building a caring future
HOSPITAL | COMMUNITY | HOME

Northumbria Healthcare NHS
NHS Foundation Trust

Transfusion Associated Circulatory Overload

Anna Bartholomew – Specialist Transfusion Practitioner
Northumbria Healthcare NHS Foundation Trust
Wansbeck General Hospital

building a caring future
HOSPITAL | COMMUNITY | HOME

Northumbria Healthcare NHS Foundation Trust

What is TACO?

- TACO occurs when a patient's circulatory system is unable to handle an increase in circulatory volume
- Leads to pulmonary oedema
- Risk factors:
  - Cardiac failure
  - Renal Impairment
  - Hypoalbuminaemia or fluid overload
  - Aged more than 70 years
  - Low body weight

building a caring future
HOSPITAL | COMMUNITY | HOME

Northumbria Healthcare NHS
NHS Foundation Trust

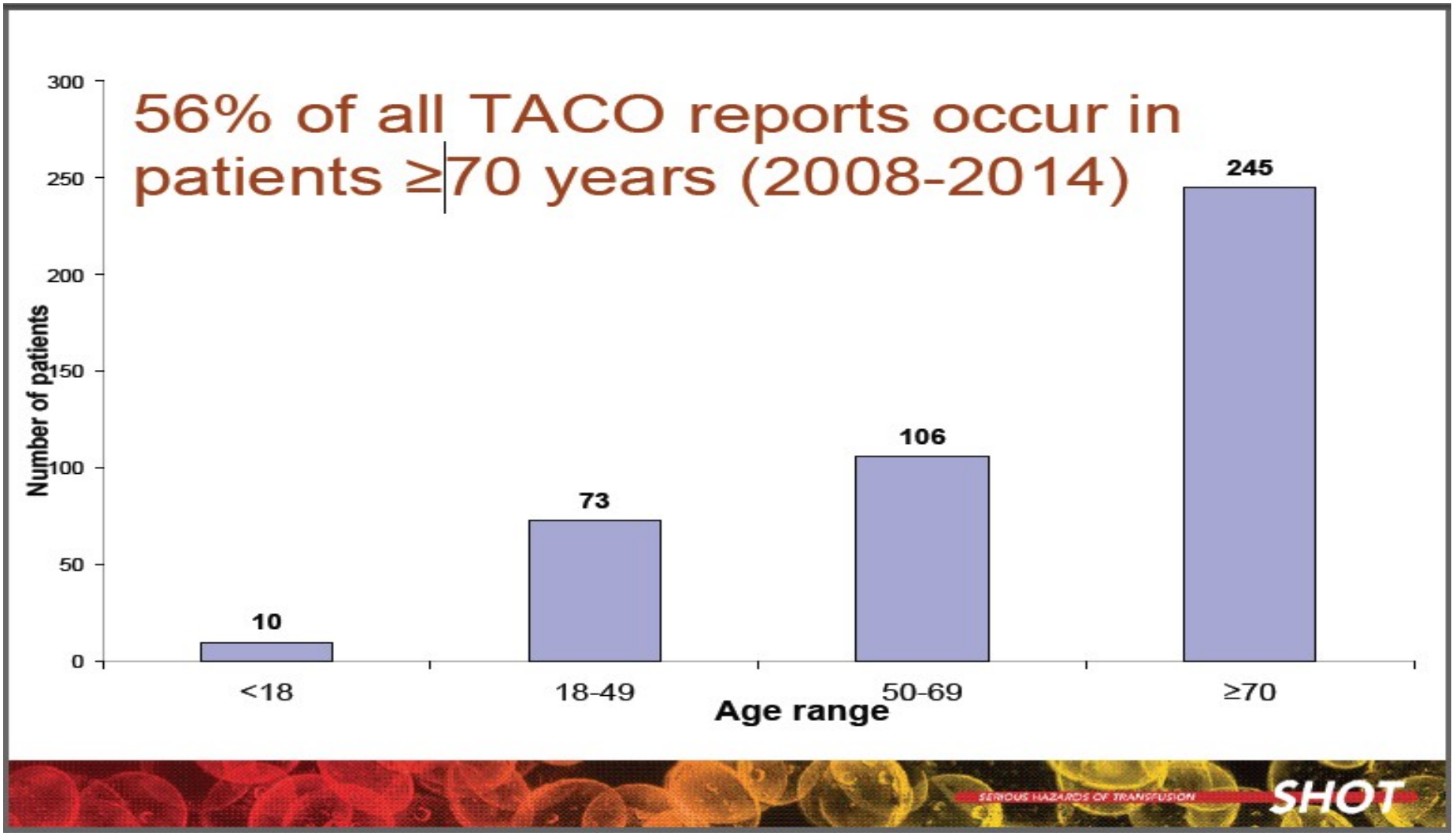
How did we identify TACO?

