%)
- PTP: 2 (0.1%)
- CS: 42 (2.3%)
- PUCT: 2 (0.1%)
- TAD: 35 (1.9%)
- TACO: 71 (3.9%)
- TRALI: 12 (0.7%)
- HTR: 94 (5.2%)
- ATR: 587 (32.3%)
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

SEVERE/LIFE THREATENING
- Call for urgent medical help
- Initiate resuscitation ABC
- Is hemorrhage likely to be causing hypotension? If not, discontinue transfusion (do not discard implicated units)
- 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 I)

Review at HTC
- Report to SHOT/MHRA as appropriate

MILD
- Isolated temperature ≥ 38°C and rise of ≥ 1°C and/or
- Pruritus/rash only

- 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)

If consistent with underlying condition or transfusion history manage as for moderate/severe reaction (see left)

If not consistent with condition or history
- Discontinue (do not discard implicated unit/s)
- Perform appropriate investigations (see Table I)

Transfusion-related event

If consistent with underlying condition or transfusion history consider continuation of transfusion at slower rate and appropriate symptomatic treatment

Transfusion unrelated

Document in notes that no HTC/HTC review/SHOT report necessary
To summarise actions

- Stop transfusion and maintain line with saline
- Quickly assess patient ID and vital signs
- Decide whether life-threatening or moderate/mild
- Treat clinical features
- Will you continue the transfusion?
- Investigate as appropriate
- Plan management of future transfusions
- Review and report
  - Internally
  - SHOT, SABRE
Contaminated platelets
To summarise actions

- Stop transfusion and maintain line with saline
- Quickly assess patient ID and vital signs
- Decide whether life-threatening or moderate/mild
- Treat clinical features
- Will you continue the transfusion?
- Investigate as appropriate
- Plan management of future transfusions
- Review and report
  - Internally
  - SHOT, SABRE
Dealing with symptoms or signs

- Mild
  - Pyrexia without rigors or rash only
    - Symptomatic treatment

- Moderate
  - Rigors, chills
    - Exclude sepsis
    - Symptomatic treatment: Paracetamol or anti-inflammatory
  - Dyspnoea
    - Exclude underlying condition, TACO
    - Assess oxygen saturation
    - Treat appropriately: Oxygen, salbutamol

- Severe
  - Shock, hypotension
    - Urgent need for skilled help
    - Recognise and treat anaphylaxis if present: Adrenaline is first line
    - Transfer patient into appropriate area
    - Discuss with NHSBT in case recall of components needed

Deal with clinical features, rather than assume it is a particular type of reaction
To summarise actions

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  - Internally
  - SHOT, SABRE
SHOT vignette, 2011

- 82 year old woman with iron deficiency
- Hb 4.5 g/dL
- Given 4 units of red cells, each over 2.5 hours
- Then developed acute dyspnoea, oxygen sats 54%
- Pulmonary oedema
- Tachycardia, 110 bpm
- BP initially rose to 200/100 then dropped suddenly to 50/20
- Required intubation, 2 days ventilation on ITU
- Recovered
What’s this?

- Allergic reaction?
- TACO?
- TRALI?
- Unrelated to transfusion?
SHOT vignette, 2011

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2011 TACO cases
Incidence of TACO

SHOT TACO cases, 2011

Blood usage in NE region, 2009
ATRs with red cells: reports and usage
ATRs with platelets (145 reports)
Age profile of severe reactions

2011 data
Anaphylaxis: age profile

2011 data
Mortality from ATR since 2006: all imputabilities
Surgical use of red cells over 10 years

Units red cells used over 28 days

10-14
15-19
20-24
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70-74
75-79
80-84
85-89
90+
Total

Surg 2009
Surg 2004
Surg 1999

Transfusion, 2012
TRALI and TACO

- TRALI: age is not an independent variable
- TACO
  - SHOT 2011 figures show 41/70 (59%) aged ≥70 (C.I. 25.5)
  - Small stature
  - More females
2011 haemolytic reactions by age
Despite these stats it is important to consider reactions in the elderly. Are they under reported?
Case History

- Elderly man was transfused 3 units of B pos red cells perioperatively (amputation for gangrene)
- He developed respiratory problems, further anaemia and jaundice
- These were ascribed to his underlying condition, and perhaps to fluid overload
- He required further transfusion and was in fact found to be O positive
Older patients

- Higher incidence of conditions requiring long term transfusion
- Leading to:
  - Delayed haemolytic reactions
  - TACO
  - ATRs
- Increasing co-morbidity
SHOT vignette, 2011

- Elderly male with multiple co-morbidities including pneumonia, disordered liver function, oesophageal stricture and PE
- Required insertion of PEG tube
- Abnormal liver function and on heparin
- FFP given
- Developed florid “maroon” coalescing rash
Continued

- Acute dyspnoea
- Cardiac arrest from which he could not be resuscitated
- Post mortem inconclusive
- IgA normal
- Concluded that anaphylaxis could not be ruled out
- Transfusion team reviewed the case: FFP had been given appropriately
Classical anaphylaxis.. but avoidable?

