streptokinase (strep-toe-kye-nase)

Indications

Action
Combines with plasminogen to form plasminogen activator complexes, then converts plasminogen to plasmin, which is then able to degrade clot-bound fibrin.

Pharmacokinetics
Absorption: Complete after IV administration. Administration into occluded cannulae has a more localized effect.
Distribution: Streptokinase appears to cross the placenta minimally, if at all. Remainder of distribution for streptokinase is not known.
Metabolism and Excretion: Rapidly cleared from circulation by antibodies and other unknown mechanisms.
Half-life: Initial half-life (due to clearance by antibodies) – 18 min, then 83 minutes.

Contraindications/Precautions
Contraindicated in: Active internal bleeding. History of cerebrovascular accident. Recent (within 2 mo) intracranial or intraparenchymal trauma. Intracranial neoplasm, arteriovenous malformation, or aneurysm; Severe uncontrolled hypertension; Known bleeding tendencies; Hypersensitivity; cross-sensitivity with anistreplase and streptokinase may occur.

Use Cautiously in: Recent (within 10 days) major surgery, trauma, GI or GU bleeding; Left heart thrombus; Severe hepatic or renal disease; Hemorrhagic ophthalmic conditions; Septic phlebitis; Recent streptococcal infection or previous therapy with anistreplase or streptokinase (within 5 days – 6 mo); may produce resistance because of antibody formation; increased dosage requirements may be encountered (anistreplase and streptokinase only). Previous therapy with streptokinase or anistreplase (within 12 mo); may produce resistance because of antibody formation; Geriatric patients (>75 yr; increased risk of intracranial bleeding); Pregnancy, lactation, or children (safety not established).

Adverse Reactions/Side Effects

Interactions
Drug-Drug: Aspirin, other NSAIDs, warfarin, heparin and heparin-like agents, acetaminophen, salicylates, ticlopidine, clopidogrel, ticagrelor, or dipyridamole — concurrent use is contraindicated. Effects may be by antithrombotic agents, including anticoagulants, including antiplatelet agents, including anticoagulants, including antiplatelet agents, including anticoagulants.
Route/Dosage

Myocardial Infarction

IV (Adults): 1.5 million IU given as a continuous infusion over up to 60 minutes. Intravenous (Adults): 20,000 IU bolus followed by 2000 IU/min infusion for 60 min.

Deep Venous Thrombosis, Pulmonary Embolism, Arterial Embolism, or Other Thromboses

IV (Adults): 200,000 IU loading dose, followed by 2000 IU/min infusion for 60 min.

Deep Venous Thrombosis, Pulmonary Emboli, Arterial Emboli, or Other Thromboses

IV (Adults): 250,000 IU loading dose, followed by 100,000 IU/hr for 24 hr for pulmonary emboli, 72 hr for recurrent pulmonary emboli or deep vein thrombosis.

Occluded Arteriovenous Cannulae

IV (Adults): 250,000 IU/2 mL instilled into occluded catheter.

NURSING IMPLICATIONS

Assessment

- Assess therapy as soon as possible after the onset of symptoms.
- Monitor vital signs, including temperature, continuously for myocardial infarction. Do not use lower extremities to monitor BP. Notify health care professional if systolic BP ≥ 180 mm Hg or diastolic BP ≥ 110 mm Hg. Thrombolytic therapy should not be given if hypertension is uncontrolled. Inform health care professional if hypotension occurs. Hypotension may occur from the drug, hemorrhage, or cardiogenic shock.
- Assess patient carefully for bleeding every 15 min during the 1st hr of therapy, every 15–30 min during the next 8 hr, and at least every 4 hr for the duration of therapy. Frank bleeding may occur from sites of invasive procedures or from body orifices. Internal bleeding may also occur (decreased neurologic status; abdominal pain with coffee-grounds emesis or black, tarry stools; hematuria; joint pain). If uncontrolled bleeding occurs, stop medication and notify health care professional immediately.
- Inquire about previous reaction to streptokinase therapy. Assess patient for hypersensitivity reaction (rash, dyspnea, fever, changes in facial color, swelling around the eyes, wheezing). If these occur, inform health care professional promptly. Keep epinephrine, an antihistamine, and resuscitation equipment close by in the event of an anaphylactic reaction.
- Inquire about recent streptococcal infection. Streptokinase may be less effective if administered between 5 days and 12 mos of a streptococcal infection.
- Assess neurologic status throughout therapy. Altered sensorium or neurologic changes may be indicative of intracranial bleeding.
- Myocardial Infarction: Monitor ECG continuously. Notify health care professional if significant arrhythmias occur. IV lidocaine or procainamide (Pronestyl) may be ordered prophylactically. Monitor cardiac enzymes. Radionuclide myocardial scanning and/or coronary angiography may be ordered 7–10 days after therapy to monitor effectiveness of therapy.
- Assess intensity, character, location, and radiation of chest pain. Notify health care professional if chest pain is unrelieved or recurs.
- Assess heart sounds and breath sounds (leaves). Notify health care professional if signs of HF occur (palpitations, dyspnea, S3 heart sound, jugular venous distention, relieved CVP).
- Pulmonary Embolism: Monitor pulse, BP, hemodynamics, and respiratory status (rate, degree of dyspnea, ABO).
- Deep Vein Thrombosis/acute Arterial Occlusion: Observe extremities and palpate pulses of affected extremities every hour. Notify health care professional immediately if circulatory impairment occurs. Computerized tomography, impedance plethysmography, quantitative Doppler flow determination, and/or angiography may be used to determine continuation of blood flow and duration of therapy; however, repeated venograms are not recommended.
- Cannula Occlusion: Monitor ability to aspirate blood as indicator of patency. Ensure that patient relaxes and holds breath when connecting and disconnecting IV syringes to prevent air embolism.
- Lab Test Considerations: Hematocrit, hemoglobin, platelet count, fibrin/fibrin degradation product (FDP/fdp) titer, fibrinogen concentration, prothrombin time, thrombin time, and activated partial thromboplastin time may be evaluated before and frequently during therapy. Bleeding time may be assessed before therapy if patient has received platelet aggregation inhibitors.
- Obtain type and crossmatch and have blood available at all times in case of hemorrhage.
- Stools should be tested for occult blood loss and urine for hematuria periodically during therapy.