- International Society of Blood Transfusion (ISBT) definition states that TACO includes any 4 of the following that occur within 6 hours of transfusion
  - Acute respiratory distress
  - Tachycardia
  - Increased blood pressure
  - Acute or worsening pulmonary oedema
  - Evidence of positive fluid balance
- 2014 SHOT Report informs us definitions of TACO are being reviewed

building a caring future
HOSPITAL | COMMUNITY | HOME

Northumbria Healthcare NHS
NHS Foundation Trust

2014 SHOT Report



building a caring future
HOSPITAL | COMMUNITY | HOME

Northumbria Healthcare NHS
NHS Foundation Trust

Why carry out the audit?

- Masters Level Degree
- Project to manage
- TACO always been of interest
- Collaboration with Denise
- Prompt for NCA
- Decided on an audit

  'Recognition of transfusion associated circulatory overload in patients aged over 70 years'
- Retrospective audit over a 3 month period in 2012

building a caring future
HOSPITAL | COMMUNITY | HOME

Northumbria Healthcare NHS
NHS Foundation Trust

Aims of the audit?

- To determine:
  - Incidence of TACO within the Trust
  - Is under-reporting indicated?
  - Observable links to TACO in patients aged over 70 years
  - If an framework would assist with the prescribing of blood components for this vulnerable group of patients

building a caring future
HOSPITAL | COMMUNITY | HOME

Barriers

Northumbria Healthcare NHS
NHS Foundation Trust

- Availability and accessibility of patient's notes
- Layout of notes and information
- Multiple volumes of notes
- Large number of patients
- Lack of relevant documentation

building a caring future
HOSPITAL | COMMUNITY | HOME

Northumbria Healthcare NHS
NHS Foundation Trust

Data collected

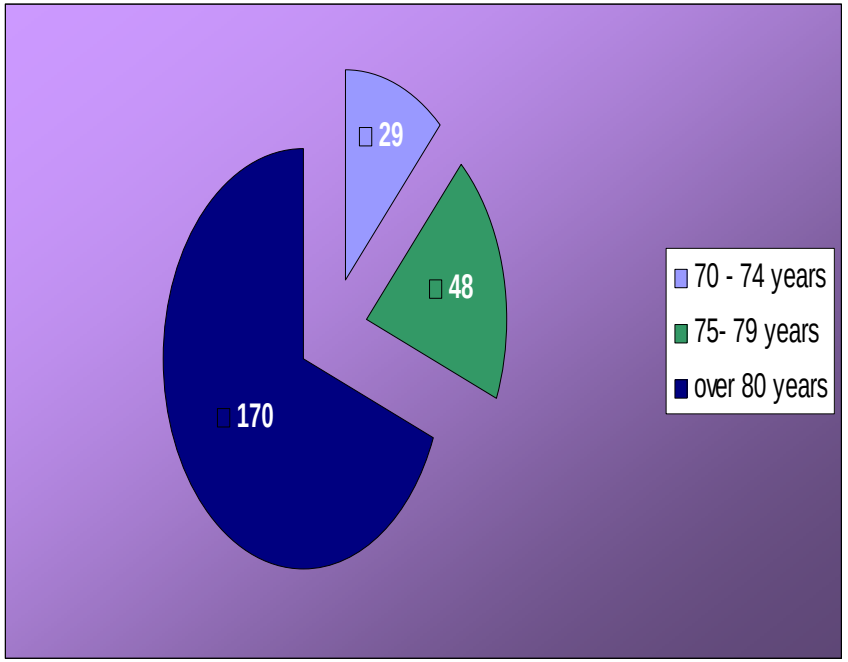
- Age of patient
- Male / Female
- Weight of patient
- Location of patient at time of transfusion
- If a diuretic was prescribed in advance of the transfusion
- Recorded on fluid balance chart
- Any evidence of TACO – if so, was it reported within Trust / SHOT

