# Blood Components and IV Transfusions

BELMATT
HEALTHCARE TRAINING

# Learning Outcomes

This course will develop your skills to:

- Understanding the benefits and risks of a blood transfusion
- Consider alternatives to a blood transfusion
- Demonstrate effective and safe patient assessment
- Explore the importance of a blood transfusion and when it is administered
- Provide patients with education and advice
- Consider the importance of consent before administering bloods.

# What is a Blood Transfusion?

- It is the IV administration of whole blood or its components such as plasma, packed red blood cells or platelet to treat a clinical condition in a patient.

# Why do we administer blood transfusions?

In order to improve oxygen carrying capacity of blood.

Treatment of hypovolaemia

Treatment of symptoms of anaemia

Critically unwell patient with significant blood loss.

# Indications for Blood Transfusion

Treatment of:

1. Acute anaemia – blood transfusions can increase oxygen carrying capacity of blood

- Most young adults can tolerate 30-40% volume loss with adequate crystalloid replacement alone.
- Aim is to keep Hb > 10g/dl

2. Peri – Operative especially before major surgery

3. Severe illness

4. After surgery , trauma or haemorrhage .

5. Leucopaenia (↓se WBC).

6. Agranulocytosis (bone marrow does not produce enough or mature WBC)


# All blood components are made from whole blood

- Packed red blood cells
- Platelets
- Fresh frozen plasma
- Cryoprecipitate

- You only have 4-hours to get the PRBCs infused.
- Any blood not infused in 4-hours could become contaminated.
- For this same reason, you must hang it within 30 minutes of your arrival to the floor

# Important Note!

- Is blood transfusion necessary in this patient?
- If so, ensure:
  - right blood
  - right patient
  - right time
  - right place

# ABO System

There are four main blood groups: A, B, AB and O.

- All normal individuals have antibodies to the A or B antigens that are not present on their own red cells.
- The frequency of ABO groups varies in different ethnic populations and this must be taken into account when recruiting representative blood donor panels. For example, people of Asian origin have a higher frequency of group B than white Europeans.
- Individuals of blood group O are sometimes known as universal donors as their red cells have no A or B antigens.
- However, their plasma does contain anti-A and anti-B that, if present in high titre, has the potential to haemolyse the red cells of certain non-group O recipients

# Requesting Blood and Blood Products

- Human errors are the commonest cause of blood transfusion problems –
- Requests will not (and should not) be processed if any

of the following stages are missed or are wrong

(a) Request Form details have errors

(b) Blood bottle details are incorrect. Check date of birth and hospital number

(c) No patient wrist band or missed details on the

- band

# Preparation of the Patient

- Explain the procedure to the patient & relatives
- Check if patient had undergone prior transfusions and if they had any reactions
- Take informed consent from the patient/relative
- Ensure patient is in a comfortable position
- Check & record the vital signs of the patient.
- Offer a bedpan or take them to the toilet before starting the procedure.
- Educate the patient about adverse reactions & ask her/him

to report immediately

# Consent

- Patients must be given information regarding the risks/benefits and alternatives, including the option of no transfusion. This is the responsibility of a doctor; however, signed consent is not required.
- It is helpful to provide patients with an information sheet outlining the risks and benefits of blood transfusion.
- If a patient refuses a transfusion the Doctor in charge of the patient should be informed and any blood product on the ward immediately returned to the Blood Bank.

# Questions to think about before a transfusion:

- Is this a recent blood result?
- Have you reviewed the clinical condition of your patient?
  Is intervention required?
- Is transfusion the only appropriate intervention?
- Are the blood products prescribed on blood prescription sheet?
  Is it clearly documented in the medical notes why the decision to transfuse?
- Does the patient have the mental capacity required to be able to make an informed decision regarding the transfusion?
- Has the doctor discussed the need for transfusion with the patient, and advised them of all known risks and obtained informed verbal consent?

