

Intravenous Alteplase (rtPA): Reconstitution, Dosing, and Administration

Narrator reads the following script while pharmacist demonstrates the steps for reconstituting intravenous rtPA.

Introduction

In this video, we will demonstrate how to reconstitute, dose, and administer alteplase, or recombinant tissue plasminogen activator, for treatment of acute ischemic stroke.

Alteplase should be reconstituted immediately before administration. In some cases, reconstitution may be performed while waiting for more information to determine eligibility for treatment in order to save time. Drug that is unused and remains in its original vial may be returned to the pharmaceutical company that manufactures alteplase.

Supplies

You will need the following materials:

- Inside the alteplase package, you should find one vial of 100 mL of preservative-free sterile water for injection, one vial of 100 mg of alteplase, and the transfer device.
- One 10 mL syringe for the alteplase bolus
- One large syringe, such as the 60 mL size, for the discard quantity of alteplase
- At least two large-bore needles, such as 19-gauge
- Alcohol swabs
- One 50 mL or 100 mL bag of 0.9% saline solution
- Intravenous infusion pump
- Standard IV pump tubing
- If the 100 mg vial of alteplase is not available, you may use two 50 mg vials instead.

Reconstitution

First, make sure to use aseptic technique by cleaning your hands with soap and water or hand sanitizer and using gloves.

Remove the protective cap and use an alcohol wipe to swab the top of each vial.

You will use the transfer device to add sterile water to the bottle of alteplase. Remove the cap from one end of the transfer device. Insert the exposed end all the way through the center of the stopper of the sterile water vial.

Keep the bottle upright and remove the protective cap from the other end of the transfer device.

Hold the bottle of alteplase upside down and make sure the stopper is centered over the pin of the transfer device. Push the bottle all the way down onto the transfer device.

Invert the bottles so that the bottle of alteplase is on the bottom and the bottle of sterile water is on top.

Allow all of the sterile water to flow into the bottle of alteplase. This usually takes about two minutes. A half milliliter of sterile water may remain in the upper vial.

Remove the empty bottle and transfer device from the alteplase vial. Make sure to discard the transfer device in a sharps container.

If you are using two vials of 50 mg of alteplase, use a syringe with a large bore needle to transfer 50 mL of sterile water into each 50 mg bottle of alteplase, for a final concentration of 1 mg of alteplase per 1 mL of water.

To mix the alteplase in sterile water, gently swirl until dissolved. Do NOT shake the vial. Slight foaming is normal. The solution will be a clear or pale yellow color.

If needed, you can let the alteplase solution sit for up to several minutes to allow large bubbles to dissipate.

Reconstituted alteplase remains stable at room temperature for up to 8 hours. Do not freeze the alteplase solution, and do not add other medications for administration to reconstituted alteplase.

Dosing

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The recommended dose of alteplase for treating acute ischemic stroke is 0.9 mg per kg.

Alteplase is administered first as a bolus over one minute, followed by an infusion of the remaining dose over 60 minutes. The bolus dose is 10% of the total dose, and the infusion dose is the remaining 90% of the total dose.

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The concentration of the alteplase solution is 1 mg per mL. Therefore, the alteplase dose in mg is equivalent to the alteplase volume in mL. Calculate the volume of the total dose and subtract it from the total volume of the alteplase bottle, which is 100 mL. The difference is the amount of alteplase to be discarded, or the discard quantity.

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Calculate the total dose, bolus dose, infusion dose, and the discard quantity. To ensure dosing accuracy, verify your calculations with another member of the treatment team or use your institution's dosing verification system.

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For example, if Mr. Smith weighs 77 kg, the total dose of alteplase is 0.9 mg/kg multiplied by 77 kg, which equals 69 mg. The bolus dose, or 10% of 69 mg, will be 6.9 mg. The infusion dose, or 69 mg minus 6.9 mg, will be 62.1 mg. The discard quantity will be 100 mL minus 69 mL, which is the volume of the total dose, for a final volume of 31 mL to be discarded.

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The total dose should not exceed 90 mg. For patients who weigh 100 kg or more, the total alteplase dose should always be 90 mg, with a 9 mg bolus, 81 mg infusion dose, and discard quantity of 10 mL.

Narrator reads the following script while pharmacist demonstrates the steps for administering intravenous rtPA.

Administration

Attach a large-bore needle to the large syringe. Insert the needle into the rubber stopper of the alteplase bottle at a separate site, off-center from the puncture site created by the transfer device. Take care not to invert the vial, since doing so can cause alteplase solution to leak from the puncture sites. Draw the discard quantity into the syringe and discard or set aside the syringe immediately to prevent dosing errors.

Attach a large bore needle to the 10 mL syringe. Insert the needle in an off-center site on the rubber stopper of the alteplase bottle and draw the bolus dose.

Insert the spike end of the infusion set into the alteplase vial in the same puncture site created by the transfer device. Peel the plastic vial hanger from the bottle label and hang it by the loop.

Make sure to prime the IV tubing with alteplase solution so the infusion can start immediately after the bolus is given. Take care in priming the pump to avoid discarding any alteplase solution.

The bolus can be given manually or by programming the infusion pump to give the bolus at the start of the infusion. The bolus dose should be given over one minute.

Set the rate of infusion so that the infusion dose will be given over 60 minutes. Do not add any additional medications to the infusion of alteplase.

When the pump signals that the vial is empty, there is still alteplase in the IV tubing. Spike the 50 or 100 mL bag of 0.9% saline solution with the alteplase infusion set and continue the infusion at the same rate until the programmed dose of alteplase has been completely administered.