building a caring future
HOSPITAL | COMMUNITY | HOME

Northumbria Healthcare NHS
NHS Foundation Trust

Results

- 247 patients, accounting for 526 blood components
- 170/247 (69%) were aged over 80yrs
- 107 Males
- 140 Females

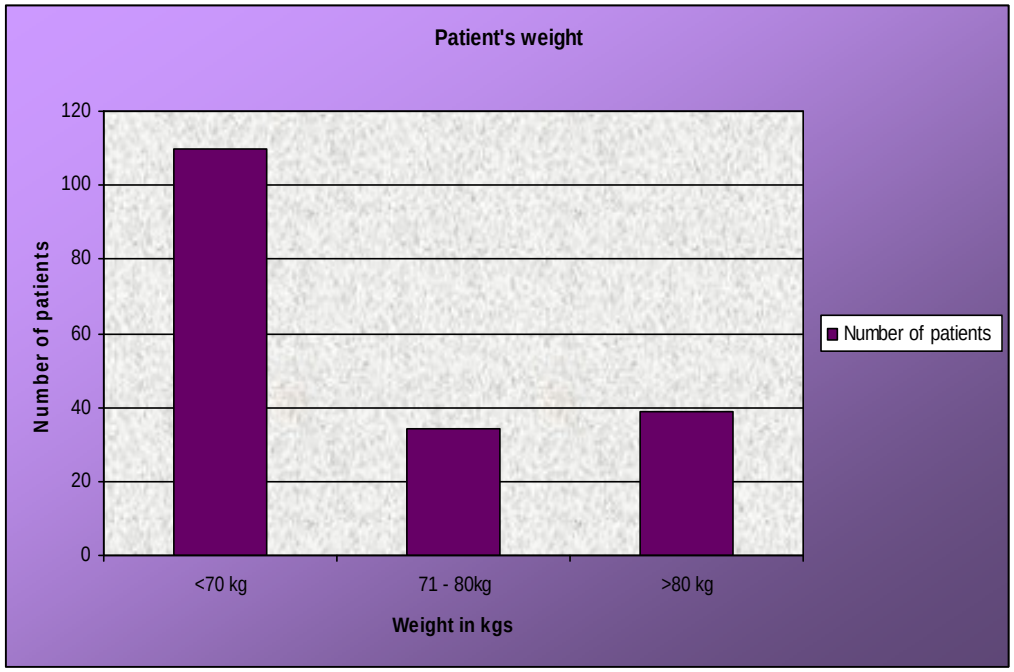


building a caring future
HOSPITAL | COMMUNITY | HOME

Northumbria Healthcare NHS
NHS Foundation Trust