# Prescribing blood transfusion products

Blood can only be prescribed by a doctor or advanced nurse practitioner (who has completed a recognised Hospital Transfusion Team approved nurse authorisation course specific to blood products).

The prescription for blood and blood products must be signed and dated by the prescriber on the appropriate blood prescription sheet

It is essential that the prescription sheet contains the patient identification details surname, first name, date of birth, patient identification number.

# Check the following information on the prescription

- The prescription must document the following:
  - Consent obtained
  - Retrospective notification of transfusion if consent not obtained.
  - What components are to be transfused
  - ate of transfusion
  - The volume/number of units to be transfused
  - The rate of transfusion for red cells is usually 1.5 - 2 hours. Transfusion must be completed
  - within 4 hours of removal from the Blood Fridge or authorised sealed blood product transit
  - box.
  - The rate of transfusion is 20 - 30 minutes for an adult therapeutic dose of platelets / bag of
  - fresh frozen plasma (FFP) or Cryoprecipitate.
  - Any other special instructions or requirements e.g. Irradiated, HLA matched or CMV
  - negative products required and the reason. Blood Bank must be made aware of any special
  - requirements prior to transfusion.
  - Requirement for any concomitant drugs.

# Timing and viability of samples

- Recent transfusion or pregnancy may stimulate unexpected antibodies
- Serological tests must be collected within 3 days of actual transfusion
- If sample 1 day old when cross matched, blood to be transfused within 2 days
- If no recent transfusion or pregnancy, sample valid for 7 days.
- A second sample should be requested for confirmation of the ABO group of a first time patient prior to transfusion, where this does not impede the delivery of urgent red cells or other components

# Completion of request form

- Full name – surname and forename.
- District number and/or NHS number may be used. Hospital numbers from other hospitals are not acceptable as they do not uniquely identify the patient on PAS. The NHS number must be available for the issue of blood products using BARS.
- Date of birth.  Gender, Patients location
- Consultant
- Number and type of blood products required.
- Date and time required.
- Patient's diagnosis / clinical details (include pregnancy status).
- Reason for the request (clinical indication) including most recent haemoglobin and or platelet count if applicable, include date tested.
- Any special requirements (e.g. Irradiated, HLA matched, CMV negative).
- Date and time bled.
- Requestors name and signature.
- The request form should be signed by the person drawing the sample.
- Date of last transfusion.
- Any known antibodies
- If pregnant within the last 6 months and Rh D negative please state the dates and doses of any prophylactic Anti-D immunoglobulin administered during this pregnancy.

# Management of blood products

- Blood and blood products should be transfused as soon as possible after delivery to the ward / clinical area i.e. within 30 minutes of leaving the blood fridge
- If after collection of the blood a problem arises which prevents immediate transfusion, the unit must be returned to Blood Bank within 30 minutes of collection.
- If blood has been out of the fridge for more than 30 minutes and there is no prospect of its immediate use, the hospital blood bank should be informed. The blood must be returned to the blood bank for disposal due to the risk of bacterial growth and breach of the cold chain regulations.

# Transfusion time

- Final check must be conducted next to the patient by the same trained and competent licensed healthcare professional who administers the component.
- All patients receiving a transfusion must be positively identified.
- All patient core identifiers on the patient's identification wristband must match the details on the blood component label.

All blood components should be administered using a blood administration set with integral mesh filter.

- Transfusion should be completed within 4 hours of leaving temperature controlled storage.

# Inspection of blood products

- The inspection should pay attention to:
  - The integrity of the pack by checking for leaks at the port or seams.
  - Evidence of haemolysis in the plasma or at the interface between red cells and plasma
- Evidence of unusual discoloration or turbidity.
- The presence of large clots.

# Responsibility for the identity check of the Patient and the Blood Product

- Although two members of staff may be involved in the checking procedure it is recommended that one member of staff should be responsible for carrying out the identity check of the patient and the unit of blood at the patient's bedside.
- The member of staff must be a doctor, or a nurse holding current registration of the GMC Professional Register as a Registered General Nurse (RGN), Registered Sick Children's Nurse (RSCN) or Registered Midwife (RM).

