Granulocytes

APPLICABILITY: This document applies to AHS, Covenant Health, and all other health care professionals involved in the transfusion of blood components and products in Alberta.	***Other Names:*** *N/A* ***Class:*** *Human blood component*

	INTRAVENOUS			OTHER		
ROUTES	**DIRECT IV**	**Intermittent Infusion**	**Continuous Infusion**	**SC**	**IM**	**OTHER**
Acceptable Routes*	No	Yes	No	No	No	N/A

*** Professionals performing these restricted activities have received authorization from their regulatory college and have the knowledge and skill to perform the skill competently.**

DESCRIPTION OF PRODUCT:

- Granulocytes are a human blood component obtained by apheresis collection from a single donor.
- Each unit contains at least 1 x 10^{10} granulocytes, 24 - 40 mL red blood cells, and variable amounts of lymphocytes and platelets in plasma.
- Each unit also contain approximately 36mL of Hespan 6% and 2mL of sodium citrate.
- Due to the short shelf life of 24 hours, granulocytes are shipped prior to the completion of transmissible disease testing.

AVAILABILITY:

- Granulocytes are only collected at Héma-Québec in Canada and transported to the local Canadian Blood Services (CBS) centre for distribution.
- The local Transfusion Medicine (TM) service must be contacted for approval.
- Must be irradiated prior to administration, to prevent transfusion-associated graft-vs.-host disease (TA-GVHD).
- Must be ABO compatible (for red blood cells and plasma) due to significant amount of red blood cell contamination in the product.
- Where possible, CMV seronegative patients should receive CMV seronegative granulocytes.

INDICATIONS FOR USE:

- Maintenance therapy for patients with severe neutropenia (<0.5 x 10^9/L) and severe, documented bacterial or fungal infection that is unresponsive to antimicrobials or antifungals.
- The use of granulocyte transfusions is controversial and is only done after consultation with a Transfusion Medicine (TM) physician.

CONTRAINDICATIONS / CAUTIONS:

Contraindications

- Not recommended for prophylactic treatment of infections.

Cautions

- There may be less benefit and higher risk of complications for patients with anti-HLA or anti-neutrophil antibodies.
- Due to short shelf life and the need to transfuse as soon as possible after collection, transmissible disease testing often cannot be fully completed prior to transfusion. Informed consent should reflect specific consideration for transfusion of incompletely tested products.

DOSE:

- Consult with a Transfusion Medicine physician for transfusion frequency.
- Clinical endpoints include:
  - Resolution of infection;
  - Fever diminishes or disappears;
  - Absolute neutrophil count ≥ 0.5 x 10^9/L; or
  - Most Responsible Health Practitioner (MRHP) stops therapy.
- A transfusion of granulocytes is rarely associated with an increase in granulocytes in the patient. This may be attributable to the consumption of granulocytes at the infectious process site.

ADMINISTRATION:

Ensure patient consent has been obtained prior to requesting blood components and products from lab/TM service where possible.

Pre-Infusion:

- Pre-transfusion testing is required.
- Administer any ordered pre-medications.
- Perform the appropriate pre-transfusion checks per nursing protocol.

Access:

- Peripheral, central, umbilical, and PICC lines are acceptable (PICC lines are not used in the NICU for blood component transfusions).

Administration Supplies:

- Standard blood transfusion set (170 – 260 micron filter).
- Do not use a leukocyte reduction or microparticulate filter, as these will trap the granulocytes.

Compatible Solutions:

- 0.9% normal saline.
- Plasma protein products and ABO compatible plasma can be administered concurrently with physician order.

Incompatible Solutions:

- Calcium-containing crystalloid or colloid solutions.

Administration:

- Transfuse immediately upon receipt, due to expiry 24h post-collection.
- Complete transfusion within 4 hours of issue from the lab/TM service.
- Transfuse via gravity flow where possible, due to cell fragility.

Infusion Rate/Duration:

- Rate/duration should be specified by MRHP after patient assessment. Generally transfused over 1 – 2 hours.
- Starting rate: 1 – 2 mL/min (60 – 120 mL/h) for the first 15 minutes. For infusions calculated at or slower than 60 mL/h, start transfusion at half the prescribed rate for the first 15 minutes.
- If no reaction in the first 15 minutes, continue at the prescribed rate for the remainder of the transfusion.

Additional Notes

- If ordered concomitantly, separate amphotericin B administration and granulocyte transfusions by at least 2 hours.

POTENTIAL HAZARDS WITH PARENTERAL ADMINISTRATION:

Adverse Events

- Potential adverse events related to a blood component transfusion range in severity, from minor with no sequelae, to life-threatening.
- All adverse events occurring during a transfusion should be evaluated to determine whether or not the transfusion can be safely continued/restarted.
- All adverse events suspected to be related to a transfusion (whether during or after a transfusion) should be reported to your local lab/ TM service.
- Chills, fever, and pulmonary insufficiency can be associated with granulocyte transfusions.
- Side effects (especially allergic reactions) due to Hespan® 6% (corticosteroid used to stimulate granulocyte donor) are possible.

NURSING IMPLICATIONS:

Patient Monitoring:

	Pre Transfusion Vitals?	Stay At Patient Bedside			Vital Signs During Transfusion		Post Transfusion Monitoring
		First 5 min	First 10 min	First 15 min	After 15 min	Remainder of transfusion	
ADULTS (in patients)	**Yes**	**Yes**	**NO**, but must be immediately available*		**Yes**	**q1h**	Set of V/S then monitor prn
ADULTS (out patients)	**Yes**	**Yes**	**NO**, but must be immediately available*		**Yes**	**q1h**	Set of V/S. Monitor for minimum of 15 min post**
PEDIATRICS & NEONATES	**Yes**	**YES**			**Yes**	**1st hour**→q15 min **2nd and 3rd hours**→ q30 min then q1h until complete	For 30-60 minutes following

* Defined as performing non-dedicated tasks with the patient in view.
**If patient has had a previous adverse reaction to component transfusion, or this is the first transfusion patient has had for component, monitor for 30-60 minutes.

Note: Vital signs/patient monitoring may be conducted more frequently as determined by clinical condition of patient.

Patients receiving blood product transfusions must be observed closely for signs of any unexpected or untoward reactions. These reactions may occur during or after the infusion. For follow up instructions to a transfusion reaction, click http://www.albertahealthservices.ca/lab/Page4240.aspx

Documentation:

- The transfusion documentation should be double signed (where required) to indicate infusion.
- Start and stop time of infusion and assessment of patient tolerability should also be documented in appropriate flowsheets or clinical record (electronic or paper) as required.
- Document vital signs as required in the appropriate flowsheet or clinical record (electronic or paper).
- Provide patient notification of transfusion documentation where required (electronic or paper).

STORAGE & STABILITY of PRODUCT:

- Store at 20 - 24°C for up to 24 hours post-collection.
- **DO NOT** refrigerate.
- **DO NOT** agitate.

COMMENTS:

Date Effective: 26 Mar 2020
Version 1.00
Approved By: APL Transfusion Medicine Discipline Council
Document Number: PTMGNR00070
For questions or comments, please contact Transfusion.SafetyTeam@ahs.ca

REFERENCES:

1. Austin Health. Clinical Procedure: Administration of Granulocytes (September, 2012): https://www2.health.vic.gov.au/about/publications/policiesandguidelines/Austin-Health---Administration-of-Granulocytes
2. Héma-Québec Circular of Information For the use of Labile Blood Products (December, 2018): https://www.hema-quebec.qc.ca/userfiles/file/media/anglais/hospitals/PUB-00038%5B0%5D(1).pdf