NICE National Institute for Health and Care Excellence

NICE Pathways

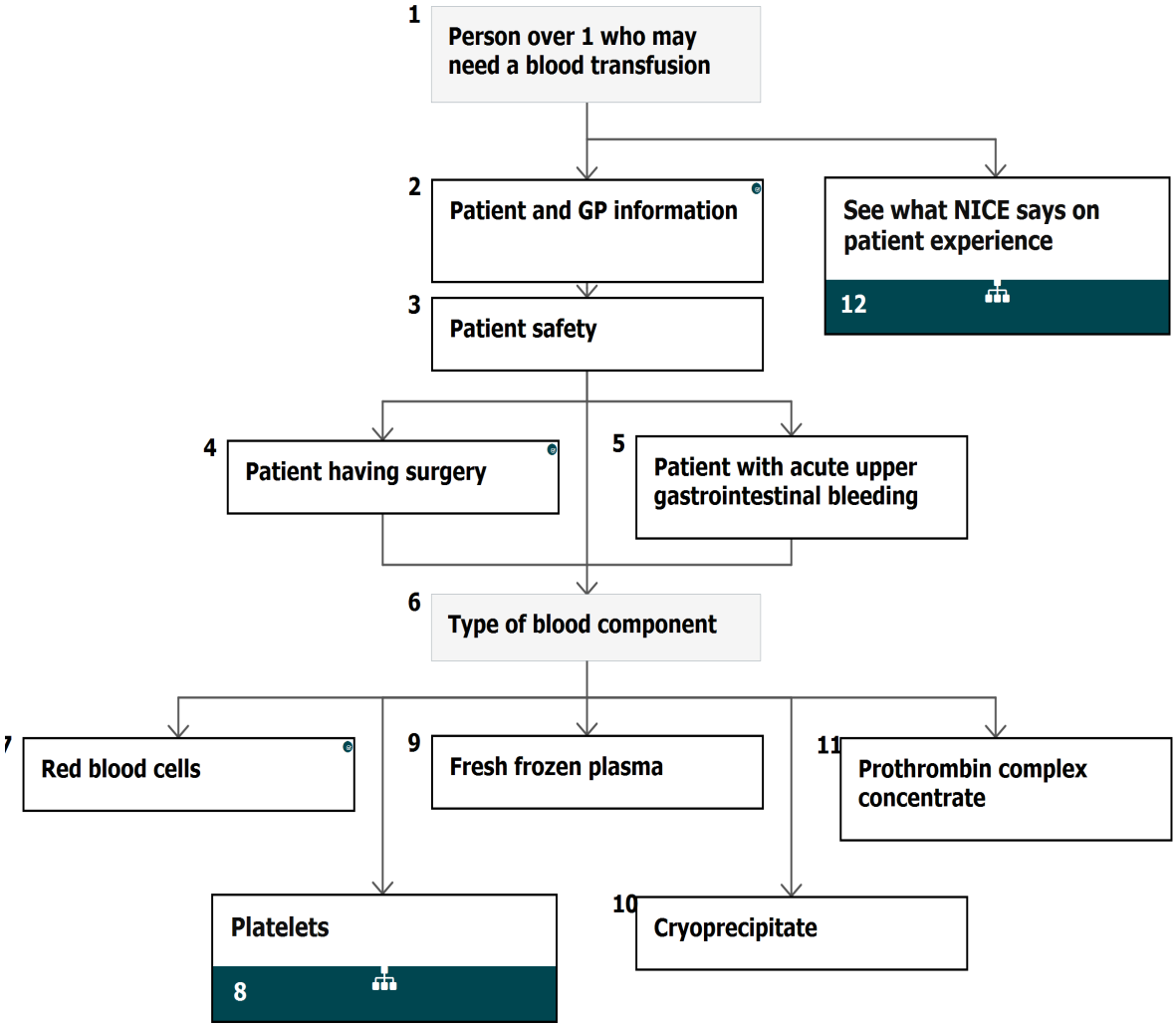
Blood transfusion overview

NICE Pathways bring together everything NICE says on a topic in an interactive flowchart. NICE Pathways are interactive and designed to be used online.

They are updated regularly as new NICE guidance is published. To view the latest version of this NICE Pathway see:

http://pathways.nice.org.uk/pathways/blood-transfusion
NICE Pathway last updated: 10 August 2017

This document contains a single flowchart and uses numbering to link the boxes to the associated recommendations.



1 Person over 1 who may need a blood transfusion

No additional information

2 Patient and GP information

Provide verbal and written information to patients who may have or who have had a transfusion, and their family members or carers (as appropriate), explaining:

- the reason for the transfusion
- the risks and benefits
- the transfusion process
- any transfusion needs specific to them
- any alternatives that are available, and how they might reduce their need for a transfusion
- that they are no longer eligible to donate blood
- that they are encouraged to ask questions.

Document discussions in the patient's notes.

Provide the patient and their GP with copies of the discharge summary or other written communication that explains:

- the details of any transfusions they had
- the reasons for the transfusion
- any adverse events
- that they are no longer eligible to donate blood.

See what NICE says on communication and patient-centred care in patient experience.

