Clinical Nursing Skills: VitalSource Interactive etext features

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About the Clinical Nursing Skills resources:
This sample is an extract of the resources related to Chapter 15, and found within the complementary VitalSource interactive etext.

Fully integrated with the print book, this VitalSource etext houses homework assignments, tutorial assistance, guided solutions and additional content in one convenient resource which can be downloaded to the computer or mobile device.
Blood transfusion

Erica Wood, Kylie Rushford, Christine Michael and Terri Dunstan

LEARNING OBJECTIVES

After studying this chapter, you should be able to do the following:

1. Identify the key elements in transfusion decision-making, pre-transfusion assessment, blood administration and monitoring of the transfused patient
2. Understand the importance of correct patient identification and sample labelling to safe transfusion practice
3. Recognise the main types of transfusion adverse events and their potential consequences
4. Reflect on opportunities to reduce hazards and improve transfusion safety in the clinical setting.
Compatibility of blood components

Giving components of an incorrect group can lead to a fatal haemolytic transfusion reaction due to ABO incompatibility, so it is vital that products of the correct group are administered, especially RBC components. These will usually be ABO and RhD identical to the patient’s blood group, but may be different if the patient has unusual RBC antibodies or other special requirements. Sometimes group O RBCs may be issued to patients to meet other patient special requirements, or to avoid wastage of group O units. See Table 15.3 for RBC and Table 15.4 for plasma component compatibilities.

Table 15.3 Red blood cell compatibility

<table>
<thead>
<tr>
<th>Patient’s blood group</th>
<th>1st choice</th>
<th>2nd choice</th>
<th>3rd choice</th>
<th>4th choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unknown</td>
<td>O Neg</td>
<td>O Pos *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O, RhD positive</td>
<td>O Pos</td>
<td>O Neg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O, RhD negative</td>
<td>O Neg only</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A, RhD positive</td>
<td>A Pos</td>
<td>O Pos</td>
<td>A Neg</td>
<td>O Neg</td>
</tr>
<tr>
<td>A, RhD negative</td>
<td>A Neg</td>
<td>O Neg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B, RhD positive</td>
<td>B Pos</td>
<td>O Pos</td>
<td>B Neg</td>
<td>O Neg</td>
</tr>
<tr>
<td>B, RhD negative</td>
<td>B Neg</td>
<td>O Neg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AB, RhD positive</td>
<td>AB Pos</td>
<td>B Pos</td>
<td>A Pos</td>
<td>All other groups</td>
</tr>
<tr>
<td>AB, RhD negative</td>
<td>AB Neg</td>
<td>B Neg</td>
<td>A Neg</td>
<td>O Neg</td>
</tr>
</tbody>
</table>

*RhD positive RBCs in the setting of unknown blood group are only suitable for use in in male patients or females > 50 years old/not of childbearing potential unless otherwise specified by hospital policy.

Table 15.4 Plasma products compatibility

<table>
<thead>
<tr>
<th>Patient’s blood group</th>
<th>1st choice</th>
<th>2nd choice</th>
<th>3rd choice</th>
<th>4th choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unknown</td>
<td>AB</td>
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<td>B</td>
<td>AB</td>
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<tr>
<td>A</td>
<td>A</td>
<td>AB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>B</td>
<td>AB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AB</td>
<td>AB</td>
<td>A if AB unobtainable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note that Rh type is not considered when plasma products are selected.

Usually platelets of the same ABO group will be issued by the laboratory. RhD negative platelets should be provided for RhD negative females of childbearing potential to avoid the risk of being sensitised to the RhD antigen. If RhD positive platelets are required, a dose of RhD immunoglobulin may be issued at the same time to avoid sensitisation to
Part III: Fundamental skills for patient care

- Check information on the patient’s identification wristband, blood unit and infusion chart.
- Notify and seek advice from the treating clinical team and transfusion laboratory.

Depending on the clinical scenario, for an acutely unwell patient, do the following:
- Request urgent reconfirmation of blood group on the pre-transfusion sample.
- Collect a new patient sample for urgent re-testing of blood group and antibody screen.
- Request additional samples – for example, renal function, haemolysis screen and coagulation testing for disseminated intravascular coagulation in the case of suspected acute haemolytic transfusion reaction. Samples for Gram stain and blood cultures from the patient and blood component should be collected in the case of suspected bacterial contamination.
- Manage the patient according to the clinical features of the event. IV fluids, oxygen, adrenaline, antibiotics, diuretics and/or other measures, including intensive care support, may be necessary depending on the cause and severity of the reaction.
- Consider also non-transfusion-related causes of any deterioration during or following a transfusion, such as pulmonary embolism or medication reaction.