# Traceability

The return of the blood tags is mandatory.

- The completed detachable blood tag must immediately be returned to Blood Bank following the completed transfusion.
- The peel off sticker from the blood tag must be attached to the prescription sheet.
- The start and finish time of the transfusion must be recorded on the blood prescription sheet
- The efficacy/ outcome/ benefit of this transfusion must be recorded in the patients notes

# Adminstration : Giving Sets

- Adhere to strict aseptic techniques when handling blood or blood components.
- Blood products should be transfused through a sterile giving set designed for the procedure.
- Filtersize;170–200 micron filter is required.
- Drugs must not be added to blood products under any circumstances.

Cannula

A 20 gauge cannula is the minimum size required for transfusion in an adult. The size of cannula chosen can affect the speed at which the blood can be transfused.

# Red Cells (RBC) (SAGM Volume 220 – 340ml)

- Electronic infusion pumps may damage blood cells and should not be used for administration of red cells unless the manufacturers have verified them as safe to use for this purpose, staff have been trained in their use and all maintenance requirements are met.
- To prevent bacterial growth a new giving set must be used after 12 hours or after 3 units whichever is earlier. Some giving sets may be issued with different instructions, if the usage life of a giving set is shorter always follow the manufacturers instructions.
- Start transfusion as soon as the unit is received from Blood Bank.
- Each unit of blood must be used within a maximum of four hours from leaving the Blood Bank fridge or validated sealed blood storage box, usually red cells are transfused over 2-3 hours.
- Washing through the remainder of the blood in the line with Sodium Chloride 0.9% is not recommended.
- All blood products are leucocyte depleted.
- Usually supplied as packed red cells in additive solution (SAGM).
- Red cells can be irradiated, HLA matched, HT, K, Hb S or CMV negative for specific patient groups.
- Blood Bank must be notified of any special requirements.

# Platelets (PLT) (Mean Volume 202ml)

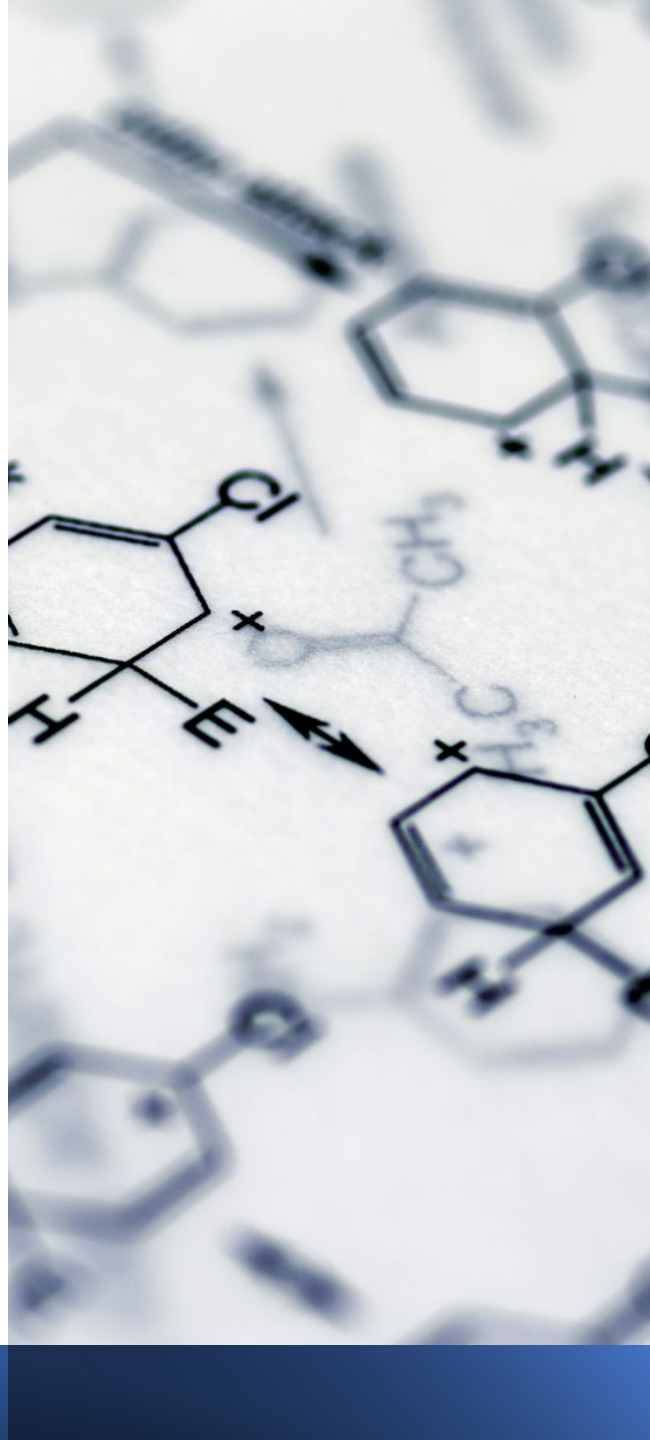
- A standard blood or platelet giving set should be used for the administration of platelets.
- Platelets should be transfused through a new clean standard blood or platelet giving set (not one already used for blood).
- Never put platelets in a fridge.
- Start infusion as soon as the pack is received from the Blood Bank.
- Infuse stat or maximum time 30 minutes in an adult.
- In paediatrics infuse over 60 minutes via the designated pump (unless specifically directed otherwise in emergency situations).

