PURPOSE:

- To provide instruction on the safe and proper administration of C1 Esterase Inhibitor therapies to patients in the home setting.

POLICY:

- C1 Esterase Inhibitors will be administered by a Registered Nurse in accordance with a physician's order, any available / provided pharmacy or manufacturer instructions, and Agency policy.

- C1 Esterase Inhibitors therapies include Berinert, Cinryze, Kalbitor and Ruconest.

GENERAL CONSIDERATIONS:

- C1 esterase inhibitor is used to treat or prevent Hereditary Angioedema (HAE).

- HAE is a rare disease that causes swelling of the face, hands, feet, throat, stomach, bowels, or genitals. People who have HAE have low levels of C1 esterase inhibitor in their body.

SPECIAL CONSIDERATIONS:

- A registered nurse should remain with the patient for the entirety of the infusion.

- If medication is refrigerated it should be allowed to equilibrate to room temperature prior to infusion.

    - If medication is stored in refrigerator, it should be stored at 2° to 8°C (36° to 46°F). If there are any doubts about the storage and viability of the drug, reach out to the Agency immediately so that confirmation may be sought from the Pharmacy.

- RN shall monitor for infusion-related reactions and hypersensitivity reactions including anaphylaxis, dyspnea, bronchospasm, urticaria, flushing, rash, and increased blood pressure and heart rate.

- If anaphylaxis or other serious infusion-related reactions occurs, discontinue administration of medication immediately and initiate appropriate treatment to include administration of anaphylactic medications as necessary and activating EMS.

- Notify the Agency as soon as possible so that the Pharmacy & MD may be notified.

- The Mix2Vial® transfer device is a needle-free reconstitution and transfer system to facilitate reconstitution and administration.

- Berinert, Ruconest and Cinryze can be self-infused by the client/caregiver after receiving proper training from a healthcare professional.

- Berinert, Ruconest and Cinryze after reconstitution are injected into the vein with a butterfly needle.

- Kalbitor is a subcutaneous injection that should only be administered by a healthcare professional.

BERINERT:

- Berinert is a plasma-derived concentrate of C1 Esterase Inhibitor (Human).

- Berinert is indicated for the treatment of acute abdominal, facial, or laryngeal attacks of hereditary angioedema (HAE) in adult and pediatric patients.

- Berinert replaces missing or dysfunctional C1-INH through an intravenous infusion, which quickly increases their C1-INH levels.

- Berinert delivers an individualized amount of C1-INH for every patient.

  - The recommended dosage is 20 IU per kilogram of body weight with an infusion rate of 4 mL/min.
  - Doses lower than 20 IU/kg body weight should not be administered.

- Berinert is supplied in a single-use vial of 500 IU to be reconstituted with 10 mL sterile water for injection.

- Berinert works on demand, so it is used only when patients have an acute abdominal, facial, or laryngeal attack—not to prevent an attack.

- Reconstituted medication should not be refrigerated and must be used within 8 hours of reconstitution.

CINRYZE

- Cinryze (C1 esterase inhibitor [human]) is indicated for routine prophylaxis against angioedema attacks in adults, adolescents, and pediatric patients (6 years of age and older) with Hereditary Angioedema (HAE).

- Administered every 3 - 4 days.

- Dosing and infusion rate for Adults and Teenagers (≥12):

    - 1,000 U intravenously
    - For patients who have not responded adequately to 1,000 U, doses up to 2,500 U (not exceeding 100 U/kg) may be considered based on individual response.
    - 1 mL/min (10 minutes)

- Dosing and infusion rate for Children 6 – 11 years:

    - 500 U intravenous
    - The dose may be adjusted according to individual response, up to 1,000 U
    - 1 mL/min (5 minutes)

- Once reconstituted, Cinryze must be used within 3 hours.

RUCONEST:

- Ruconest is used for the treatment of acute attacks in adult and adolescent patients with Hereditary Angioedema (HAE).

- Dosing:
    - For patient's weighing < 84 kg dose is 50 U/kg
    - For patient's weighting >84 kg dose is 4200 U.

- No more than 2 doses should be administered within a 24-hour period.
- Do not exceed 4200 U per dose.
- Prior to reconstitution RUCONEST **does not** need to be refrigerated.
- Reconstitute each vial (2100 U) by adding 14 mL sterile water for injection per vial to obtain a solution of 150 U per ml.
- Keep refrigerated for up to 8 hours after reconstitution and discard partially used vials.

KALBITOR (ECALLANTIDE):

- Kalbitor is a plasma kallikrein inhibitor.
- Kalbitor is used to treat sudden attacks of hereditary angioedema (HAE) in people 12 years of age and older.
- Kalbitor should only be administered by a healthcare professional.
- The recommended dose of Kalbitor is 30 mg (3 mL), administered subcutaneously in three 10 mg (1 mL) injections. If the attack persists, an additional dose of 30 mg may be administered within a 24-hour period.
- The injection site for each of the injections may be in the same or in different anatomic locations (abdomen, thigh, upper arm). There is no need for site rotation. Injection sites should be separated by at least 2 inches (5 cm) and away from the anatomical site of attack. The same instructions apply to an additional dose administered within 24 hours. Different injection sites or the same anatomical location (as used for the first administration) may be used.
- Vials removed from refrigeration should be stored below 86°F/30°C and used within 14 days or returned to refrigeration until use.

PROCEDURE:

1. Obtain and verify physician's orders including concentration and rate of infusion and emergency protocols (in-date anaphylactic kit on-hand). If you notice any discrepancies in the orders, contact the Agency before proceeding.

2. Explain procedure and purpose to patient/caregiver.

3. Perform initial Hand Hygiene and maintain throughout the procedure.

4. Follow appropriate standard precautions.

5. Assemble supplies on a clean, dry surface. Ensure all supplies needed to complete the infusion from beginning to end are available. If any supplies are missing, notify the Agency immediately prior to starting the infusion process.

6. Check the expiration date on each vial to ensure it is within date.

7. Assess and record patient's vital signs to establish a baseline and ensure vital signs are not contraindicative to starting the infusion.

8. Establish IV access – if needed. **DO NOT** tamper with medication until patent IV access is established and flushed. After 2 unsuccessful IV attempts, notify the Agency immediately for further instruction on how to proceed.

9. Once dissolved, visually inspect the solution in each vial for particulate matter and/or discoloration prior to dilution. If the solution has not fully dissolved or if there are opaque particles or other foreign particles, **DO NOT** use it. Reach out to the Agency immediately so that the Pharmacy can be notified. The pharmacy will advise as to how to handle the medication (i.e., disposal, return shipping, etc.).

10. Begin the infusion and infuse as directed.

11. Record vitals at baseline and at infusion end.

12. Disconnect the patient and remove the IV.

13. Place a pressure dressing at the IV site.

14. Clean up your workspace and properly discard all waste, ensuring that all needles have been placed in a sharp’s container.

15. Document the procedure, the patient's response to the procedure, and all lot numbers and expirations dates for vials used.

16. **Note:** If the infusion is not completed, notify the Agency immediately so the Pharmacy can be notified, and advisement received on how to store or dispose of the medication properly.

    - Examples for incomplete infusions include losing IV access that is unable to be re-established, symptoms of intolerance, medication is unusable or compromised (broken / leaking vial or discolored or altered in normal appearance). **NEVER** discard of the medication without speaking to the Agency first.