



## 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

*[MGH Beeper 34282]*

Prior to making any medical decisions, please view our [disclaimer](#).

### tPA Mixing and Administration

GENERIC NAME	Alteplase
TRADE NAME	Activase
APPLICABLE UNIT	Emergency Department
ACTION	Tissue plasminogen activator (tPA) for thrombolysis
INDICATION	Treatment of acute ischemic stroke

### 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 Activase (tPA) 100 mg or two vials of Activase (tPA) 50 mg each
- One 10 ml syringe
- Two 19-gauge needles
- One blunt canula
- Standard pump tubing
- Intravenous infusion pump

- 100 cc 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
  - Direct stream of water into lyophilized cake
  - Swirl but DO NOT SHAKE (slight foaming is common)
  - Let stand several minutes to allow large bubbles to dissipate
  - Final concentration is 1 mg/ml
- Using a 10 ml syringe, withdraw the bolus dose directly from the Activase bottle (see dosing sheet for bolus dose based on patient weight\*). Fill out red medication label with all required information (patient name, medication, dosage, time, date, RN signature). Write "BOLUS DOSE" and affix label to syringe.
- 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
- 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
- Draw waste dose from bottle and verify waste amount by showing to the Stroke Neurologist and another nurse.
- Connect Activase bottle to IV pump tubing, carefully priming to avoid discarding any medication.
- Verify patency of IV site and tubing connections
- Verify that all blood work has been drawn and sent
- 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 and name of Stroke Neurologist.
- When pump alarms "no flow above", there is still some tPA left in the tubing which must be infused. Remove the IV tubing connector from the Activase bottle and attach it to a newly spiked 100 cc bag of 0.9% NS. Continue the infusion at the current setting to deliver the remainder of the original tPA volume over the remaining time. Continue the infusion until the preset volume is completed.
- Document end time of infusion. Expect to see significant volume remaining in 100 cc 0.9% NS bag.

## 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

Enter the Weight:  lbs

Estimated Weight (lbs)	Conversion to Kilograms (Kg)	Total iv t-PA Dose (mg) at 0.9 mg/kg	t-PA Bolus (mg) *10% of total*	t-PA Bolus (ml)	Discard Dose t-PA (Not for infusion)	Infusion Dose (mg)	Infusion Rate (ml/hr)
220+	100.0	90.0	9.0	9.0	10.0	81.0	81.0
210	95.5	85.9	8.6	8.6	14.1	77.3	77.3
200	90.9	81.8	8.2	8.2	18.2	73.6	73.6
190	86.4	77.7	7.8	7.8	22.3	70.0	70.0
180	81.8	73.6	7.4	7.4	26.4	66.3	66.3
170	77.3	69.5	7.0	7.0	30.5	62.6	62.6
160	72.7	65.5	6.5	6.5	34.5	58.9	58.9
150	68.2	61.4	6.1	6.1	38.6	55.2	55.2
140	63.6	57.3	5.7	5.7	42.7	51.5	51.5
130	59.1	53.2	5.3	5.3	46.8	47.9	47.9
120	54.5	49.1	4.9	4.9	50.9	44.2	44.2

110	50.0	45.0	4.5	4.5	55.0	40.5	40.5
100	45.5	40.9	4.1	4.1	59.1	36.8	36.8

**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 Activase bottle and hand to the Neurologist. Then you withdraw and discard (100 ml- 61 ml) = 39 ml as the waste. The volume of tPA 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. The pump alarms when the Activase bottle is empty but 11 ml are left in the tubing. In order to complete the dose, un-spike the Activase bottle and spike a bag of saline with the same tubing set-up. Run the pump to allow it to complete the original 55.2 ml volume over the remaining time for the original 1 hour infusion. In this case, it completes the infusion in 12 minutes.

Estimated Weight (lbs)	150
Conversion to Kilograms (Kg)	68.2
Total iv t-PA Dose (mg) at 0.9 mg/kg	61.4
t-PA Bolus (mg) *10% of total *	6.1
t-PA Bolus (ml)	6.1
Discard Dose t-PA (Not for infusion)	38.6
Infusion Dose (mg)	55.2
Infusion Rate (ml/hr)	55.2

### 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 tPA is removed from Omnicell but not reconstituted and the packaging is intact, return to Omnicell under the patient's name
- If tPA 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 \_ tPA bottle, syringe or IV bag. (Remove blunt canula or needles from syringes.) Place containers in a plastic bag if necessary to prevent spillage
- Place all containers in the blue bin in the Trauma/Acute med room (bin is labeled "tPA return")
- Do not place any IV administration equipment (tubing, etc.) in the blue bin

### References

1. Adams HP Jr, Adams RJ, Brott T, del Zoppo GJ, Furlan A, Goldstein LB, Grubb RL, Higashida R, Kidwell C, Kwiatkowski TG, Marler JR, Hademenos GJ; Stroke Council of the American Stroke Association. Guidelines for the early management of patients with ischemic stroke: A scientific statement from the Stroke Council of the American Stroke Association. *Stroke*. 2003 Apr;34(4):1056-83.
2. Albers GW, Amarenco P, Easton JD, Sacco RL, Teal P. Antithrombotic and thrombolytic therapy for ischemic stroke: the Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy. *Chest*. 2004 Sep;126(3 Suppl):483S-512S.
3. American Heart Association. Guidelines for Cardiopulmonary Resuscitation Emergency Cardiovascular Care. *Circulation*. 2000, 102 (suppl I): I-1-I-384.

### Authoring Information

Reviewed/Approved by: ASQT

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