Review Article

Nursing Skill and Responsibility in Administration of Injection Actilyse

Abstract

Actilyse can break blood clots that form in the heart, blood arteries, or lungs during a heart attack. This medication is also given to stroke patients to improve recovery and reduce the likelihood of impairment. Recombinant DNA technology was used to create Activase, a tissue plasminogen activator. It is a sterile, purified glycoprotein of 527 amino acids. It is made by combining complementary DNA (cDNA) from a human melanoma cell line with the natural human tissue-type plasminogen activator. After reconstitution with Sterile Water for Injection, USP, Activase is a sterile, white to off-white lyophilized powder for intravenous injection.

Keyword: Actilyse, Stroke, Activase, Glycoprotein, Lyophilized Powder.

Introduction

Actilyse 50mg Injection is a medication that dissolves blood clots that have developed in blood arteries. It is employed to treat stroke, heart attack, and pulmonary embolism (blood clots in the lungs). It is referred to as a thrombolytic or "clot-busting" medication.[1]

Actilyse 50mg A doctor will provide an injection directly into a vein as soon as the first signs of a heart attack, stroke, or pulmonary embolism are observed. Patient breathing, blood pressure, oxygen levels, and other vital signs will be closely monitored. Physicians may be given another medication to prevent the production of new blood clots either concurrently or following treatment.[1]

Actilyse 50mg is a medication that is used to treat a variety of conditions. The injection might produce dizziness, nausea, and vomiting. It has a slew of negative consequences. Bleeding is the most common and dangerous side effect of this medication. This drug's use can result in brain bleeding (cerebral hemorrhage), severely low blood pressure (shock), and cardiac collapse (where your heart stops beating). If any of these occur, medical treatment may be halted. Before taking this medication, consult your doctor about the possibility of significant adverse effects.[1]

This medication is not appropriate for everyone. There is an extensive list of scenarios in which the physician will refuse to provide treatment. If the patient has had a head injury, surgery on the brain or spinal cord, or any current bleeding anywhere in the patient's body, Actilyse 50mg Injection should be considered. Before administering this medication, the healthcare team must know a great deal about the patient's medical history.[1]

Indication

Actilyse is used to treat several conditions caused by blood clots forming within blood vessels, including:

- Heart attacks caused by blood clots in the arteries of the heart (myocardial infarction);
- Blood clots in the arteries of the lungs (pulmonary embolism);
- Stroke is caused by a blood clot in an artery of the brain (acute ischaemic stroke).[2]

How to work Actilyse

The active element in Actilyse is alteplase. It belongs to a class of drugs known as thrombolytic agents Actilyse acts by causing blood clots to dissolve. Because they disrupt normal blood flow, these clots cause disease. The active element in Actilyse powder is alteplase, which comes in 10 mg, 20 mg, and 50 mg. Additionally, it contains arginine, phosphoric acid, polysorbate 80, and nitrogen. Sodium hydroxide or phosphoric acid may be added to adjust the acidity of Actilyse.[3]

During therapy with Activase

1. Perform neurologic assessment every 15 minutes during the 1-hour infusion
2. Check for primary and/or minor bleeding
3. Monitor blood pressure every 15 minutes during the 1-hour infusion
4. Monitor for signs of intracranial hemorrhage (ICH)
5. Monitor for signs of orolingual angioedema
6. Discontinue infusion and obtain an emergency CT scan if the patient develops a severe headache, acute hypertension, nausea, or vomiting, or has a worsening neurologic examination

After therapy with Activase

1. Continue to monitor for neurologic deterioration
   a) Every 15 minutes for the first hours after cessation of infusion
   b) Every 30 minutes for the next 6 hours
   c) Every hour from the eighth post-infusion hour until 24 hours after the infusion is stopped
2. Continue to monitor and control blood pressure
   a) Every 15 minutes for the first hours after cessation of infusion
   b) Every 30 minutes for the next 6 hours
   c) Every hour from the eighth post-infusion hour until 24 hours after the infusion is stopped
3. Continue to check for primary and/or minor bleeding
4. Obtain a follow-up CT scan or magnetic resonance imaging (MRI) 24 hours before starting anticoagulants or antiplatelet agents
5. Continue to monitor for signs of hypersensitivity