# Rh D Negative Female of Child Bearing Age:

- If Rh D positive Platelets have to be given in a clinical emergency where a delay in waiting for RhD negative platelets would increase risk to the patient, prophylactic anti-D immunoglobulin must be given at a dose of 250 IU immediately, by intramuscular injection, after platelet transfusion.
- This 250 IU dose is enough to cover five successive adult therapeutic doses of RhD positive platelets over a period of up to six weeks.
- Nevertheless, if a unit of RhD positive platelets has been given and followed by anti-D prophylaxis, and if further treatment with platelet concentrates is required, RhD negative platelets are still preferred and recommended.

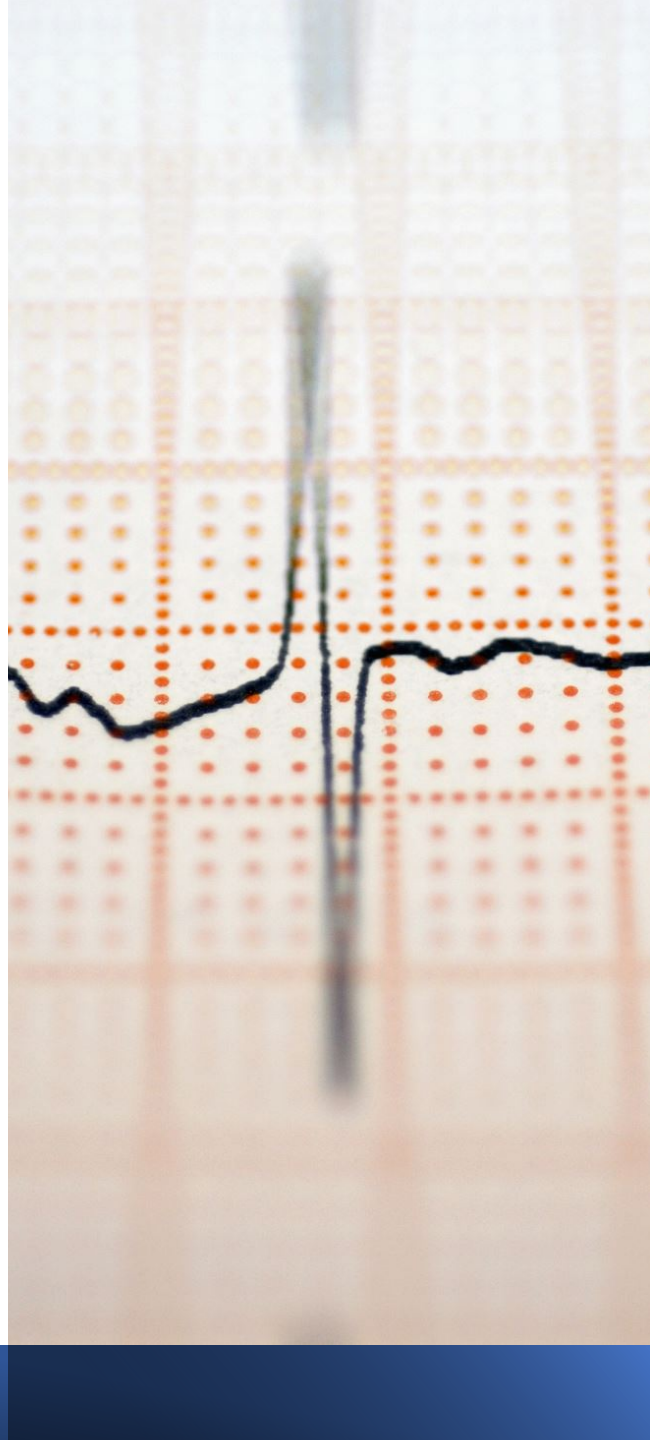
# Fresh Frozen Plasma (FFP) (Mean Volume 271ml)

- Filter size; 170 – 200 micron filter is required (blood giving set).
- Do not refreeze. Use within 4 hours if maintained at 22oC ± 2oC or 24 hours if stored at 4oC (extended storage will result in a decline in labile coagulation factors).
- Start infusion as soon as the pack is received from the Blood Bank
- Infuse each bag over not more than 20-30 minutes.



# Monitoring of Adults Patient

- Observations should be undertaken for every unit transfused. Minimum monitoring of the patient should include:
- Regular visual observation throughout the transfusion episode
- Pre transfusion pulse (P), blood pressure (BP), temperature (T), respiratory rate (RR) and Oxygen saturations.
- saturation. To be taken no more than 60 minutes before starting transfusion
