Stroke Reperfusion Therapy: IV t-PA Administration

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Comments in brackets denote activities specific to MGH, or additional commentary regarding national standards or guidelines. For example:

Activate the Stroke Team

_Children's ED2CT Group pager_

Prior to making any medical decisions, please view our disclaimer.

### tPA Mixing and Administration

<table>
<thead>
<tr>
<th>GENERIC NAME</th>
<th>Alteplase</th>
</tr>
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<tbody>
<tr>
<td>TRADE NAME</td>
<td>Activase</td>
</tr>
<tr>
<td>APPLICABLE UNIT</td>
<td>Emergency Department</td>
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<tr>
<td>ACTION</td>
<td>Tissue plasminogen activator (tPA) for thrombolysis</td>
</tr>
<tr>
<td>INDICATION</td>
<td>Treatment of acute ischemic stroke</td>
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### Critical Elements

- **Usual Dosage Range and Route**
  - 0.9 mg/kg to a maximum of 90 mg
    - First 10% of calculated dose GIVEN BY PHYSICIAN as intravenous bolus dose
    - Remaining 90% of calculated dose given in infusion over 1 hour
- **Verify that the Stroke Neurologist has reviewed the inclusion/exclusion criteria and discussed the plan with the patient and/or family if available**
- **Verify that administration will start within three hours of symptom onset or time last known well**
- **Document neurologic assessment findings at least hourly or more frequently if neurologic changes occur**
- **If the patient's neurologic status declines during tPA infusion the following actions should be taken**
  - Stop the infusion
  - Page the Stroke Neurologist
  - Draw and send PT/PTT, D-Dimer and fibrinogen
  - Prepare for emergent CT
Equipment

- 1 vial of t-PA (alteplase, or Activase 100 mg) or two vials of t-PA (alteplase, or Activase 50 mg each)
- One 10 ml syringe
- Two 20-gauge needles
- 10 mL Luer-lock syringe
- 60 mL Luer-lock syringe
- Two 10 mL Normal Saline Flushes
- Standard pump tubing
- MRI Tubing
- Intravenous infusion pump
- 100 mL bag of 0.9% NS
- Alcohol wipes
- Two red medication labels

Administration Protocol

It is appropriate to mix tPA prior to CT even if it is not used: See below procedure for returning tPA that is mixed but not administered.

- Verify the bolus dose, infusion dose and discard dose with the Stroke Neurologist
- Reconstitute the vial of t-PA with the supplied preservative-free water
  - Remove flip-caps from t-PA and sterile water vials
  - Swab both vial tops with alcohol prep pads
  - Insert transfer device into sterile water
  - Turn t-PA (lyophilized cake) vial upside down, position over the transfer device and push down
  - Invert the 2 vials allowing the sterile water to mix with the t-PA powder
  - Remove sterile water vial (with transfer device)
  - Gently swirl t-PA to dissolve powder (approximately 1 minute). DO NOT SHAKE.
  - Using 10 mL syringe, withdraw IV Bolus amount. (NOTE: Do not prime syringes with air.)
  - Apply label (“BOLUS DOSE”, t-PA, and dosage) to Bolus syringe. (MDs only administer bolus dose over 1 minute.)
  - Using 60 mL syringe, withdraw amount of drug to be wasted and discard
  - Attach vented spike adapter to t-PA vial using the same puncture site from the transfer device
  - Attach IV tubing to vented spike adapter (Note: some brands of IV tubing and the spike adapter are all one unit)
  - Attach IV tubing to MRI tubing if patient is going to have an MRI
  - Prime entire line
  - Place t-PA on infusion pump
  - Use BASIC MODE on pump to infuse over 1 hour
  - Infuse 100 mL Normal Saline after pump finishes (to administer all t-PA in tubing). (NOTE: Hang NS as soon as all the t-PA has entered into the drip chamber. Air cannot be withdrawn from the tubing as t-PA would be wasted.)
  - Final concentration is 1 mg/mL
- Hand the bolus dose syringe to the Stroke Neurologist and verify again the bolus dose, infusion dose and rate and discard dose
- Stroke Neurologist will administer bolus dose via intravenous push method over one minute
  - Stroke Neurologist will document administration of bolus dose on ED Medication Administration record including time, dose, route, initials and signature
- Draw waste dose from bottle and verify waste amount by showing to the Stroke Neurologist and another nurse.
- Fill out red medication label with all required information (patient name, medication, dosage, time, date, RN signature). Write “INFUSION DOSE” and affix label to Activase bottle
- Connect alteplase bottle to IV pump tubing, carefully priming to avoid discarding any medication.
- Verify patency of IV site and tubing connections
- Attach noninvasive blood pressure cuff to other arm
- Set infusion pump rate according to dosing sheet and start infusion with a total infusion time of 1 hour. Document infusion start time on medication record.
Infuse 100 mL Normal Saline after pump finishes (to administer all t-PA in tubing). (NOTE: Hang NS as soon as all the t-PA has entered into the drip chamber. Air cannot be withdrawn from the tubing as t-PA would be wasted.)