Patients weight

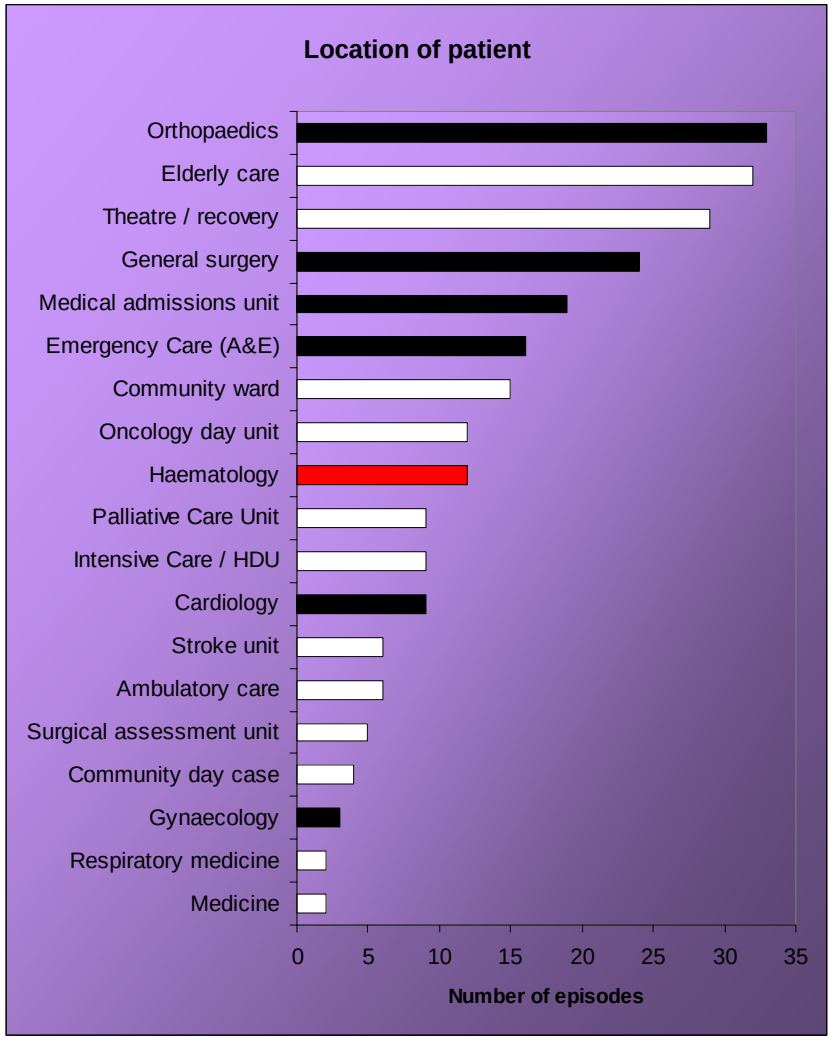
- 183/247 had a weight recorded (74%)
- 110/183 (60%) weighed less than 70kg
- Lowest weight recorded was 34kg!



building a caring future
HOSPITAL | COMMUNITY | HOME

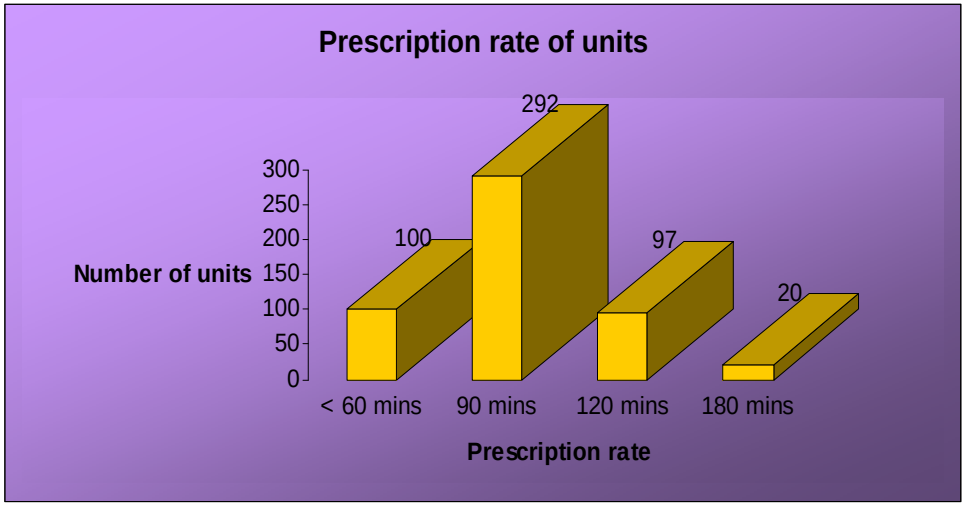
Northumbria Healthcare NHS
NHS Foundation Trust

Location of patients



Use of diuretics?