- A complete set of vital signs should be taken 15 minutes after the start of each transfusion for all patients.
- For a stable patient repeat vital signs at the halfway mark.
- More frequent observations may be required e.g. rapid transfusion, or patients who are unable to complain of symptoms which would raise suspicion of a developing transfusion reaction



# Types of Reactions

- Acute hemolytic reactions (ABO incompatibility)
- Febrile reactions (leukocyte incompatability)
- Allergic reactions (reaction to plasma proteins— IgM,IgA,IgD,IgG, IgE)
- Circulatory overload: Cardiac or renal insufficiency. Need fluid balance assessment
- Sepsis: Improper handling/contamination

# Adverse Transfusion Reaction

- Stop the transfusion immediately and maintain IV access with 0.9% normal saline. Notify the physician.
- All adverse reaction events MUST be reported to the Blood bank regardless of the signs/symptoms Request Transfusion Reaction Investigation
- Monitor patient's vital signs.
- Re-check identification of patient and blood and/or blood product.

- If a serious adverse reaction is suspected collect T&S and first voided urine sample, complete transfusion reaction form and return blood/blood product to Blood Bank

- Minor Allergic or Febrile Adverse Reaction – ask Physician about medication, and you may be able to restart transfusion
  - Notify lab – if transfusion is restarted and with
  - no further incident, document steps taken on
  - transfusion reaction form and return.