Document end time of infusion.

**tPA Dosing Chart**

Use the calculator for the optimal dose, and check the range by quickly estimating the dose from the table below

**tPA Dose Calculator**

<table>
<thead>
<tr>
<th>Estimated Weight (lbs)</th>
<th>Conversion to Kilograms (Kg)</th>
<th>Total iv t-PA Dose (mg) at 0.9 mg/kg</th>
<th>t-PA Bolus (mg) <em>10% of total</em></th>
<th>t-PA Bolus (ml)</th>
<th>Discard Dose t-PA (Not for infusion)</th>
<th>Infusion Dose (mg)</th>
<th>Infusion Rate (ml/hr)</th>
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**EXAMPLE:** Mrs. Jones weighs 150 lbs, which equals 68 Kg. Her total dose is (68 kg * 0.9 mg/kg) 61.4 mg which is equal to 61.4 ml of a 1mg/ml solution. You withdraw 6.1 ml from the 100 ml Actiavse bottle and hand to the Neurologist. Then you withdraw and discard (100 ml - 61 ml) = 39 ml as the waste. The volume of t-PA remaining in the Activase bottle is now (61.4 ml - 6.1 ml) 55.2 ml; you set the volume to infuse at a rate of 55.2 ml/hr and start the pump. As soon as the last drop of t-PA from the bottle enters the IV tubing drip chamber, remove the alteplase bottle and spike a 100 mL bag of Normal Saline with the same tubing set-up. Continue running the pump with the original 55.2 ml over 1 hour rate until all the Normal Saline is out of the bag.

**Precautions and Side Effects**

- Hemorrhage (GI, GU, catheter puncture site, intracranial, retroperitoneal, pericardial, gingival, epistaxis)
- New ischemic stroke
- Bruising
- Anaphylaxis
- Laryngeal edema
- Rash, urticaria

**Protocol for Returning Unused Medication at MGH**

When tPA is mixed but not administered or the packaging is damaged, the reconstituted and unused tPA should be returned for pharmacy credit

- If t-PA is removed from Omnicell but not reconstituted and the packaging is intact, return to Omnicell under the patient's name
- If t-PA packaging is not intact and the medication was not used, place a patient identification label on the box and page the pharmacist to pick it up.
- If t-PA is reconstituted and not used, squirt any t-PA that was drawn up in syringes back into the t-PA vial. Place patient identification labels on the vials and box and page the pharmacist to pick it up. (NOTE: Be careful that no medicine can leak out of the vial due to the large spike that was initially placed during drug preparation.) Be sure this bottle is kept upright.
• If t-PA is reconstituted or the packaging is not intact and the medication was not used, place a patient identification label on any container holding reconstituted drug _ t-PA bottle, syringe or IV bag. (Remove blunt canula or needles from syringes.) Place containers in a plastic bag if necessary to prevent spillage
• Page ED RPh (pgr 34941) to facilitate returning med to pharmacy for patient credit a
• IV administration equipment (tubing, syringes, etc.) is not returned to pharmacy
• If medication was used at all (e.g. bolus administered, etc.) medication is NOT returned to pharmacy

References


Authoring Information

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