- 28/247 (11%) were prescribed a diuretic in advance of the transfusion
- A further 9 patients (4%) required a diuretic as a result of the transfusion



building a caring future
HOSPITAL | COMMUNITY | HOME

Northumbria Healthcare NHS
NHS Foundation Trust

Fluid balance charts

- Only 56/247 episodes, accounting for 92 units were recorded
  - Not all units in the episode were recorded, e.g. one but not the other
  - Many incomplete charts
  - No charts used

building a caring future
HOSPITAL | COMMUNITY | HOME

Northumbria Healthcare NHS
NHS Foundation Trust

Key Findings

- 8 cases of possible TACO
  - Not identified at the time, so not reported to SHOT
- 5/8 weighed less than 70kg; 2/8 had no weight recorded
- 8/8 aged over 80 years
- 6 Females; 2 Males
- Suggestion of high incidence of under reporting

building a caring future
HOSPITAL | COMMUNITY | HOME

Northumbria Healthcare NHS
NHS Foundation Trust

8 Possible Cases

Patient ID	Units transfused	Diuretic in advance	Full observations	History of cardiac failure	History of renal impairment
1	2	x	x	√	√
2	3	√	√	√	x
3	2	x	√	√	x
4	2	x	√	√	x
5	2	x	x	x	√
6	3	√	x	√	x
7	2	x	x	√	x
8	2	x	√	√	x

building a caring future
HOSPITAL | COMMUNITY | HOME

Northumbria Healthcare NHS
NHS Foundation Trust

Recognition of Transfusion Associated Circulatory Overload in patients aged over 70 years

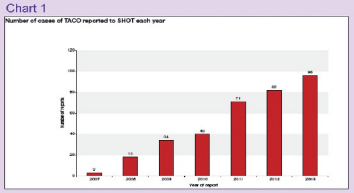
Anna Bartholomew[1], Coral Redshaw[1], Janice Robertson[2], Denise Watson[2]
[1]Northumbria Healthcare NHS Foundation Trust ; [2]NHS Blood and Transplant

Northumbria Healthcare NHS
NHS Foundation Trust

Introduction

In 2012 there were 82 cases of Transfusion Associated Circulatory Overload (TACO) reported to the Serious Hazards of Transfusion scheme in the United Kingdom[1]. This figure increased to 96 in 2013 (shown in Chart 1)[2] with the number of probable deaths doubling to 12.

Chart 1



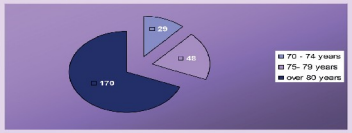
Method

A retrospective audit over a 3 month period in 2012.

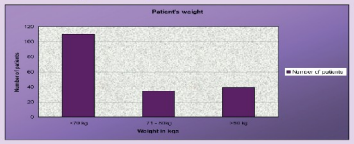
Data was analysed to determine:

- Incidence of TACO within the Trust
- Is under-reporting indicated?
- Observable links to TACO in patients aged over 70 years
- If an algorithm or check list would assist with the prescribing of blood components for this vulnerable group of patients.

Data was collected on 247 patients, accounting for 526 blood components. 170/247 (69%) were aged over 80 years as shown below.



Of the 247 patients, weight was recorded for 183. 110/183 (60%) of patients weighed less than 70kg, the lowest recorded weight was 34kg.