If the adverse event is minor (for example, a small temperature rise that seems to be a febrile non-haemolytic transfusion reaction), and the patient settles, it may be possible to restart the transfusion after a clerical check and clinical review, in accordance with hospital policy. However, the patient should be monitored very closely for signs of further deterioration. If the symptoms or signs recur, the transfusion should be stopped and not restarted.

If the event was caused by clerical error, consider whether other patient(s) may be at risk – for example, from sample mix-up or mislabelling. If there is a product concern (e.g. bacterial contamination), notify the blood supplier urgently – other patients may be at risk from components prepared from the same donation. Specialised testing may be required (e.g. platelet, granulocyte and/or HLA antigen/antibody testing in case of transfusion-related acute lung injury (TRALI) or post-transfusion purpura). Liaise with the hospital transfusion medicine team, transfusion laboratory and the blood supplier for advice.

Links to more detailed information on prevention, classification and management of adverse events is provided in the Further Reading section.

SKILLS IN PRACTICE

Monitoring and responding to the transfused patient

A 70-year-old woman develops acute dyspnoea shortly after commencing a RBC transfusion. The transfusion is immediately ceased and the patient urgently evaluated by medical staff. She is normotensive but tachycardic, and unable to speak full sentences due to severe wheezing and breathlessness.

Chest examination reveals widespread coarse crepitations and elevated jugular venous pressure. Chest X-ray shows evidence of bilateral pulmonary infiltrates. Immediate treatment is provided with supplemental oxygen and intravenous frusemide, and the patient settles quickly.

The patient has myelodysplasia and requires frequent transfusions for symptomatic anaemia. Further information reveals that the patient has already received two units of RBCs earlier today and has underlying cardiovascular disease.
SUMMARY

LEARNING OBJECTIVES

Learning objective 1: Identify the key elements in transfusion decision-making, pre-transfusion assessment, blood administration and monitoring of the transfused patient

Transfusion is a complex, multi-step process involving medical, nursing, laboratory and other staff. Making a careful assessment of a patient’s clinical situation and consideration of whether or not transfusion may help address a specific problem are essential. If transfusion is proposed, wherever possible the patient should be included in the decision-making and informed consent should be obtained. Trained and credentialled staff should carry out each activity and monitor the patient at each phase of the process. Patients and staff should be alert to the possibility of adverse reactions, and respond promptly if they occur.

Learning objective 2: Understand the importance of correct patient identification and sample labelling to safe transfusion practice

In developed countries, human error is the most common contributor to serious adverse effects of transfusion, including ABO incompatible transfusions. Errors typically involve failure to follow procedure in patient identification at pre-transfusion sample collection or labelling, and/or blood administration.

Learning objective 3: Recognise the main types of transfusion adverse events and their potential consequences

Infectious hazards such as transmission of hepatitis and HIV are now rare complications of transfusion in developed countries. Bacterial contamination is the major residual infectious hazard, and the greatest risk is from platelet transfusions, which are stored at room temperature; this permits proliferation of contaminating organisms. National blood services have introduced a range of measures to reduce these risks. Importantly, adverse events can include immune and non-immune causes, such as allergic reactions, transfusion-associated circulatory overload, acute and delayed haemolytic reactions, and many other potential complications. Fortunately, serious complications are rare, but vigilance by staff and patients in prevention and early response can save lives.

Learning objective 4: Reflect on opportunities to reduce hazards and improve transfusion safety in the clinical setting

In addition to the availability of high-quality blood products, safe transfusion practice requires a sound clinical governance framework, trained staff and appropriate clinical transfusion decision-making, pre-transfusion assessment, blood administration and monitoring processes. Correct patient identification and sample labelling are of fundamental importance.
Multiple-choice questions

Q1: An unconscious patient has been admitted to the emergency department and is given an emergency identification number. The patient is bleeding acutely and you have just commenced transfusing a unit of blood when the relatives inform you of the patient’s correct details. Do you:
A Update the patient’s details immediately to ensure proper identification
B Wait until the critical episode is over and then update the patient’s details
C Update the patient’s details and stop the transfusion until correctly labelled product is available
D Call the hospital transfusion laboratory and ask them to re-label the pre-transfusion specimen with the correct details

