

Red Cell Transfusion: When do we transfuse?

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Objectives

- Who do we transfuse?
- Hb trigger for transfusion?
- How much blood?

Red cell transfusion

The theory:

- Increase oxygen carrying capacity of the blood
- Avoid tissue hypoxia
- Used in acute or chronic anaemia

Why is appropriate transfusion important?

- Lack of consensus in its use & variation in practice
- Inappropriate use is widespread
- Safety of transfusion – both infectious & non-infectious complications
- Limited resource

Red cell issues

- 2.3 million units in 1999
- 1.7 million units in 2012
- Change in surgical practice
- Better blood transfusion

Cases

Case 1

- 32yr old lady presents feeling tired. History of menorrhagia.
- Hb 69 g/L

Case 2

- 75yr old gentleman Myelodysplastic Syndrome, requires tranfusion every 4-6 weeks.
- Feeling tired and feels like he is 'ready for next tranfusion'
- Hb 89 g/L

Case 3

- 67yr old lady with chronic kidney disease
- Feels tired
- Hb 82 g/L

Case 4

- 81yr old gentleman who had a myocardial infarction 2yrs ago
- Hb 80 g/L

Case 5

- 65yr old lady awaiting bowel surgery in four weeks time.
- Hb 87 g/L

Who to transfuse?

The Old Way

80yr old lady on MAU with LRTI & Hb 83 g/L

- Ward round: antibiotics, give 2 units, move on!

What's the Problem?

Considerations

- Why is she anaemic? Is there an alternative?
- Is she symptomatic
- Weight of patient ?90kg ?40kg
- Is she at risk of fluid overload?
- Does she consent?
- Special requirements
 - Irradiation
 - CMV negative

'Symptomatic Anaemia'

Its not feeling a bit tired!

- **Unstable** cardiac disease
- Orthostatic hypotension
- Tachycardia not responding to fluid
- Congestive cardiac failure

Alternatives?

- Does something need to be replaced
 - Iron replacement (oral/IV)
 - Folate/B12
- Kidney failure
 - Erythropoietin +/- iron
- Pre-operatively
 - Iron (oral vs IV)

Transfusion Triggers

- Should not be based solely on Hb reading
- Hb value used as a guide
- Decision should consider clinical situation, co-morbidities and symptoms

Blood Transfusion Guidelines

NICE guideline. Published: 18
November 2015

[nice.org.uk/guidance/ng24](https://www.nice.org.uk/guidance/ng24)

Thresholds and targets

- Use **restrictive RBC transfusion** thresholds for patients **who do NOT**:
 - Have major haemorrhage
 - Have acute coronary syndrome
 - Need regular blood transfusions for chronic anaemia

Restrictive RBC transfusion threshold

- Threshold of 70g/litre
- Hb target of 70-90g/litre AFTER transfusion

Acute coronary syndrome

- Threshold 80g/L
- Target of 80-100g/L post transfusion

Transfusion for chronic anaemia

- For patients on regular transfusions
- Setting individual threshold and targets