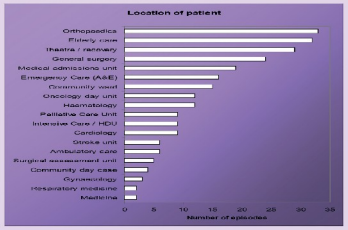


References:
1. PHB Bolton-Maggs (Ed), D Poles, A Watt, D Thomas and H Cohen on behalf of the Serious Hazards of Transfusion (SHOT) Steering Group. The 2012 Annual SHOT Report (2013)
2. PHB Bolton-Maggs (Ed), D Poles, A Watt and D Thomas on behalf of the Serious Hazards of Transfusion (SHOT) Steering Group. The 2013 Annual SHOT Report (2014)

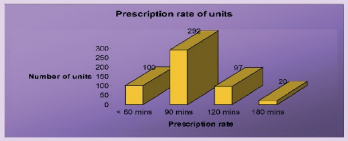
Key Findings

- 8 cases of possible TACO
- Cases not identified at the time and therefore not reported to SHOT
- 5/8 weighed less than 70kg; 2/8 had no weight recorded
- 8/8 cases aged over 80 years
- 6 Females; 2 Males
- Suggestion of high incidence of under-reporting to SHOT

The locations for transfusion were varied.



28/247 (11%) of the patients audited were prescribed a diuretic in advance of the transfusion. A further 9/247 (4%) required a diuretic as a result of the transfusion.



Only 56/247 episodes, accounting for 92 units were recorded on the fluid balance chart.

Recommendations / Actions

- Ensure you:
  - Record your patients weight
  - Complete a fluid balance chart
  - Consider diuretic cover
  - Monitor for TACO at all times
- Present the findings locally, regionally and nationally
- Suggest a National Comparative Audit to determine if the National picture correlates with local findings
- Improve patient safety for this vulnerable group
- Develop an algorithm to help clinicians prescribe blood for these patients safely and appropriately
- Advocate use of single unit transfusions for patients in this vulnerable group

building a caring future
HOSPITAL | COMMUNITY | HOME

Case Study

Northumbria Healthcare NHS Foundation Trust

- Male patient aged 87
- Admitted to MAU through A&E
- Patient weighed 69.8kgs
- Hb 62 g/L 2 units RBC's prescribed
- Pt developed acute respiratory distress
- Increased blood pressure
- Acute/worsening pulmonary oedema all within 6 hours
- NO fluid balance chart present

- History of AF and Hypoalbuminaemia

- Review was requested of ward medical staff after the transfusion had completed
- IV Furosemide 80mgs given to patient

Hb checked and a further unit was given the next day with 2 x Furosemide 40mgs given to the patient before and after

- No reference to TACO or fluid overload documented following this episode
- No Datix/SHOT report

building a caring future
HOSPITAL | COMMUNITY | HOME

Case Study

Northumbria Healthcare
NHS Foundation Trust
NHS

- Female patient aged 86 weight 53.9Kgs on Gynae

  Prescribed 2 units of blood for Hb of 75g/L actively bleeding
- Acute respiratory distress
- Tachycardia
- Acute/worsening pulmonary oedema
- Evidence of positive fluid balance
- Within 6 hours of Transfusion
- History of Cardiac Failure and Fluid Overload

- Units recorded on fluid balance chart
- Pt reviewed by ward Medics and commenced on 35% O2 and required 40mgs Furosemide after 1st unit and at 3am
- However not documented in patient's notes

  Not reported to Lab/ STP/ TTT/ HTC No Datix and not reported to SHOT

building a caring future
HOSPITAL | COMMUNITY | HOME

Northumbria Healthcare NHS
NHS Foundation Trust

Case Study

- Male pt aged 80+ weight not recorded
- Haematology Patient admitted with active UGI Bleed
- Hb 76g/L
- Pt developed ARD
- Acute/worsening pulmonary oedema
- Evidence of positive fluid balance
- Within 6 hours of transfusion
- Patient had history of cardiac failure and fluid overload

- Pt reviewed by ward medical staff
- Transfusion stopped part way through 2nd unit
- Oxygen commenced – unable to determine % given
- Diuretic administered
- Documented in the patients notes

