ALBERTA PRECISION LABORATORIES
Leaders in Laboratory Medicine

Berinert®
C1 Esterase Inhibitor (human)

APPLICABILITY: This document applies to APL, AHS, Covenant Health, and all other health care professionals involved in the transfusion of blood components and products in Alberta.	***Other Names:*** *C1 Esterase Inhibitor* ***Company:*** *CSL Behring* ***Class:*** *Manufactured blood product, derived from human plasma*

	INTRAVENOUS			OTHER		
ROUTES	**DIRECT IV**	**IV Infusion**	**Continuous Infusion**	**SC**	**IM**	**OTHER**
Acceptable Routes*	Yes**	No	No	Yes***	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.**

**** Direct IV Administration of Blood Products may be performed by professionals per the Transfusion of Blood Components and Products Learning Module. Not to be confused with medication administration.**

*****Subcutaneous administration is currently considered off-label use and may only occur at the direction of the Rare Blood Disorders / Angioedema Clinic Physician**

DESCRIPTION:

- Berinert® C1 Esterase Inhibitor (C1-INH) is a purified, lyophilized concentrate of C1 esterase inhibitor derived from large pools of human plasma.
- Viral inactivation steps include pasteurization, nanofiltration and chromatography.
- Supplied in 500IU and 1500IU dose sizes
  - Berinert® 500 contains 500 IU C1-INH with 10 mL diluent (sterile water for injection)
  - Berinert® 1500 (volume reduced) contains 1500 IU C1-INH (volume reduced) with 3 mL sterile water for injection.
- Also contains glycine, sodium chloride and sodium citrate.
- Latex-free

AVAILABILITY

- Supplied by Canadian Blood Services.
- Contact your local laboratory/transfusion service regarding stock availability on site.

INDICATIONS FOR USE:

- Treatment of acute abdominal, laryngeal or facial attacks of hereditary angioedema (HAE) of moderate to severe intensity in adult and pediatric patients.

CONTRAINDICATIONS:

- Patients who are hypersensitive (allergic) to this blood product or any ingredient in its formulation (see description of product)

WARNINGS:

- Hypersensitivity reactions may occur.
- Thrombotic events have occurred in patients at or higher than the recommended dose following treatment of HAE attacks. Patients with known risk factors for thrombotic events should be monitored closely.

DOSE (Refer to Product Insert):

- Dose to be determined by the most responsible health practitioner (MHRP).
- Consult with Hematologist or bleeding disorders clinic
- **Treatment for moderate to severe abdominal, facial, and laryngeal HAE attacks:**
  - Refer to patient's care plan or Factor First card, if available
  - If neither are available, consult with bleeding disorders clinic or transfusion medicine physician
  - Manufacturer recommended dose: 20 units/kg body weight.

ADMINISTRATION:

Confirm written (signed) consent has been obtained and documented prior to requesting blood component from lab/transfusion service where possible.

Pre-Infusion: Ensure recent patient weight is on file and pertinent labs are available. Perform the appropriate pre-transfusion checks per nursing protocol.

Access: Product can be given via peripheral or central venous access site. Subcutaneous administration may be performed at the direction of a hematologist or the bleeding disorders clinic physician.

Reconstitution Supplies:

- Berinert® RT® Product (lyophilized powder)
- Sterile water for injection (included with product)
- Mix2Vial™ Transfer Device (included with product)
- Alcohol swabs (not included with product)

Administration Supplies:

- Alcohol swabs
- Syringe and Infusion set (included with product)

Reconstitution:

- See *Mix2Vial® Reconstitution Instructions.*
- Reconstituted Berinert 500 product should be clear and colourless
- Reconstituted Berinert 1500 product should be clear to slightly opalescent and colourless
- Do not refrigerate after reconstitution.

Administration:

- Discard any unused portions within 4 hours
- Do not mix with any other medications or solutions. Separate infusion line is recommended.
- Do not use solutions that are cloudy, have deposits, or are not colourless
- **Administration rate:**
  - Administration rate should be specified by the MRHP after patient assessment.
  - Recommended slow direct IV administration. Suggested rate for Berinert® 500IU is 4mL/min.
  - Consult with hematologist or bleeding disorders clinic for subcutaneous infusion rates.

NURSING IMPLICATIONS:

Patient Monitoring:

- Vital Signs: Pre-administration**,** on completion of dose, and as patient condition requires.

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 of blood or blood products. For follow up instructions to a transfusion reaction, go to: www.albertahealthservices.ca/lab/page4240.aspx

Documentation:

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

POTENTIAL HAZARDS WITH PARENTERAL ADMINISTRATION:

- Potential adverse events related to a blood product 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 product transfusion (whether during or after a transfusion) must be reported to your local transfusion service.
- The most serious adverse reaction reported in subjects enrolled in clinical studies was an increase in the severity of pain associated with HAE.
- The most commonly reported adverse reaction in patient receiving Berinert® are subsequent HAE attacks, headache, abdominal pain, dysgeusia, nausea, muscle spasm, pain, diarrhea and vomiting.
- Thrombotic events have been reported with the use of Berinert® at or above the recommended dose.

Side Effects - Flushing - Headache - Nausea - Itching and redness at the venipuncture site	→	**Action:** Slow rate of infusion
Potential Allergic Reaction - Stuffy nose - Hives/severe itching - Cough - Chest pain - Wheezing - Facial swelling - Fainting	→	**Action:** **STOP** infusion **IMMEDIATELY** and contact physician

STORAGE & STABILITY OF PRODUCT:

- Stored at 2-30°C.
- Do not freeze.
- Protect from light.
- Product expiry is 36 months from date of manufacture.
- Expiration date is indicated on package.
- Do not use expired product.

CONTACT INFORMATION:

Approved By: APL Transfusion Medicine Discipline Council
For questions or comments please contact: Transfusion.SafetyTeam@aplabs.ca

REFERENCES:

Berinert® Product Monograph. Available from www.cslbehring.ca

Betschel et al. The International / Canadian Hereditary Angioedema Guideline Allergy Asthma Clin Immunol (2019) 15:72