protamine sulfate (proe-ta-meen)

**Classification**
Therapeutic: antidotes
Pharmacologic: antihemorrhagins

**Pregnancy Category C**

**Indications**
Acute management of severe heparin overdosage. Used to neutralize heparin received during dialysis, cardiopulmonary bypass, and other procedures. Unlabeled: Management of overdose of heparin-like compounds.

**Action**
A strong base that forms a complex with heparin (an acid). Therapeutic Effects: Neutralization of heparin.

**Pharmacokinetics**

**Absorption:** Administered IV only, resulting in complete bioavailability.

**Distribution:** Unknown.

**Metabolism and Excretion:** Metabolic fate not known. Protamine-heparin complex eventually degrades.

**Half-Life:** Unknown.

**TIME/ACTION PROFILE (reversal of heparin effect)**

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV</td>
<td>30 sec–1 min</td>
<td>unknown</td>
<td>2 hr†</td>
</tr>
</tbody>
</table>

†Depends on body temperature

**Contraindications/Precautions**

**Contraindicated in:** Hypersensitivity to protamine or fish. Use with caution in: Patients who have received prior protamine-containing insulin or vasectomized men (risk of hypersensitivity reactions); OB, Lactation, Pedi: Safety not established.

**Adverse Reactions/Side Effects**

**Resp:** Dyspnea.

**CV:** Bradycardia, hypertension, hypotension, pulmonary hyperten-

**GI:** Nausea, vomiting.

**Derm:** Pruritus, rash, urticaria, flushing, warmth, Edema, bleeding, MI back.

**Hemat:** Bleeding.

**MS:** Back pain.

**Misc:** Hypersensitivity reactions, including ANAPHYLAXIS, ANGIOEDEMA, and PULMONARY EDEMA.

**Drug Interactions**

**Drug-Drug:** None significant.

**Route/Dosage**

**IV (Adults and Children):** Heparin overdose—1 mg/100 units of heparin. If given > 30 min after heparin, give 0.5 mg/100 units of heparin (not to exceed 100 mg/2 hr). Further doses should be determined by coagulation tests. If heparin was administered subcutaneously, use 1–1.5 mg protamine per 100 units of heparin. 23–50 mg of the protamine dose should be followed by a continuous infusion over 6–16 hours. Enoxaparin overdose—1 mg/kg or enoxaparin to be neutralized. Dalteparin overdose—1 mg/100 anti-Xa IU of dalteparin. If re-

**NURSING IMPLICATIONS**

**Assessment**

- Assess for bleeding and hemorrhage throughout therapy. Hemorrhage may occur 8–9 hr after therapy because of rebound effects of heparin. Rebound may occur as late as 10 hr after therapy if patients heparinized for cardiopulmonary bypass.
- Assess for allergy to fish (salmon), previous reaction to prota-

**Interventions**

- Assess patient for signs and symptoms of hypersensitivity reaction (hives, edema, coughing, wheezing). Keep epinephrine, an antihista-

**NURSING DIAGNOSES**

Beach for injury (Indications)

- Ineffective tissue perfusion (Indications)
Implementation

- Do not confuse protamine with Protonix (pantoprazole).
- Discontinue heparin infusion. In milder cases, overdosage may be treated by heparin withdrawal alone.
- In severe cases, fresh-frozen plasma or whole blood may also be required to control bleeding.
- Avoid giving protamine sulfate with any anticoagulant containing protamine.
- Dose varies with type of heparin, route of heparin therapy, and amount of time elapsed since discontinuation of heparin.
- Do not administer > 200 mg in 1 hr without rechecking clotting studies, as protamine sulfate has its own anticoagulant properties.

IV Administration

- **pH:** 6.0–7.0.
- **Dose:** May be administered undiluted. If further dilution is desired, D5W or 0.9% NaCl may be used.
- **Concentration:** 10 mg/mL.
- **Rate:** Administer by slow IV push over 1–3 min. Rapid infusion rate may result in hypotension, bradycardia, flushing, or feeling of warmth. If these symptoms occur, stop infusion and notify physician. No more than 50 mg should be administered within a 10-min period.
- **Y-Site Compatibility:** allopurinol, amikacin, ampicillin, ampicillin/sulbactam, cephalothin, cefazolin, cefoxitin, cefuroxime, chloramphenicol, clindamycin, ciprofloxacin, cyclosporine, dexamethasone, diltiazem, enalapril, famotidine, fentanyl, fluconazole, gentamicin, glyburide, glycopyrrolate, heparin, hydroxyzine, insulin, lorazepam, magnesium sulfate, mannitol, meperidine, metoclopramide, midazolam, morphine, nalbuphine, naloxone, nafcillin, nesiritide, norepinephrine, ondansetron, oxacillin, pentamidine, pentazocine, phenobarbital, phenylephrine, potassium chloride, procainamide, propofol, propranolol, ranitidine, succinylcholine, tetracycline, tobramycin, vancomycin, verapamil.
- **Y-Site Incompatibility:** amphotericin B colloidal, ampicillin, ampicillin/sulbactam, cefazolin, cefotaxime, cefotrim, ceftriaxone, cefuroxime, chloramphenicol, clindamycin, dexamethasone-sodium phosphate, diazepam, doxycycline, furosemide, heparin, hydrocortisone sodium succinate, indomethacin, insulin, ketorolac, methylprednisolone sodium succinate, nafcillin, oxacillin, penicillin G, pentamidine, penicillin, pentobarbital, phenytoin, ticarcillin/clavulanate, trimethoprim/sulfamethoxazole.

Patient/Family Teaching

- Explain purpose of the medication to patient. Instruct patient to report recurrent bleeding immediately.
- Advise patient to avoid activities that may result in bleeding (shaving, brushing teeth, receiving injections or rectal temperatures, or ambulating) until risk of hemorrhage has passed.

Evaluation/Desired Outcomes

- Control of bleeding.
- Normalization of clotting factors in heparinized patients.

**Why was this drug prescribed for your patient?**

© 2015 F.A. Davis Company.