- **Remember the unit must be transfused within**
- **4 hours of leaving the blood bank regardless**
- **of how much has be transfused.**

# Transfusion Reactions

**Serious Signs and Symptoms:**

**Any ONE of the following:**

- **Onset 15 min or less:**
- **Bleeding from IV site**
- **Hypotension/shock**
- **Nausea/vomiting**
- **Rigors**
- **Anxiety**
- **Tachycardia/Arrhythmia**
- **Back/chest pain**
- **Generalized flushing**
- **Dyspnea/SOB**
- **Hives/rash covering >2/3 body**
- **Hemoglobinuria**

**Check for Clerical Discrepancy Or Incompatibility**

**Allergic:**

- **Skin reaction ONLY (no other symptom - Hives/rash covering 2/3 or less of body**

**Febrile Reaction:**

- **Increase of temperature by 2 degree as well as a temperature greater than 38 degrees**
- **No other symptoms AND**
- **Onset > 15 minutes in transfusion**

# Symptoms of a Reaction

- Pyrexia and other symptoms or signs of an inflammatory response (myalgia, malaise, nausea, chills or rigors) may  occur in acute haemolysis.
- Temperature increase >2 degrees above normal temperature
- Urticaria and angio-oedema indicates possible life threathening allergy
- Dyspnoea, stridor or wheeze

- STOP infusion immediately.

# Severe Adverse Reactions

- Stop transfusion immediately
- Change blood administration set and maintain venous access using Sodium Chloride 0.9% running slowly to keep the vein open.
- Inform patient's doctor
- A Consultant Haematologist must be informed.
- The reaction should be reported immediately to the Blood Bank, who will issue a Transfusion Reaction Investigation sheet. Follow the instructions carefully, complete the sheet and return to Blood Bank as instructed along with any remaining blood products which may have been involved in the reaction
- Monitor vital signs every 15 minutes
- The volume and colour of any urine passed should be recorded in the patient's notes.

# Documentation of Severe Adverse Events / Reactions

- Any adverse events should be recorded in the patient's notes and logged on the blood prescription sheet (WPR26561).
- Report via DatixWeb.
- All adverse events related to blood / blood product transfusion will be reviewed by the
- Hospital Transfusion Committee.
- Serious adverse events should be reported to the MHRA via SABRE (Serious Adverse Blood Reactions and Events) and to SHOT (Serious Hazards of Transfusion) via the Blood Bank.
- Suspected cases of transfusion-transmitted infection / TRALI should be reported immediately to the local Transfusion Centre via the Blood Bank.

# Completion of Transfusion

- If a further blood component unit is prescribed
  o Repeat the administration/identity check with each unit.
- If no further units are prescribed
- Remove the blood administration set and dispose of bag and tubing
- Ensure all transfusion documentation is completed and the tag is returned immediately to Blood Bank.
  Return any unused blood products to Blood Bank.

# Patient Refusal of Transfusion

- Acknowledge and respect patients beliefs
- Explain risks and benefits clearly
- Record in patients notes
- ***Jehovah's Witnesses have definite objections to blood transfusions for both religious and medical reasons. Witnesses rule out the transfusion of red cells, whole blood, fresh frozen plasma, platelets and white cells, Pre-donation (PAD) and may refuse to donate bone marrow/ stem cells. Anti-D immunoglobulin and Cryoprecipitate may be accepted and should be offered where appropriate.

# Documentation

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:

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

# MCQ

In high dependency units it may be necessary to know the infusion rates in:

a. ml/hr
b. dl/hr
c. Kg/hr

# MCQ

- You are monitoring a patient and note that they appear to be having a transfusion reaction. After you stop the transfusion, which action should be immediately taken next?
  a. Remove the IV line
  **b. Run normal saline to keep the vein open**
  c. Run a solution of 5% dextrose

# MCQ

- Why do we transfuse patients with blood products

a. Restore blood volume after hemorrhage

b. Maintain hemoglobin levels in severe anemia

c. Replace specific blood component.

d. All of the above.