- Elderly woman given 3 units of FFP for warfarin reversal prior to surgery
- Rash, dyspnoea, angioedema
- BP dropped from 109/82 to 67/40
- Transferred to ITU
- Adrenaline, antihistamine, hydrocortisone
- Recovered
- On review, MCTs showed rise and fall pattern
Effect of treatment for ATR?

- A female patient in her 60s with leukaemia received a unit of platelets as a day case, for prophylaxis. Hydrocortisone and antihistamine were given as prophylaxis.
- She developed a rash on her arm which appeared to be spreading.
- She was given further IV antihistamine, and quickly lost consciousness.
- The arrest team were called: IV fluids were given, plus hydrocortisone. The patient quickly recovered.
- Cause for the collapse not clear: IV chlorphenamine can cause hypotension in older patients.
A special area for concern

- Hypotensive reactions can be severe
  - Isolated fall in systolic BP of 30 mm or more
- In US, seen in patients on ACE inhibitors but reduced by wbc removal
- Commoner in patients on bypass
- May be hard to distinguish hypotensive reaction from bleeding
Hypotensive reaction

- Elderly male patient experienced 2L blood loss during cardiac bypass surgery
- Transfused 3 units. The third unit was transfused in HDU
- During the 3rd unit, he became tachycardic. BP fell from 128/72 to 82/30
- Recovery staff decided this was due to continued bleeding, whilst awaiting surgeon’s decision, transfused 4th unit: hypotension worsened
Mystery patient

- Elderly female with Ca colon and chronic anaemia
- Hb 6.7 g/dL (measured on POCT device, not checked in lab)
- Transfused 5 red cells over 3 days and discharged with Hb of 10.3 g/dL
- 11 days later readmitted
- Hb 3.5 g/dL
- What is going on?
Results

- Raised bilirubin, raised LDH
- Low haptoglobins
- Positive DAT
- Patient now has anti Jk^a plus autoantibody
- 4/5 units Jk^a positive
- Dramatic Hb fall (but was initial Hb correct?)
Delayed haemolytic reactions

- One of the more frequent causes of major morbidity or even death
  - 6 fatalities in SHOT up to 2006
  - In 2011, 9 cases of major morbidity
  - Often due to associated conditions
- Under recognised
  - About 1 in 2000 units transfused
- Almost always due to a secondary immune response in previously transfused patient
# Acute and Delayed HTRs

<table>
<thead>
<tr>
<th>Acute</th>
<th>Delayed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usually ABO</td>
<td>Rh, Jk a and b, etc</td>
</tr>
<tr>
<td>Immediate</td>
<td>Present 5-10 days later</td>
</tr>
<tr>
<td>Easily recognised</td>
<td>Under-recognised</td>
</tr>
<tr>
<td>IgM mediated</td>
<td>IgG mediated</td>
</tr>
<tr>
<td>Intravascular haemolysis, haemoglobinuria</td>
<td>Less evidence of haemolysis</td>
</tr>
</tbody>
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When do DTRs occur?

30 plus:
54, 60, 70, 74 days (due to haemolysis)
Antibodies implicated in DTRs
In summary...

- Are we actually seeing a transfusion reaction or underlying condition?
- Which clinical features will be less well tolerated?
  - Hypotension
  - Hypoxia
  - Hypertension
- Response to medication
  - Antihistamines
Reducing the risk in the elderly

- All transfusions should be appropriate
- All patients should be transfused in clinical areas where they can be directly observed, and where staff are trained in the administration of blood components
- Fluid balance
- Patients with small stature need close monitoring
  - Have you checked the BMI?
- There is no evidence to support routine premedication
- Drugs used to treat reactions should be given cautiously
- Remember that DHTR may present with subtle features
- Moderate or severe reactions should be reported to SHOT and SABRE
Thank you

- To all who report to SHOT
- To the SHOT data analysts and my fellow SHOT writers
- To Angus Wells, Jonathan Wallis and colleagues for work on WDBG including the latest round, and to the WDPG team