Alteplase

Alteplase is a thrombolytic medication that dissolves blood clots by fibrin lysis. Known as a "clot buster," this medication is similar to naturally occurring enzyme human tissue plasminogen activator (tPA) that breaks down the fibrin found in blood clots. Since this drug disrupts normal coagulation, alteplase is contraindicated in patients with a history of bleeding. Avoid injections, invasive procedures, and the administration of anticoagulants and antiplatelets. Amicar may be given as an antidote to prevent bleeding.



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Mechanism

Tissue Plasminogen Activator
Tissue-box Plastic-man-jam
Alteplase, a synthetic tissue plasminogen activator, functions as a fibrinolytic medication by converting plasminogen into enzyme plasmin. Plasmin breaks down blood clots by destroying fibrin structure, thereby dissolving the blood clot.

Indications

Thrombosis
Trombones
As a thrombolytic, alteplase breaks down an already-formed thrombus or blood clot and is used in acute situations. The formation of a blood clot within a blood vessel or within the heart may obstruct normal blood flow and tissue perfusion. The thrombus may result in acute myocardial infarction, acute ischemic stroke, or acute pulmonary embolism. In addition, this drug may be given to dissolve a thrombus causing central venous catheter (CVC) blockage. For acute ischemic stroke, treatment should be initiated promptly and no later than 4.5 hours after the onset of symptoms.

Side Effects

Bleeding
Bleeding
The most significant risk of alteplase therapy is bleeding, including intracranial hemorrhage, gastrointestinal bleeding, or any internal bleeding. Because alteplase activates plasminogen, it promotes fibrinolysis and can interfere with normal clotting, increasing the risk of bleeding complications.

Contraindications

Prior Intracranial Hemorrhage
Prior In-head Hemorrhage-hammer
Alteplase is contraindicated for patients with prior intracranial hemorrhage. Because of alteplase’s fibrinolytic activity, it may lead to life-threatening intracranial bleeding in patients with prior episodes of intracranial hemorrhage.

Active Bleeding
Active-gear Bleeding
When active ongoing bleeding internal or external alteplase is contraindicated, as the drug may increase the risk of worsening the bleeding by promoting fibrinolysis.

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History of Bleeding Disorders

History-form of Blood Disordered

Patients with a history of bleeding disorders, which involve conditions that impair blood clotting, are at increased risk of excessive bleeding, making the use of alteplase contraindicated due to its potential to worsen bleeding.

Considerations

Minimize Bleeding

Avoiding Needles and Pressure on Bleeding

Since alteplase increases the risk of bleeding, precautions should be taken to avoid complications. Avoid administering anticoagulants (i.e., heparin, warfarin, dabigatran) and antiplatelet (i.e., aspirin, clopidogrel) medications since they increase the risk of bleeding. Maintain tissue integrity by avoiding invasive procedures and needle punctures related to subcutaneous or intramuscular injections.

Monitor for Shock

Monitor Shocking

Internal bleeding may cause hypovolemic shock in the patient receiving alteplase. Significant intravasculature fluid loss prevents the heart from pumping an adequate supply of blood and oxygen to the organs. It is important to frequently monitor the patient for symptoms of shock. Be alert for changing vital signs such as decreased blood pressure, increased heart rate, and decreased body temperature. Assess the patient for increasing anxiety, confusion, shallow breathing, profuse sweating, and weak pulse.

Antidote

Aminocaproic Acid

A-mean-ol'-capris Acidic-lemon

If excessive bleeding is suspected, stop thrombolytic therapy and administer aminocaproic acid (Amicar) as an antidote to prevent further bleeding. This antifibrinolytic drug prevents the conversion of plasminogen to plasmin and avoids fibrinolytic activity that results in bleeding.

Platelet Transfusion

Plate Tranfusion-IV

Platelet transfusion is performed in alteplase toxicity only when bleeding is severe and platelet dysfunction or thrombocytopenia is present. It works to restore platelet numbers and functions to support clot formation.

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