Administration of Granulocytes

Staff this document applies to
Registered nurses, authorised enrolled nurses and medical staff.

Related policies, procedures or guidelines
Blood Specimen/Request Form Labelling for Pre-Transfusion Testing
Requesting Blood Components for Emergency and Non-Emergency Transfusion
(Informed) Consent (to diagnosis and treatment) policy
Management of Patients Who Refuse Blood and Blood Products policy
Collection of Blood / Blood Products from the Austin Blood Bank (Austin Hospital)
Anaphylaxis-Initial Management
Patient Information (adult & paediatric) - Blood Transfusion Website - Austin Health
Medication Administration – Enrolled nurses and nursing students on placement

Purpose
This document will provide guidance to staff to safely administer granulocytes and assist in recognising and managing reactions associated with granulocyte transfusion.

Definition
Granulocytes are a blood component that includes the following white cells - lymphocytes, neutrophils, eosinophils and basophils. The granulocyte component collected for transfusion primarily contains neutrophils.

Indications for using granulocyte transfusion include:

1. Severe neutropenia, defined as an absolute neutrophil count < 0.5 x 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. Neutrophil recovery is expected and/or there is anticipated therapy of curative potential planned.

Recommended Dose: Daily administration of one donated unit of granulocytes until the patient’s infection resolves or the patient’s neutrophil count exceeds 0.5 x 10^9/L and is maintained. Granulocytes should be given at a minimum dose of 1x10^10 granulocytes to achieve a therapeutic effect, but ideally at a higher dose of 2-3x10^10.
Granulocytes are collected from related donors (family members, friends) who are screened for suitability by the haematology medical staff. The granulocyte component is collected by the Cannulation and Apheresis Treatment Service via a procedure called apheresis.

Donors and recipients should be ABO compatible (for red cells and plasma) and a current group and screen should be available to allow crossmatching of the product with the recipient given the significant amount of red cell contamination in the product.

Where possible, cytomegalovirus (CMV) seronegative patients should receive CMV seronegative granulocytes.

Donors are screened for infectious disease risk which includes testing for HIV, hepatitis B and C. Granulocytes will be authorised for release from blood bank following review of test results by the treating haematology consultant. NAT testing results will unlikely be available prior to granulocyte transfusion therefore the treating consultant will have a discussion with the patient and/or family about the risk/benefit of releasing the component for transfusion without the NAT results being available. Any such discussion shall be documented in the patient’s medical notes.

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**Clinical Alerts**

- The staff member spiking/hanging the granulocyte component must be one of the two staff members who have undertaken the blood component and patient identity check. ¹

- **ALL** patients receiving granulocytes must have an identification wristband in-situ that includes the patient’s surname, given name(s), UR number and date of birth.

- Donors and recipients should be ABO red cell and plasma compatible and crossmatching of the product with the recipient is required given the significant amount of red cell contamination in the product.

- Granulocyte components must be irradiated prior to transfusion to reduce the risk of transfusion-associated graft versus host disease (TA-GVHD). Granulocytes should not be administered unless a label to indicate irradiation has been attached or affixed.

- Consent: Patients receiving granulocyte transfusion shall provide written consent using the Blood Transfusion M109.0 form. Medical staff shall indicate that the consent relates to granulocyte transfusion.

- Compatible fluids: 0.9% sodium chloride¹,²,³ Albumin 4%, plasma protein fractions and ABO compatible plasma may be administered concurrently with blood following approval from the treating doctor.¹,²,³

- Incompatible fluids: Crystalloid/colloid solutions containing calcium (i.e. Haemaccel). Concurrent administration will cause clotting in the IV line.¹,²,³ Note: Gelofusine has a negligible calcium content and therefore does not clot blood if given concurrently through the same intravenous line.⁹

- Granulocyte components issued from blood bank are intended for immediate use. If there is no intention to administer the component immediately then it must be returned to blood bank without delay.

- **DO NOT** store in ward fridges. Granulocytes are stored in Austin Blood Bank at room temperature 20 – 24°C.¹

- **DO NOT** agitate the product.¹
• **DO NOT** use leucocyte (white cell) removal filters for administration.

• **DO NOT** use a mechanical infusion device to administer granulocytes due to cell fragility.

• The product has a shelf life of 24 hours however granulocyte function deteriorates during storage therefore the component should be administered as soon as possible following donation (within the first 6 hours for greatest benefit).

• **Transfusion Reactions** and adverse events associated with granulocytes include febrile reactions, TRALI (Transfusion Related Acute Lung Injury), allergy/anaphylaxis and HLA immunisation.

  ALL actual or suspected transfusion reactions must be reported (see section 5 Transfusion Reaction/s – Immediate management)

*Extreme care must be taken with the unconscious/confused/child patient to determine consent for transfusion. Patients who are Jehovah’s Witnesses do not accept blood or its components. For further information please refer to the Management of Patients Who Refuse Blood and Blood Products policy*

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**Equipment**

• **Blood administration set** with 170 -200 micron in-line filter.

• **DO NOT** use infusion pumps due to cell fragility.

• Prescription on Blood Transfusion M109.0 form.

• Compatibility and Administration Record D1.1 issued with the granulocyte component.

• Frequent observation chart

• Fluid balance chart if required.

• Standard precautions equipment: non-sterile gloves, eye protection goggles.

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**Patient Preparation**

• Explain the procedure to include the indication/s for granulocyte transfusion.

• Educate about adverse reactions (see clinical alerts).

• Identify allergies and relevant past history from patient and/or medical record.

• Assess patient for any pre-existing fever, rash, itching or other signs which may later be confused with a transfusion reaction.