Alternatives to blood transfusion for patients having surgery

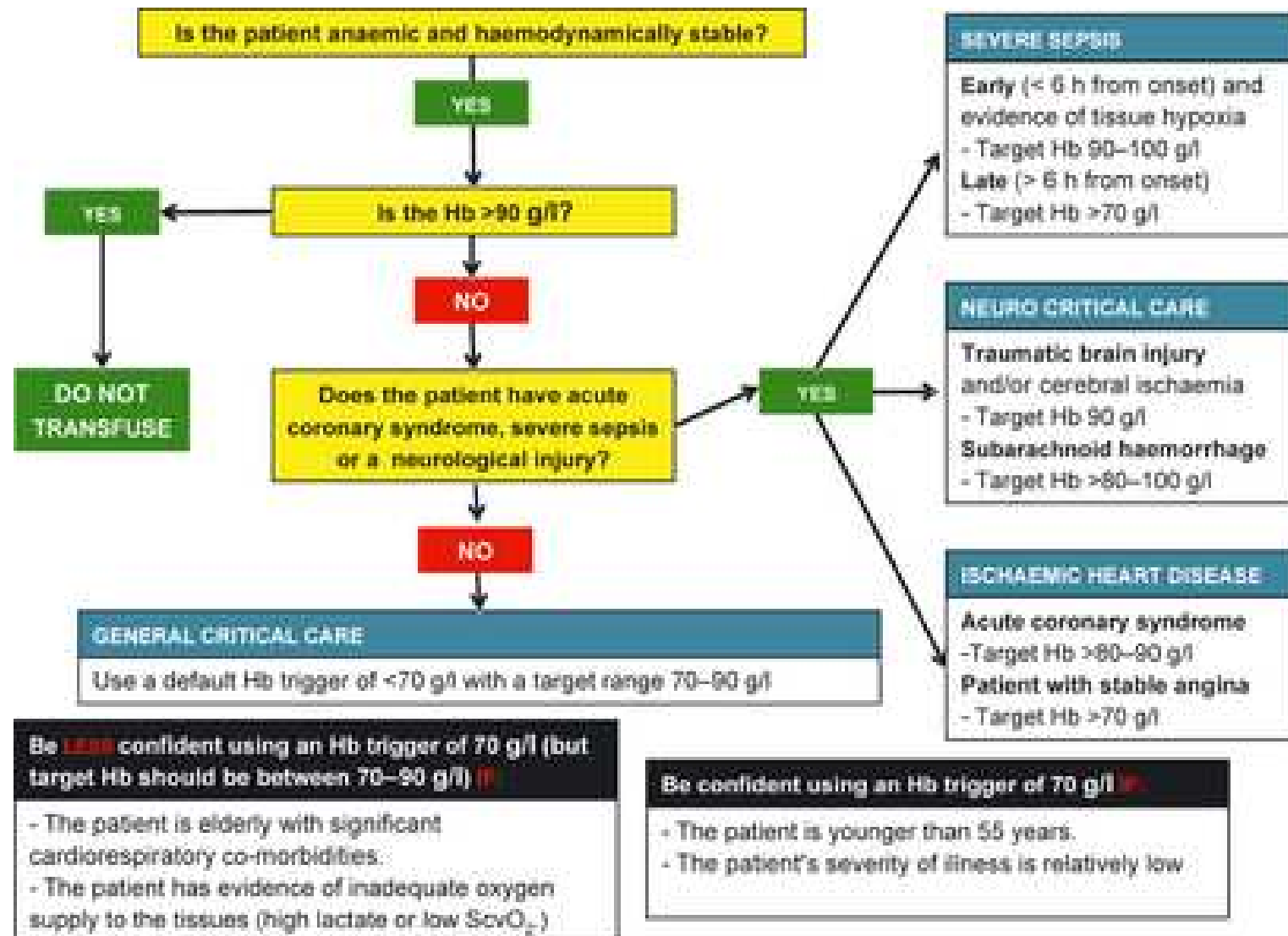
- Intravenous and oral iron
 - Oral iron before and after surgery to patients with iron-deficiency anaemia
 - IV iron may sometimes be appropriate
- Cell salvage and tranexamic acid
 - Tranexamic acid to adults who are expected to have moderate blood loss > 500ml
 - Intra-operative cell salvage with tranexamic acid to those expected to have high volume of blood loss

Critical Care

Transfusion in critical care setting

- Guidelines on the management of anaemia and red cell transfusion in adult critically ill patients
- British Journal of Haematology, 2013, 160, 445–464
- TRICC trial

Guidelines on the management of anaemia and red cell transfusion in adult critically ill patients



RBC transfusion in adult critically ill patients

- Default threshold 70g/L or below, with a target Hb of 70-90g/L unless there are specific co-morbidities or acute illness-related factors (see later)
- Transfusion triggers should not exceed 90g/L in most critically ill patients

