
GRANULOCYTE TRANSFUSION

PURPOSE

To order and transfuse **granulocyte products** effectively and safely.

SCOPE

This policy and procedure applies to Division 1 Nursing staff, and Medical officers.

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PROCEDURE

1. Ordering Granulocytes

Director of Apheresis must approve granulocyte requests. The procedure is a multistep process with potential complications associated with donor granulocyte collection (to the donor) and product administration (to the recipient).

Due to the complexity and time required for the donor screening and collection process, advise Apheresis staff as soon as possible of the potential need to collect granulocyte products.

The referring physician must complete the **Apheresis Unit Referral Form (MRxx)**, providing all **patient (recipient) details as requested.**

This referral must be reviewed and approved by the Director of Apheresis prior to any potential donor screening or apheresis procedures being undertaken.

The completed referral form is to be sent to Apheresis Unit nursing staff.

A **minimum of 2 working days notice** is required to allow for donor screening procedures and administration of marrow stimulating medications to the donor. Refer to **Apheresis Staff** for more information on **ext 7848/ mobile 0431 507109** and Granulocyte and Platelet Screening and collection policy (A 2.7.12)

The Medical Officer must write the orders for infusion on the Intravenous Prescription Form (MR51)

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Insertion:	August 2005 Refusal Of Blood Products (Lisa Stevenson & Dr Philip Campbell, Haematologist)	13. Granulocyte Transfusion
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2. Indications

The indications for a Granulocyte transfusion should include the following:

1. Profound neutropenia ($< 0.5 \times 10^9/L$)
2. A documented or presumed severe bacterial or fungal infection
3. No response of the infection after 48 hours of appropriate antibiotic treatment
4. Expected prolonged neutropenia
5. Anticipated survival of > 6 months

3. General Information

General: Granulocytes are a blood component that includes various types of white cells in addition to neutrophils.

Red cells in the granulocyte product should be ABO-compatible with the recipient's plasma. Crossmatching of the product is required given the significant amount of red cell contamination in the product

Where possible, **cytomegalovirus (CMV) seronegative patients should receive CMV seronegative granulocytes.** If a CMV positive donor is all that is available for a CMV seronegative recipient, the treating consultant must be informed and confirm collection prior to the donor stimulation procedure.

Granulocyte products **must be irradiated** prior to transfusion to reduce the risk of transfusion-associated graft versus host disease (TA-GVHD), which is almost always fatal.

Recommended Dose: Daily transfusion until patient's infection resolves or neutrophil count exceeds $0.5 \times 10^9/L$

Administration:

IV infusion **using a filter-free line available BW6**

(An **IMED pump should not** be used due to fragility of cells)

(DO NOT USE leukocyte reduction filters or microaggregate filters)

Pre-medication with paracetamol or anti-histamines is recommended routinely due to a high incidence of fevers. Steroids should be considered on an individual patient basis. (Previous febrile reaction not predictive)

Rate of Infusion: Granulocytes should be infused as soon as possible after collection (see expiry)

The product infused **slowly (25mL over the first 15 minutes)** with the RN observing the patient. If no reaction is observed, increase the infusion rate to **complete the transfusion within one hour.**

Amphotericin B and granulocyte transfusions should be separated by at least two hours if concomitantly prescribed.

Compatibilities: Normal Saline 0.9%

Storage: Granulocytes should be maintained at 20-24°C **DO NOT REFRIGERATE.**

Handle granulocyte products carefully. **DO NOT SQUEEZE** the pack as this will cause cell destruction.

Expiry: Product **must** be infused **ASAP** after collection and irradiation, preferably within 8 hours, but no later than 24 hours, from the time of collection indicated on the product label.

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4. Procedure for Administering Granulocytes

Equipment Required

- **Filter-free** infusion set – available from BW6 - platelet and leucocyte infusion line (**DO NOT USE leukocyte reduction filters or microaggregate filters**)
- PathCare Blood product Transfusion report form
- Intravenous Prescription Form (MR51)
- Non-sterile gloves
- Safety Goggles

Product and Recipient Identification Procedure

Two Division 1 Registered Nurses or Division 1 Nurse and RMO confirm that the following points correspond immediately prior to the transfusion, at the patient's bedside.

The transfusion **must not** commence if any discrepancies are found. Clarification must be sought by contacting the PathCare Blood Bank Scientist (ext 7351).

1.	Patient's full name and date of birth (DOB) and UR if available	<ul style="list-style-type: none"> • Verbally with the patient (where possible) • Patient's Identification Band • Blood Product Transfusion report form (PathCare) • Intravenous Prescription Form (MR51) • Blood product label on the product (PathCare) • Apheresis Label on Product
2.	ABO & Rh Blood Group of the patient and Product.	<ul style="list-style-type: none"> • Blood product Transfusion report form (PathCare) • Blood product label on the product (PathCare)
3.	Product Identification Number	<ul style="list-style-type: none"> • Blood product Transfusion report form (PathCare) • Blood product label on the product (PathCare)
4.	Expiry of the Product And Pack Integrity	<ul style="list-style-type: none"> • Blood Product Transfusion report form (PathCare) • Blood product label on the product (PathCare) • Pack is intact (Granulocyte transfusions will usually be dark red and cloudy). • Absence of clots and foreign bodies • No later than 24 hrs from time of collection on Apheresis product label
5.	Check to: <ul style="list-style-type: none"> • Ensure the product is irradiated • Ensure the product is labeled as non-reactive for Hepatitis B & C, HIV 1/2, HTLV I/II and syphilis. 	