• Ensure that written patient consent has been obtained prior to transfusion. The Blood Transfusion M109.0 form may be used to obtain consent for granulocyte transfusion.

• Ensure that the patient has patent IV access prior to requesting the granulocytes to be collected from the blood bank.
1. **Patient and Blood Component Identification Procedure**

   Two qualified members of staff: registered nurse, authorised enrolled nurse, medical, must check the granulocyte component and orders at the patient’s bedside **immediately prior to administration**.

   1. **ASK** the patient to **state** their **FULL name and date of birth** and ensure that the details provided (including UR number) are identical to those on:
      - The patient’s identification wristband,
      - Compatibility label attached to the granulocyte unit,
      - Prescription: Blood Transfusion Form M109.0, and
      - Compatibility and Administration Record D1.1.

      If the patient is unconscious / confused / infant, the identification wristband **must** be used to verify their identity. Check the identification wristband for the patient’s surname, given name(s), UR number and date of birth. It is also important to verify the patient’s identity with a carer/spouse/parent if available.

   2. Cross check the following blood component details (one at a time) against the granulocyte unit label and the Compatibility and Administration Record D1.1:
      - Type of blood component
      - Blood group of granulocyte unit and patient - **Are they compatible?**
      - Donation number
      - Expiry date
      - Irradiation of product

   3. Check the prescription (Blood Transfusion form M109.0) for the following:
      - Type of blood component
      - Duration of infusion
      - Special requirements eg CMV negative
      - Medications required e.g. premedication, frusemide

   4. Visually inspect the granulocyte bag for:
      - Leaks at ports or seams
      - Evidence of discoloration or turbidity
      - Presence of clots

   **If there are any discrepancies with the above steps DO NOT PROCEED and rectify the problem immediately. If unsure seek advice from senior staff or haematology laboratory registrar.**
2. **Granulocyte Administration Rate**
   - One unit of granulocytes is generally administered over 1-2 hours.
   - The administration rate should be no greater than **5mls/minute for the first 15 minutes** of transfusion.\(^1\) If no reaction has been noted after the first 15 minutes, continue the administration at the prescribed rate as outlined on the Blood Transfusion orders.
   - Granulocytes should be **administered as soon as possible** after collection (at least within 6 hours).
   - Pre-medication with paracetamol is recommended routinely due to a high incidence of fevers. Steroids should be considered on an individual patient basis. Previous febrile non-haemolytic reactions to other cellular blood component transfusions are a useful guide to the likelihood of reactions to granulocytes
   - Administer any prescribed pre-medication at least 20-30 minutes prior to commencing the transfusion
   - **Amphotericin B and granulocyte transfusions should be separated by at least two hours if concomitantly prescribed**

3. **Patient Monitoring**
   Always maintain close observation of the patient for the first 15 minutes of the granulocyte transfusion and observe for signs of transfusion reaction (see clinical alert section).
   The following vital signs are the minimum required and should be performed with the administration of each new unit of granulocyte component.
   - Vital signs (Temperature, pulse rate, respiratory rate and blood pressure) immediately prior to commencing the transfusion,
   - Repeat vital signs after 15 minutes
   - Repeat vital signs half-way through the unit, and
   - Repeat vital signs at the end of unit.

   More frequent vital signs during the infusion must be taken when:
   (a) The patient has an unstable underlying condition,
   (b) The patient becomes unwell or shows signs of a transfusion reaction.

   Maintain frequent visual observations (at least every 15 minutes) of the patient throughout the transfusion for signs of transfusion reaction or fluid overload.

4. **Transfusion Reaction/s – Immediate management**
   Be aware that clinical symptoms (see clinical alert section), not only changes in vital signs may be the first indications of a transfusion reaction.

   In the event of a transfusion reaction:
   1. **STOP** administration immediately and maintain IV access (keep the suspected unit and attached administration set for possible investigation)
   2. **ASSESS** vital signs and stabilise the patient.
   3. **CHECK** the granulocyte bag and all paperwork against the patient’s identification to confirm that the blood component was intended for the patient.
   4. **NOTIFY** medical officer promptly. **MET / MER** call if patient meets criteria.
5. **ADMINISTER** instructions given by the medical officer to treat the reaction.

6. **REMAIN** with the patient until the reaction has resolved.

7. **REPORT** the reaction. Complete the transfusion reaction report, located on page 4 of the Blood Transfusion Form M109.0. Complete a RISKMAN incident report.

8. **DOCUMENT** the reaction and associated management in the patient’s medical record.

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**Post –Procedure Care:**

**Post Transfusion Increment**
- A post-transfusion FBE should be taken 30-60 minutes following granulocyte administration.

**Disposal of waste**
- On completion of administration, dispose of any waste (blood bags and administration sets) into the yellow infectious waste bins located on all wards/departments.

**Documentation**
- Ensure the compatibility and administration record D1.1 is complete to allow traceability of blood products administered to the patient. Some complications of transfusion can be recognised many years following transfusion therefore; **It is a requirement that all blood / blood products can be traced back to the individual recipient by donation or batch number for a period of 20 years**5,7,8

- Ensure the following is documented in the patient’s medical record: vital signs, date and time of administration, signatures of staff checking and administering the product and patient tolerance of the treatment.

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**Legislation/References/Supporting Documents:**

1. AABB technical manual. 15th Ed. 2005


6. Peter MacCallum Cancer Centre Policies and Procedures Clinical Manual, Granulocyte Transfusion-34.10

7. Public Record Office Standard, PROS 99/04, Authority, General Retention & Disposal Authority for Public Health Services Patient Information Records, Incorporating Variations 1 & 2, Ref No. 3.7.0


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