Q2: In developed countries, the top risks of transfusion in order of frequency are (greatest to least risk):
A HIV infection, hepatitis B infection, bacterial contamination
B Patient identification error, bacterial contamination, HIV infection
C Hepatitis B infection, hepatitis C infection, HIV infection
D Hepatitis B infection, TRALI, TACO

Q3: A patient’s blood group is A Rh(D) negative. Which of the following red blood cells (RBCs) and fresh frozen plasma (FFP) are appropriate to transfuse?
A ARBC A Pos, FFP A Pos
B RBC O Neg, FFP A Pos
C RBC O Pos, FFP A Neg
D None of the above

Multiple-choice questions

Q1: In the initial management of transfusion reactions:
A Stop the transfusion but do not disconnect or flush the IV line
B Continue the transfusion but slow the rate to a minimum
C Disconnect the transfusion and discard the blood component
D Give a dose of adrenaline if a febrile reaction is suspected

Q2: The major risks of transfusion in developed countries:
A Are due to transmission of infectious diseases
B Are typically caused by human error at various stages of the transfusion process
C Are due to product defects
D Can be prevented by pathogen-reduction technologies

Q3: Checks required at the patient’s bedside prior to transfusion include:
A Patient identifiers on wristband
B Product information on product label
C Patient and product information on compatibility/blood issue form accompanying the product
Multiple-choice questions

Q1: A patient develops hypotension and fever greater than 2°C rise from baseline during a platelet transfusion. Bacterial contamination of the pack is suspected. Which is the incorrect answer?

A. Stop the transfusion and dispose of the platelet bag immediately in a biohazard bag
B. Stop the transfusion and provide immediate care to the patient
C. Take blood cultures and other appropriate tests from the patient and send the platelet bag to microbiology for urgent gram stain and culture
D. Notify the blood supplier urgently – another patient may be at risk from products made with the same donation

Q2: What is the maximum infusion time for a unit of RBCs?

A. Up to 12 hours
B. Up to six hours
C. Up to four hours
D. Up to one hour

Q3: Checking the blood component at the patient’s bedside requires:

A. The patient and two appropriately qualified and trained staff
B. The patient stating his/her identification details and the staff checking these against the patient’s wristband and blood prescription/order form
C. Staff checking that patient identification on the prescription/order matches the information on the compatibility report form and product compatibility label
D. All of the above
Short-answer questions

Q1: Transfusion is a multidisciplinary process and collaboration is essential to achieve a safe and effective transfusion for the patient. Who are the team members participating in hospital transfusion activities?

A: The team members and their roles are as follows:

- Medical staff are responsible for identifying and assessing a patient’s clinical status, including the need for a transfusion or alternative therapies, for discussing options with the patient, and for gaining informed consent for proposed treatments. Medical staff write transfusion prescriptions, including documenting the appropriate product and rate of infusion.

- Nursing staff are responsible for checking the patient, pre-transfusion specimen and product identification, as well as verifying orders, monitoring infusion rates and recording patient observations before, during and after the transfusion.

- Either nursing or medical staff collect pre-transfusion specimens.

- Laboratory staff perform pre-transfusion testing, prepare blood products, manage blood product inventories and issue blood to clinical areas.

- Hospital staff such as porters or orderlies may be involved in transporting blood between the laboratory and clinical areas.

Q2: What is the role of the hospital transfusion committee?

A: The hospital transfusion committee (HTC) or equivalent may function differently in each hospital. However, key functions include clinical governance; oversight of institutional transfusion policy development and implementation; direction of staff education and training in transfusion; monitoring of compliance with national standards and guidelines; guidance for practice improvement efforts such as review of and response to clinical audit data; and coordinating communication with hospital management, clinical leaders and patient representatives.

Q3: A patient is being infused with intravenous immunoglobulin (IVIg, made from donated plasma) on a monthly basis. What, if any, consent is required for this product and if it is required, does it have to be documented for every infusion?