Both professionals checking the product **must** sign the Blood product Transfusion report form (PathCare) after checking each unit of granulocytes.

A summary of this checking procedure is provided on the Blood product Transfusion report form to ensure the correct checking procedure is followed.

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Administration Procedure

1. Prior to commencing transfusion ensure that the **patient** has received adequate education and has had an **opportunity to ask questions about granulocyte transfusions and agrees to the transfusion.**
2. Prime the **filter-free** giving set with **Normal Saline 0.9%**. It is recommended that there is access to an IV line primed with Normal Saline 0.9% in addition to the filter-free giving set for immediate use if a transfusion reaction occurs. (An example of this set up is utilizing a 3-way tap at the cannula site connecting a blood giving set and a standard giving set).
3. **Administer any prescribed pre-medication at least 20-30 minutes prior** to commencing the transfusion, where such a delay is consistent with the clinical indication for the transfusion
4. **Complete the product checking procedure** outlined above at the patient's bedside and record baseline observations.
5. Commence granulocyte transfusion **slowly (25mL over the first 15 minutes) and remain with the patient.** If there is no evidence of a reaction, adjust transfusion rate according to Intravenous Prescription Form (MR51)

6. Observations

- a) **Record baseline vital signs** (temperature/pulse/respirations/blood pressure and oxygen saturation by pulse oximetry)
- b) Remain with the patient for the first 15 minutes of the infusion and observe
- c) for adverse effects.
- d) **Record vital signs every 15 minutes during the transfusion**
- e) **Record vital signs at completion of the transfusion.**

Continue to closely monitor the patient throughout the duration of the transfusion. More frequent vital signs may be required if the patient becomes unwell or shows signs of a reaction.

8. At completion of the granulocyte infusion **flush with at least 10 ml of Normal saline 0.9%.** Discard the IV Giving set and granulocyte bag into the appropriate infectious waste disposal bin.
9. Document the transfusion in the patient's history.
10. A **post-transfusion FBE should be taken 30-60 minutes following** granulocyte infusion.

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5. Adverse Reactions –

Be aware that clinical symptoms, not changes in vital signs, may be the first indications of a transfusion reaction.

Symptoms	Possible type of Reaction	Action
1. Chills, unexpected fever (>38°C), nausea, vomiting, headaches. The fever may be severe with granulocytes, but in most cases will be persevered with the infusion	Non-haemolytic febrile reaction If symptoms are severe consider Septic- bacterial contamination (Medical emergency)	STOP TRANSFUSION maintain IV access, monitor vital signs, seek medical advice, return blood bag back to Blood Bank for culture if requested. Complete documentation of incident.
2. Localised hives, rash, flushing, wheeze, hypotension	Allergic	STOP TRANSFUSION , maintain IV access, monitor vital signs, and seek medical advice.
3. Chills, fever, back pain, ooze from IV site, pain at insertion site, hypotension, haemoglobin-urea, and feeling of impending doom, shock.	Anaphylactic ABO incompatibility, haemolytic *(Hypotension may occur in patients on ACE inhibitors)	STOP TRANSFUSION , maintain IV access, monitor vital signs, and seek medical advice URGENTLY . May require resuscitation, contact MET or Code Blue on 5555
4. Dyspnoea, productive cough, pink frothy sputum, hypertension, headache, respiratory distress, hypoxic	APO- Fluid overload TRALI –Transfusion Related Acute Lung Injury	STOP TRANSFUSION Sit patient upright, administer oxygen therapy, monitor vital signs, maintain IV access and seek medical advice May require resuscitation, contact MET or Code Blue on 5555

Nursing Intervention (if adverse reaction is apparent or suspected)

Cease transfusion immediately, maintain IV access with Normal Saline 0.9%.

Check vital signs

Notify the Medical Officer and leave transfusion line intact until patient is reviewed.

Carry out any further action as indicated by the medical officer, which may include;

- Resumption of transfusion after management of current reaction and pre-medication
- Cessation of granulocyte transfusion.
- Change the intravenous line and replace with a line using Normal Saline 0.9%
- Collection of blood from the patient by venepuncture (4 mL of blood in a EDTA tube, 10 mL in a serum tube and blood cultures)
- Collect urine specimen
- Retain & return granulocyte bag immediately to PathCare Blood Bank, together with a Transfusion Reaction form
- Complete a RiskMan Form
- Document the details of the reaction in the patient's clinical records.

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Clinical Haematology Staff (Consultant or Registrar) or PathCare Blood Bank staff (Haematologist or Scientist) can assist with further advice.

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6. References

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Royal Melbourne Hospital Policy and Procedure Manual, Granulocyte Collections.

Strauss, R. G. Section 1: Blood Components and Derivatives. Chapter 20: Neutrophil Collection and Transfusion

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FURTHER INFORMATION

Barwon Health Apheresis Unit.

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