Warnings and Precautions

Bleeding

Activase can result in substantial, and sometimes fatal, internal or external bleeding, particularly at arterial and venous puncture sites. To avoid intramuscular injections and patient trauma, avoid intramuscular injections. Venepunctures should be performed with caution and only when necessary. There have been reports of fatal incidences of bleeding associated with traumatic intubation in patients who were given Activase. In treating acute myocardial infarction and pulmonary embolism, aspirin and heparin have been provided concurrently with and immediately after infusion with Activase. The use of heparin and aspirin together with and after Activase infusions for treating acute ischemic stroke in the first 24 hours after symptom onset has not been studied. Because heparin, aspirin, or Activase might cause bleeding issues, keep an eye out for any signs of bleeding, particularly at arterial puncture sites. While patients are still taking anticoagulant medication, bleeding can occur one or more days after activating Activase. If severe bleeding occurs, discontinue the Activase infusion and seek urgent medical attention.

In the following conditions, the risks of bleeding with Activase are increased and should be weighed against the anticipated benefits: recent major surgery or procedure; cerebrovascular disease; recent intracranial hemorrhage; recent gastrointestinal or genitourinary bleeding; recent trauma; hypertension; acute pericarditis; subacute bacterial endocarditis; hemostatic defects including those secondary to severe hepatic or renal disease; significant hepatic dysfunction; pregnancy; diabetic hemorrhagic retinopathy or other hemorrhagic ophthalmic conditions; septic thrombophlebitis or occluded AV cannula at the seriously infected site; advanced age; and patients currently receiving oral anticoagulants, or any other condition in which bleeding constitutes a significant hazard or would be particularly difficult to manage because of its location.

Hypersensitivity

Hypersensitivity, including urticarial/anaphylactic reactions, has been reported after the administration of Activase. A deadly consequence for hypersensitivity was described in a rare case. Angioedema has been found in patients treated for acute ischemic stroke and acute myocardial infarction for up to 2 hours following Activase infusion. Concomitant angiotensin-converting enzyme inhibitors were given to several

patients. Patients receiving Activase should be monitored for hypersensitivity during and for several hours after the injection. Stop the Activase infusion immediately if signs of hypersensitivity appear, such as anaphylactoid response or angioedema (e.g., antihistamines, intravenous corticosteroids, epinephrine).

Thromboembolism

In individuals with a high risk of left heart thrombi, such as those with mitral stenosis or atrial fibrillation, the use of thrombolytics can increase the risk of thromboembolic events. Activase has not been found to treat underlying deep vein thrombosis in PE patients effectively. Consider the possibility of re-embolization in this case due to the lysis of underlying deep venous thrombi.

Cholesterol Embolization

Cholesterol embolism, which can be lethal, has been observed infrequently in patients receiving thrombolytic therapy; the actual incidence is unknown. It is linked to invasive vascular procedures (such as cardiac catheterization, angiography, and vascular surgery) and anticoagulant treatment.

Coagulation Tests May be Unreliable during Activase Therapy

Unless appropriate care is taken to avoid in vitro artifacts, coagulation tests and assessments of fibrinolytic activity may be unreliable during Activase therapy. When Activase is present in blood at pharmacologic amounts, it stays active in vitro, resulting in fibrinogen breakdown in blood samples withdrawn for examination.

Adverse Reactions

The most frequent adverse reaction associated with Activase therapy is bleeding.