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streptokinase

- Toxicity and Overdose: High Alert: If local bleeding occurs, apply pressure to site. If severe or internal bleeding occurs, discontinue infusion. Clotting factors and/or blood volume may be restored through infusions of whole blood, packed RBCs, fresh frozen plasma, or cryoprecipitate. Do not administer decubitus: it has antithrombin activity. Intravenous and intramuscular may be used as an anticoagulant.

Potential Nursing Diagnoses

- Ineffective tissue perfusion (Indications)
- Risk for injury (Side Effects)

Implementation

- High Alert: Precautionary and under dosage of thrombolytic medications have resulted in patient harm or death. Have second practitioner independently check original order, dosage calculations, and infusion pump settings.
- Thrombolytic agents should be used only in settings in which hematologic function and clinical response can be adequately monitored.
- Starting two IV lines before therapy is recommended: one for the thrombolytic agent, the other for any additional infusions.
- Avoid invasive procedures, such as IM injections or arterial punctures, with this therapy. If such procedures must be performed, apply pressure to all arterial and venous puncture sites for at least 30 min. Avoid venipunctures at noncompressible sites (jugular vein, subclavian site).
- Acetaminophen may be ordered to control fever.

IV Administration

- pH: 6.5
- Incompatible Infusion: Different: Reconstitute with 5 mL of 0.9% NaCl or D5W (direct to sides of vial) and work gently; do not shake. Dilute further with 0.9% NaCl for a total volume of 45–500 mL (45 mL for MI, 50 mL for deep vein thrombosis or pulmonary embolism). Solution is slightly yellow in color. Administer through 6-h micro-pore–size filter. Use recommended solution within 24 hr.
- Rate: Administer dose for MI within 30 min.
- Intravenous bolus should be followed by an intravenous maintenance infusion.
- Loading dose for deep vein thrombosis or pulmonary embolism: administered over 30 min, followed by an infusion of 100,000 IU/hr.
- Use infusion pump to ensure accurate dose.

- Y-Site Compatibility: alfentanil, amikacin, aminophylline, ascorbic acid, atracurium, aztreonam, fentanyl, gentamicin, heparin, hydroxyzine, hydromorphone, ketorolac, lidocaine, magnesium sulfate, meperidine, methionine, metoclopramide, midazolam, morphine, mepivacaine, nitroglycerin, ondansetron, oxacillin, phenobarbital, phenylephrine, phentolamine, potassium chloride, propofol, pyridoxine, ranitidine, succinylcholine, sugammadex, sufentanil, theophylline, thiamine, ticarcillin, trimethoprim/sulfamethoxazole, vancomycin.

- Y-Site Incompatibility: azathioprine, bivalirudin, chlorpromazine, dantrolene, diazepam, diazoxide, ganciclovir, hydroxyzine, nalbuphine, pentamidine, phenytoin, prochlorperazine, promethazine, trimethoprim/sulfamethoxazole, vancomycin.

- Additive Incompatibility: Do not admix with any other medication.

- Cannula/Catheter Clearance: Dilute 250,000 IU in a total volume of 245 mL with 0.9% NaCl or D5W, administer 20,000 IU (10 mL) via bolus injection.
- Rate: Intravenous bolus is administered over 15 sec–2 min.

- Intracoronary bolus should be followed by an intracoronary maintenance infusion.
- Loading dose for deep vein thrombosis or pulmonary embolism: administered over 30 min, followed by an infusion of 100,000 IU/hr.
- Use infusion pump to ensure accurate dose.

- Y-Site Compatibility: alfentanil, amikacin, aminophylline, ascorbic acid, atracurium, aztreonam, fentanyl, gentamicin, heparin, hydroxyzine, hydromorphone, ketorolac, lidocaine, magnesium sulfate, meperidine, methionine, metoclopramide, midazolam, morphine, mepivacaine, nitroglycerin, ondansetron, oxacillin, phenobarbital, phenylephrine, phentolamine, potassium chloride, propofol, pyridoxine, ranitidine, succinylcholine, sugammadex, sufentanil, theophylline, thiamine, ticarcillin, trimethoprim/sulfamethoxazole, vancomycin.

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- Additive Incompatibility: Do not admix with any other medication.

- Patient/Family Teaching

- Explain purpose of medication and the need for close monitoring to patient and family. Discuss patient to report hypotension reactions (nausea, dizziness) and bleeding or bruising.
Explain need for bedrest and minimal handling during therapy to avoid injury. Avoid all unnecessary procedures such as shaving and vigorous tooth brushing.

Evaluation/Desired Outcomes
- Lysis of thrombi and restoration of blood flow.
- Cannula patency.

Why was this drug prescribed for your patient?