A: According to Australian Standards, hospitals must have policies for informing patients about risks and benefits, and informed consent documented for all blood and blood products such as fractionated plasma products. The time period for which the consent is valid will be defined in institutional policy, but in many hospitals chronically transfused patients have their consent documentation reviewed and updated annually.
Short-answer questions

Q1: Your patient needs a RBC transfusion. What steps do you need to take before the infusion can begin?
A: Check and confirm the following:
• The clinical indication for the transfusion has been documented in the medical notes
• Informed consent discussions have been held and documented according to hospital policy
• A valid pre-transfusion sample and request for pre-transfusion testing have been received by the laboratory
• An order for the patient to receive the product has been written by the medical officer
• An order for pre-medication has been written, if applicable
• All necessary equipment is ready at the patient’s bedside – IV line, IV fluid to prime the line, infusion pump if required, etc.
• Appropriate IV access is in situ and patent
• Baseline observations have been documented
• A valid order for the laboratory to issue product has been sent

You need to undertake all steps before collecting the blood product so that the transfusion can begin promptly when the product is delivered to the clinical area. There must be minimal delay in commencing the transfusion once the product has been received from the laboratory.

Q2: The transfusion laboratory identifies a blood group discrepancy on a sample taken from one of your patients. The current sample is group A, RhD positive and the result on file from a previous admission is group O, RhD positive. How might this occur and how should it be investigated?

The most common reason would be that one of the two samples was taken from another person or labelled incorrectly – usually due to failure to follow patient identification and sample-labelling procedures correctly at the time of pre-transfusion sample collection or labelling. Sometimes this can also occur when a patient deliberately uses another identity. A laboratory error causing sample or results mix-up can also lead to this situation.

The error(s) may have occurred in relation to this current sample or its results, or could have occurred at the time of the previous testing and results. Be aware that another patient may be at risk if the situation involves a sample or results mix-up.
Short-answer questions

Q1: You are conducting a ward-based audit of transfusion practice for the hospital transfusion committee. What are some of the measures that you could record?

A: Measures include:

- Patient consent completed?
- Indication for transfusion documented in the patient health record?
- Valid order for the transfusion?
- Blood transfusion record/compatibility report present?
- Blood transfusion record/compatibility report signed by two staff?
- Date and start time completed?
- Date and stop time completed?
- Transfusion started within 30 minutes of collecting the blood from the fridge?
- Transfusion completed within four hours of spiking the unit?
- Full set of baseline observations performed before the blood transfusion commenced?
- Full set of observations performed within 15 minutes of starting the transfusion?
- Full set of observations recorded at the completion of the transfusion?

Q2: Conserving blood supplies and minimising wastage of blood products is important. What can you do to reduce the wastage of blood products in your ward or other clinical area?

A: If a blood product is collected but then the transfusion cannot be commenced, return any unused product to the hospital transfusion laboratory promptly so it can be used for another patient rather than discarded. Products must be returned within 30 minutes. Only collect (or arrange collection of) the blood product(s) from the transfusion laboratory when you are ready to commence the transfusion. Only collect one unit at a time unless the patient is having massive blood loss.

Q3: Rh(D) negative women are offered routine injections of Rh(D) immunoglobulin, currently at 28 and 34 weeks of pregnancy, plus at times of other potentially sensitising events in pregnancy, to reduce the incidence of haemolytic disease of the foetus and newborn. A blood group and antibody screen are also performed at 28 weeks. Why is it important to take the blood test before giving the Rh(D) Immunoglobulin injection?

A: This product is prepared from donated plasma containing high titres of antibodies to the RhD antigen. The specimen for blood group and antibody testing must be collected prior to giving the RhD immunoglobulin injection, as otherwise the presence of exogenous (infused) antibody from the RhD immunoglobulin may interfere with the test results and cause confusion about whether the antibody is exogenous or immune (produced by the patient in response to exposure to RhD antigens during pregnancy, or possibly through
Flippin’ Blood

A BloodSafe flip chart to help make transfusion straightforward
Patient Blood Management courses

View the Transfusion Practice Courses

Patient Blood Management (PBM)
Patient Blood Management (PBM) is individualised and evidence based care that aims to limit a patient’s exposure to blood products and thereby improve patient outcomes. It is not limited to one clinical specialty or discipline. It improves clinical outcomes for all patients who may be at risk of receiving a blood transfusion. Therefore staff working with medical, surgical, critical care, obstetric and paediatric patients will benefit from this eLearning course. This course is a prerequisite for discipline specific courses, specifically perioperative.