Severe sepsis

- In early severe sepsis (first 6 hours) during resuscitation phase, if evidence of inadequate oxygen delivery
 - Consider RBCs to target Hb of 90-100 g/L
- During later stages of sepsis
 - more conservative approach, target Hb 70-90 g/L

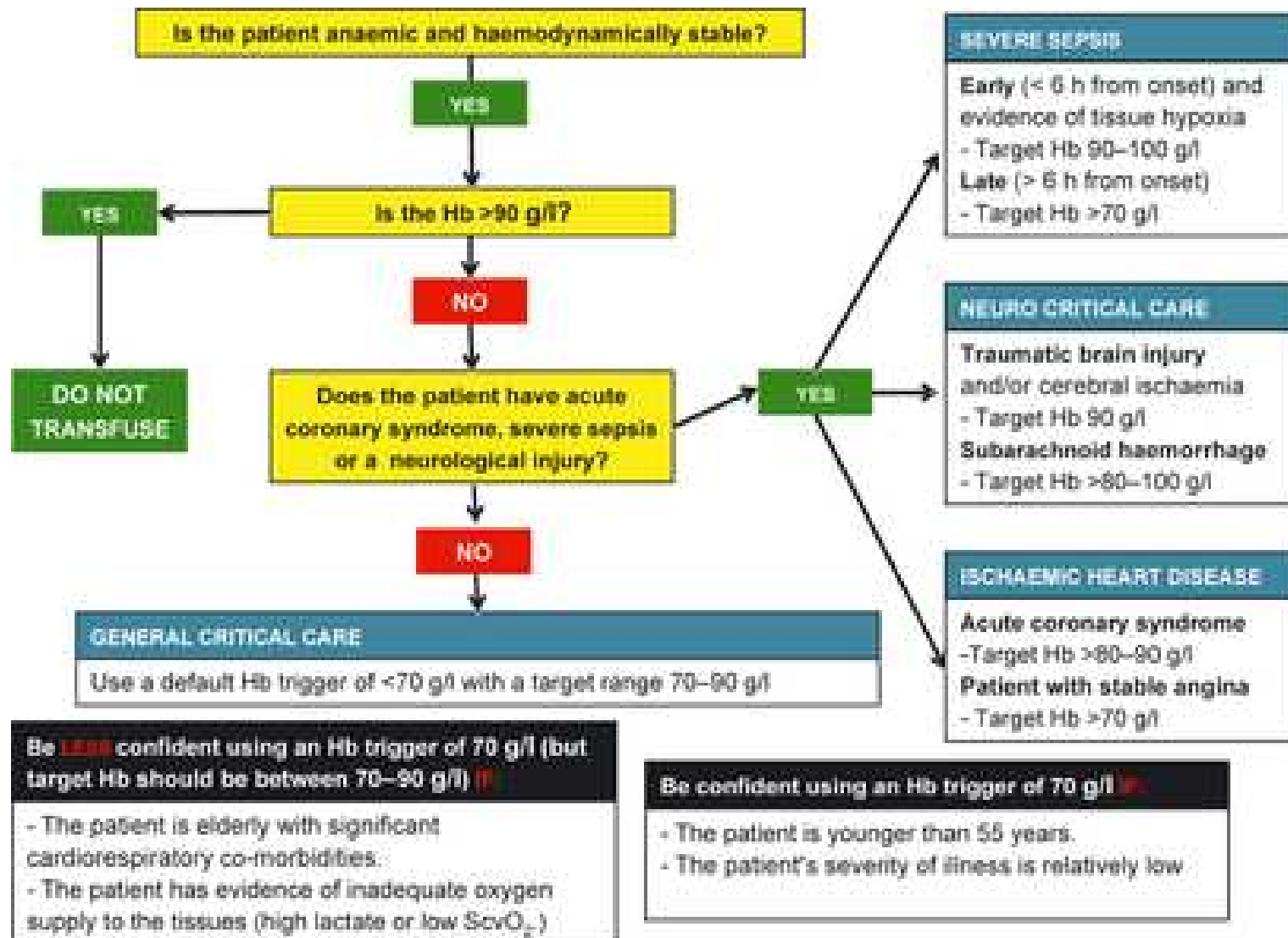
Neurological critical care

- Controversial – insufficient evidence
 1. Traumatic brain injury and/or cerebral ischaemia target Hb 90g/L
 2. Subarachnoid haemorrhage target 80-100g/L
 3. Acute ischaemic stroke in ICU, target Hb > 90g/L – both high and low Hb associated with unfavourable outcome!