Nurses Role in Giving Activase Therapy

Before administration

- Carefully lower blood pressure (BP) to maintain systolic BP less than 185 mmHg and diastolic BP less than 110 mmHg before initiating fibrinolytic therapy.[8]
- Due to an increased risk of intracranial bleeding, check INR, aPTT, and blood glucose before administration.[9]

- Alteplase should not be administered to patients who have received a total dose of low-molecular-weight heparin (LMWH) within the last 24 hours.
- In AIS patients without recent oral anticoagulants or heparin, alteplase can be started before coagulation study results. Discontinue alteplase if Pretreatment INR is more significant than 1.7 or elevated aPTT (Genentech, 2018).
- IV aspirin should not be administered within 90 minutes after the start of IV alteplase in AIS patients.

- For PE patients who are hemodynamically unstable, discontinue any prior anticoagulant therapy before and during the thrombolytic infusion to minimize the risk of bleeding (Tapson & Weinberg, 2020).[10]
- Assess for exclusion criteria/contraindications.
- Admit to the intensive care unit (ICU) for monitoring.

During administration

- Maintain strict bed rest during treatment.
- Measure BP and perform neurological assessment every 15 minutes during the infusion for 2 hours, then every 30 minutes for 6 hours, then hourly until 24 hours after treatment.[8]
    - Increase frequency of BP measurements if systolic BP greater than 180 mm Hg or if diastolic BP greater than 105 mm Hg; administer antihypertensive as needed to maintain these levels.
- If a patient develops a severe headache, acute hypertension, nausea or vomiting, or has a worsening neurological examination, stop the alteplase administration and obtain an emergency CT scan.[8]
- Avoid invasive procedures and I.M. injections, perform venipunctures carefully and only as required, and avoid internal jugular and subclavian venous punctures.
- IV aspirin should not be administered within 90 minutes after the start of IV alteplase when treating AIS patients.[9]
- Closely monitor the patient for bleeding and frequently assess all puncture sites.
- If severe bleeding occurs, stop the alteplase infusion immediately.
- Monitor for hypersensitivity and discontinue alteplase immediately if signs develop.
- Extravasation of alteplase can cause ecchymosis or inflammation. If this occurs, stop the infusion and apply local therapy.[10]

After administration

- Monitor BP and perform neurologic assessment every 15 minutes during the infusion for 2 hours, then every 30 minutes for 6 hours, then hourly until 24 hours after treatment.[8]
- After the initial 24 hours, monitor vital signs, control blood pressure, and perform neurological assessments frequently, per hospital policy.
- Maintain BP less than 180/105 mmHg for at least 24 hours after treatment in AIS patients.[8]
- For AIS patients, hold antiplatelet or anticoagulation therapy and invasive procedures for 24 hours following administration.
- For AMI and PE patients, concomitant IV unfractionated heparin is recommended near the end or immediately following alteplase infusion when the PTT or thrombin time returns to twice normal or less to prevent re-occlusion (Genentech, 2018; Gibson et al., 2020; Tapson & Weinberg, 2020).[10]
- Monitor for serious adverse events, such as bleeding and angioedema.
    - Concomitant use of angiotensin-converting enzyme (ACE) inhibitors may increase the risk of orolingual angioedema.
    - Concomitant use of anticoagulants and drugs that inhibit platelet function increase the risk of bleeding.
- Delay insertion of nasogastric tubes, indwelling bladder catheters, or intra- arterial pressure catheters if the patient can be managed without them.
- For AIS patients, obtain a follow-up CT or MRI scan 24 hours after treatment before starting anticoagulants or antiplatelet agents.[10]

Conclusion:

Actilyse injections are a thrombolytic agent used to dissolve a blood clot in such a disease condition as acute ischemic stroke, ST-elevation myocardial infarction, pulmonary embolism, low blood pressure, and blocked central venous catheter. Actilyse injection is only given in observation under the physician and intensive care unit. The drugs have more complications and side effects in that the most critical role of nurses is to observe the patient continuously and take care of the patient.

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