More Information

ACCESS COURSE

Critical Bleeding
This course aims to increase your ability to assess and recognise critical bleeding and to understand the importance of initiating a massive transfusion protocol to manage and control severe bleeding. It is designed for medical practitioners, nurses and midwives, laboratory staff and other healthcare professionals involved in critical bleeding situations.

More Information

ACCESS COURSE

Perioperative
This course aims to improve your knowledge about appropriate blood management strategies that can be used pre, intra and post operatively to optimise patients’ health to reduce the likelihood of them needing a transfusion. It is designed for medical practitioners, nurses and midwives, laboratory staff and healthcare professionals caring for perioperative patients.

More Information

ACCESS COURSE

Critical Care
This course aims to help you identify and apply the principles of blood management to any critically ill patient and will include management of anaemia, prevention and management of blood loss, and appropriate use of blood components. This course is aimed at healthcare professionals - primarily doctors and nurses - caring for critically ill patients.

More Information

ACCESS COURSE

Transfusion Practice Courses

- Clinical Transfusion Practice
- Collecting Blood Specimens
- Transporting Blood

Patient Blood Management Courses

- Patient Blood Management (PBM)
- Critical Bleeding
- Perioperative
- Critical Care
- Postpartum Haemorrhage (PPH)
- Iron Deficiency Anaemia (IDA)
- Medical and Specialties
A valued and valuable resource

‘When transfusion becomes part of a patient’s therapy, whatever happens after that, if something arises in that patient, you must always have transfusion on the agenda as one of the possibilities.’ - Prof James Vedder
Patient identification

Appropriate documentation must be taken to the transfusion provider or blood fridge when collecting a blood pack.\(^1\) This may be a specific form, or the prescription, and should be documented in hospital policy. If your hospital does not require a specific form these details must still be clearly identified in writing and taken to the point of collection.

Activity

\textbf{Use the tabs below to see patient identity details highlighted}

<table>
<thead>
<tr>
<th>First and last name</th>
<th>Medical record number and/or date of birth</th>
<th>Blood product required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blythe, Betty</td>
<td>333 33 33 33</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16/1/84</td>
<td></td>
</tr>
</tbody>
</table>

AUTHORISATION FOR ISSUE OF BLOOD/BLOOD COMPONENTS

<table>
<thead>
<tr>
<th>Surname</th>
<th>Other Names</th>
<th>Ward</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blythe</td>
<td>Betty</td>
<td></td>
<td></td>
</tr>
<tr>
<td>333 33 33 33</td>
<td>16/1/84</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Blood/Blood Component Required (indicate quantity)

Managing acute reactions

Transfusion reactions generally present as clusters of symptoms and signs. Any significant alteration in the patient’s vital signs, symptoms or condition (including pain along IV site, feeling generally unwell, or a sense of impending doom) could indicate a transfusion reaction.

Activity

\textbf{Select a cluster of symptoms for more information about managing acute reactions}.\(^1\)

1. Localised urticaria/rash, pruritus

2. Flushing, wheezing, hypotension, anaphylaxis, generalised urticarial rash

3. Unexpected fever (e.g. greater than or equal to 1 °C above baseline, if baseline greater than or equal to 37 °C) which may be accompanied by chills and rigors

4. Rigors, fever, flank/IV site pain, tachycardia, dyspnoea, hypotension, unexplained bleeding, disseminated intravascular coagulation (DIC), oliguria, haemoglobinuria, haemoglobinæmia
Clinical practice guidelines

The National Blood Authority (NBA) is currently managing the review of the previous Clinical Practice Guidelines on the Use of Blood Components (2001) which had been developed by the National Health and Medical Research Council (NH-MRC) and Australian and New Zealand Society of Blood Transfusion (ANZSBT). The guidelines are progressively being replaced with a comprehensive, evidence-based, Patient Blood Management Guideline which is being developed in six modules. Each module is approved by the National Health and Medical Research Council prior to release and the timetable is as follows:

- **Phase 1:**
  - **Module 1 Critical Bleeding/Massive Transfusion** – released March 2011
  - **Module 2 Perioperative** – released November 2011

- **Phase 2:**
  - **Module 3 Medical** – released September 2012
  - **Module 4 Critical Care** – released April 2013

- **Phase 3:**
  - **Module 5 Obstetric and Maternity** – released March 2015
  - **Module 6 Paediatric / Neonate** – released April 2016

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