Acute coronary syndrome (ACS)

- Threshold 80g/L, Hb target 80-90g/L
- Anaemic critically ill patients with STABLE angina should have Hb maintained >70g/L, transfusion to Hb >100 g/L has uncertain benefit
- Further studies are needed to determine the optimal transfusion threshold for patients with Chronic cardiovascular disease

Guidelines on the management of anaemia and red cell transfusion in adult critically ill patients



Alternatives to RBC Transfusion in critical care

- In the absence of clear evidence of iron deficiency, routine iron supplementation is not recommended during critical illness
 - Patients do not respond to iron alone
 - Excess iron may increase susceptibility to infections.
- Erythropoietin should not be used to treat anaemia in critically ill patients
 - needs further safety and efficacy

Alternatives to RBC Transfusion in critical care

- Consider blood conservation devices to reduce phlebotomy-associated blood loss
- Paediatric blood sampling tubes to reduce iatrogenic blood loss

Other situations

FOCUS study – hip fracture

- Elderly patients (high risk) undergoing hip fracture surgery
- No difference in mortality or CV complications between liberal (Hb <100g/L) or restrictive transfusion (Hb <80 g/L)
- Same in TRACs study in patients undergoing cardiac surgery

Acute upper GI bleed evidence

- NEJM 2013, Villanueva et al. Transfusion strategies for acute upper gastrointestinal bleeding.
- Excluded patients with major haemorrhage
- Restrictive transfusion safer than liberal
 - Mortality
 - Re-bleeding
 - Complications

Acute blood loss

- Transfuse if
 - Blood loss $> 30\text{-}40\%$ TBV
 - Blood loss $< 30\%$ and pre-existing anaemia or severe cardiac/respiratory distress
 - Hb $< 70\text{g/L}$ in otherwise fit
 - Hb $< 80\text{g/L}$ in elderly/cardiac/respiratory distress

Chronic anaemia

- Consider alternatives
- Maintain Hb just above lowest concentration associated with no symptoms
- Quality of life
- Special groups e.g. Thalassaemia & sickle cell anaemia who are transfusion dependent

Cancer patients

- MDS & transfusion-dependent
 - Quality of life and symptoms
- Post-chemo
 - Hb 80-90g/L threshold
- Radiotherapy
 - maintain Hb > 100g/ L (improved outcome in cervical cancer patients)

How much?

- If no active bleeding and haemodynamically stable
 - **Give ONE unit and review**
- **Weight** is crucial
 - 4 ml / Kg raises Hb by approx 10g /L
- 1 unit \neq 10g/L
 - Give one unit and review

Cases again

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Summary: When to Transfuse?

1. Who needs a red cell transfusion
 - Symptomatic anaemia
 - Consider alternatives
2. Hb trigger
 - No universal trigger
 - Restrictive transfusion threshold/trigger in general
 - Hb <70g/L if no bleeding and haemo-dynamically stable
3. How much?
 - Weight of patient
 - Give one and review

Questions?

References

1. NICE guideline. Published: 18 November 2015
 - [nice.org.uk/guidance/ng24](https://www.nice.org.uk/guidance/ng24)
2. Guidelines on the management of anaemia and red cell transfusion in adult critically ill patients. British Journal of Haematology, 2013, 160, 445–464
3. Guidelines for the clinical use of red cell transfusions. British Journal of Haematology 2001, 113: 24-31