Quality standards

The following quality statement is relevant to this part of the interactive flowchart.

4. Patient information

3 Patient safety

Monitoring for acute blood transfusion reactions

Monitor the patient's condition and vital signs before, during and after blood transfusions, to detect acute transfusion reactions that may need immediate investigation and treatment.

Observe patients who are having or have had a blood transfusion in a suitable environment with staff who are able to monitor and manage acute reactions.

Electronic patient identification systems

Consider using a system that electronically identifies patients to improve the safety and efficiency of the blood transfusion process.

4 Patient having surgery

Erythropoietin

Do not offer erythropoietin to reduce the need for blood transfusion in patients having surgery, unless:

- the patient has anaemia and meets the criteria for blood transfusion, but declines it because of religious beliefs or other reasons or
- the appropriate blood type is not available because of the patient's red cell antibodies.

Intravenous and oral iron

Offer oral iron before and after surgery to patients with iron-deficiency anaemia.

Consider intravenous iron before and after surgery for patients who:

- have iron-deficiency anaemia and cannot tolerate or absorb oral iron, or are unable to adhere to oral iron treatment (See what NICE says on medicines optimisation)
- are diagnosed with functional iron deficiency
- are diagnosed with iron-deficiency anaemia, and the interval between the diagnosis of anaemia and surgery is predicted to be too short for oral iron to be effective.

For managing anaemia in patients with chronic kidney disease, see NICE's recommendations on anaemia management in people with chronic kidney disease.

For treating anaemia in people with cancer having chemotherapy see what NICE says on anaemia for blood and immune system conditions.

Cell salvage

Cell salvage and tranexamic acid

Offer tranexamic acid to adults undergoing surgery who are expected to have at least moderate blood loss (greater than 500 ml).

Consider tranexamic acid for children undergoing surgery who are expected to have at least moderate blood loss (greater than 10% blood volume).

Do not routinely use cell salvage without tranexamic acid.

Consider intra-operative cell salvage with tranexamic acid for patients who are expected to lose a very high volume of blood (for example in cardiac and complex vascular surgery, major obstetric procedures, and pelvic reconstruction and scoliosis surgery).

Interventional procedures

NICE has published guidance on intraoperative red blood cell salvage during radical prostatectomy or radical cystectomy with **normal arrangements** for clinical governance, consent and audit.

NICE has published guidance on intraoperative red blood cell salvage in obstetrics.

Medtech innovation briefing

NICE has also published a medtech innovation briefing on Hemosep for cell salvage.

Quality standards

The following quality statements are relevant to this part of the interactive flowchart.

1. Iron supplementation

2. Tranexamic acid for adults

5 Patient with acute upper gastrointestinal bleeding

For guidance on blood transfusions for people with acute upper gastrointestinal bleeding, see what NICE says on resuscitation and initial management for acute upper gastrointestinal bleeding.

6 Type of blood component

No additional information

7 Red blood cells

Thresholds and targets

Use restrictive red blood cell transfusion thresholds for patients who need red blood cell transfusions and who do not:

- have major haemorrhage [See page 10] or
- have acute coronary syndrome or
- need regular blood transfusions for chronic anaemia.

When using a restrictive red blood cell transfusion threshold, consider a threshold of 70 g/litre and a haemoglobin concentration target of 70–90 g/litre after transfusion.

Consider a red blood cell transfusion threshold of 80 g/litre and a haemoglobin concentration target of 80–100 g/litre after transfusion for patients with acute coronary syndrome.

Consider setting individual thresholds and haemoglobin concentration targets for each patient who needs regular blood transfusions for chronic anaemia.

Doses

Consider single-unit red blood cell transfusions for adults (or equivalent volumes calculated based on body weight for children or adults with low body weight) who do not have active bleeding.

After each single-unit red blood cell transfusion (or equivalent volumes calculated based on body weight for children or adults with low body weight), clinically reassess and check haemoglobin levels, and give further transfusions if needed.

Anaemia in chronic kidney disease

For guidance on red blood cell transfusions in patients with anaemia in chronic kidney disease, see what NICE says about when to offer red cell transfusion for anaemia management in people with chronic kidney disease .

Spectra Optia for automated red blood cell exchange in sickle cell disease

The following recommendations are from NICE medical technologies guidance on Spectra Optia for automated red blood cell exchange in patients with sickle cell disease.

The case for adopting Spectra Optia for automated red blood cell exchange in patients with sickle cell disease is supported by the evidence. Spectra Optia is faster to use and needs to be done less often than manual red blood cell exchange.

Spectra Optia should be considered for automated red blood cell exchange in patients with sickle cell disease who need regular transfusion.

NICE recommends collaborative data collection to generate further clinical evidence on some outcomes of treatment with Spectra Optia. In particular, there is a need for long-term data on how automated and manual exchange affect iron overload status and the subsequent need for chelation therapy.

Based on current evidence and expert advice on the anticipated benefits of the technology when used in patients with iron overload, cost modelling shows that in most cases using Spectra Optia is cost saving compared with manual red blood cell exchange or top-up transfusion. The savings depend on the iron overload status of the patient, and are more likely to be achieved if devices already owned by the NHS can be used to treat sickle cell disease. The estimated cost saving for adopting Spectra Optia is £18,100 per patient per year, which has the potential to save the NHS in England £12.9 million each year.