- Not reported to Lab/ STP/ TTT/ HTC No Datix and not reported to SHOT

Case Study

- Female pt aged 85 weighed 70 Kgs
- Hb 79g/L Orthopaedic pt
- Given 2 units of RBC's
- Pt developed increased SOB
- Increased BP
- Acute or worsening pulmonary oedema
- Had evidence of positive fluid balance

not within 6 hours but 2 days later

- Earlier in 2012 evidence of heart failure on previous admission for pulmonary oedema

- Daily dose of 20mgs furosemide
- Pt developed post transfusion crackles on auscultation of the chest with a ?pulmonary oedema diagnosis
- Patient had only 1 kidney
- 2LO2 commenced via nasal cannulae
- No additional furosemide to daily dose administered
- Patient had received 2 x 1L N Saline over 12 hours but this had not been recorded on the fluid balance chart and blood was not recorded either
- Not reported to Lab/ STP/ TTT

building a caring future
HOSPITAL | COMMUNITY | HOME

Northumbria Healthcare NHS
NHS Foundation Trust

Recommendations

- Ensure staff:
  - Record the patients weight
  - Complete a fluid balance chart
  - Consider diuretic cover
  - Monitor for TACO at all times
- Present findings at appropriate meetings
- Suggest a NCA
- Develop an algorithm
- Advocate use of single unit transfusions where appropriate
- PBM Resources "Size Matters" "Don't give 2"

building a caring future
HOSPITAL | COMMUNITY | HOME

Northumbria Healthcare NHS Foundation Trust

NHS

PBM Educational Resources

NHS Blood and Transplant

Blood Transfusion Size Matters!

Transfusion Associated Circulatory Overload (TACO) is a known cause of transfusion-related morbidity and mortality[1]

Before Transfusion

- ✓ Document the rationale for the decision to transfuse.
- ✓ Document the patient's weight.
- ✓ Document the target Haemoglobin (Hb) level.
- ✓ Calculate the number of units required.
- ✓ Clinically re-assess the patient after each red cell unit transfused.

Transfusing a volume of 4ml/kg will typically give a Hb rise of 10g/L and should only be applied as an approximation for a 70-80kg non-bleeding patient.[1,2]

Note: The average volume of an adult red cell unit is 280mL

1. *Annual SHOT report 2012.*
2. *British Committee for Standards in Haematology: Addendum to Administration of Blood Components. 2012.*

Version 1 – August 2014

building a caring future
HOSPITAL | COMMUNITY | HOME

Northumbria Healthcare NHS
NHS Foundation Trust

PBM Educational Resources

NHS
Blood and Transplant

SINGLE Unit Blood Transfusions reduce the risk of an adverse reaction

Don't give two without review

THINK!

- Is your patient symptomatic?
- Is the transfusion appropriate?
- What is the haemoglobin trigger level?
- What is the patient's target haemoglobin level?

Each unit transfused is an independent clinical decision

DO!

- ✓ Clinically re-assess the patient after each unit transfused.
- ✓ Only one unit should be ordered for non-bleeding patients.
- ✓ Document the reason for Transfusion.[1]

1. *British Committee for Standards in Haematology: Addendum to Administration of Blood Components. 2012*

Version 1 – August 2014

building a caring future
HOSPITAL | COMMUNITY | HOME

Northumbria Healthcare NHS
NHS Foundation Trust

Outcomes

- Poster presentation at BBTS in 2014 in Clinical Transfusion and Hospital Laboratory Practice and Patient Blood Management category
- Develop algorithm for use
- Publish findings
- NCA to take place in autumn 2016

building a caring future
HOSPITAL | COMMUNITY | HOME

Northumbria Healthcare NHS
NHS Foundation Trust

And Finally…No TACO!

- Female Patient
- 80 years + 34Kgs
- #NOF Hb (106) reduced due to blood loss in theatre
- 2.5 Litres positive crystalloid fluid prior to commencement of blood transfusion
- 2 units of blood in Theatre further 6 units the next day

building a caring future
HOSPITAL | COMMUNITY | HOME

Northumbria Healthcare
NHS Foundation Trust

Any questions?