Quality standards

The following quality statement is relevant to this part of the interactive flowchart.

3. Reassessment after red blood cell transfusions

8 Platelets

See Blood transfusion / Platelet transfusion

9 Fresh frozen plasma

Thresholds and targets

Only consider fresh frozen plasma transfusion for patients with clinically significant bleeding but without major haemorrhage [See page 10] if they have abnormal coagulation test results (for example, prothrombin time ratio or activated partial thromboplastin time ratio above 1.5).

Do not offer fresh frozen plasma transfusions to correct abnormal coagulation in patients who:

- are not bleeding (unless they are having invasive procedures or surgery with a risk of clinically significant bleeding)
- need reversal of a vitamin K antagonist.

Consider prophylactic fresh frozen plasma transfusions for patients with abnormal coagulation who are having invasive procedures or surgery with a risk of clinically significant bleeding.

Doses

Reassess the patient's condition and repeat the coagulation tests after fresh frozen plasma transfusion to ensure that they are getting an adequate dose, and give further doses if needed.

10 Cryoprecipitate

Thresholds and targets

Consider cryoprecipitate transfusions for patients without major haemorrhage [See page 10] who have:

- clinically significant bleeding **and**
- a fibrinogen level below 1.5 g/litre.

Do not offer cryoprecipitate transfusions to correct the fibrinogen level in patients who:

- are not bleeding **and**

- are not having invasive procedures or surgery with a risk of clinically significant bleeding.

Consider prophylactic cryoprecipitate transfusions for patients with a fibrinogen level below 1.0 g/litre who are having invasive procedures or surgery with a risk of clinically significant bleeding.

Doses

Use an adult dose of 2 pools when giving cryoprecipitate transfusions (for children, use 5–10 ml/kg up to a maximum of 2 pools).

Reassess the patient's condition, repeat the fibrinogen level measurement and give further doses if needed.

11 Prothrombin complex concentrate

Offer immediate prothrombin complex concentrate transfusions for the emergency reversal of warfarin anticoagulation in patients with either:

- severe bleeding **or**
- head injury with suspected intracerebral haemorrhage.

Clotting levels in people with a primary intracerebral haemorrhage who were receiving anticoagulation treatment before their stroke (and have elevated INR) should be returned to normal as soon as possible, by reversing the effects of the anticoagulation treatment using a combination of prothrombin complex concentrate and intravenous vitamin K.

Consider immediate prothrombin complex concentrate transfusions to reverse warfarin anticoagulation in patients having emergency surgery, depending on the level of anticoagulation and the bleeding risk.

Monitor the INR to confirm that warfarin anticoagulation has been adequately reversed, and consider further prothrombin complex concentrate.

For information on reversal of anticoagulation in people with haemorrhagic stroke, see what NICE says on managing an acute intracerebral haemorrhage for stroke.

12 See what NICE says on patient experience

See Patient experience in adult NHS services

Major haemorrhage can be defined as any of the following:

- The loss of more than 1 blood volume within 24 hours (around 70 mL/kg, or more than 5 litres in a 70 kg adult).
- A loss of 50% of total blood volume in under 3 hours.
- Bleeding in excess of 150 mL/minute in adults.
- As a practical clinical definition, bleeding which leads to:
  - a systolic blood pressure of less than 90 mm/Hg or
  - a heart rate of more than 110 beats per minute in adults.

Glossary

INR

international normalised ratio

TIA

transient ischaemic attack; defined as stroke symptoms and signs that resolve within 24 hours

WHO

World Health Organisation

Sources

Blood transfusion (2015) NICE guideline NG24

Stroke and transient ischaemic attack in over 16s: diagnosis and initial management (2008) NICE guideline CG68

Spectra Optia for automated red blood cell exchange in patients with sickle cell disease (2016) NICE medical technologies guidance 28

Your responsibility

Guidelines

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

Local commissioners and providers of healthcare have a responsibility to enable the guideline to be applied when individual professionals and people using services wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with complying with those duties.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

Technology appraisals

The recommendations in this interactive flowchart represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, health professionals are expected to take these recommendations fully into account, alongside the individual needs, preferences and values of their patients. The application of the recommendations in this interactive flowchart is at the discretion of health professionals and their individual patients and do not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or their carer or guardian.

Commissioners and/or providers have a responsibility to provide the funding required to enable the recommendations to be applied when individual health professionals and their patients wish to use it, in accordance with the NHS Constitution. They should do so in light of their duties to

have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

Medical technologies guidance, diagnostics guidance and interventional procedures guidance

The recommendations in this interactive flowchart represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, healthcare professionals are expected to take these recommendations fully into account. However, the interactive flowchart does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

Commissioners and/or providers have a responsibility to implement the recommendations, in their local context, in light of their duties to have due regard to the need to eliminate unlawful discrimination, advance equality of opportunity, and foster good relations. Nothing in this interactive flowchart should be interpreted in a way that would be inconsistent with compliance with those duties.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.