HEPARIN

Class: Anticoagulant

Indications: Prophylaxis and treatment of thromboembolic disorders; as an anticoagulant for extracorporeal and dialysis procedures

ST-elevation myocardial infarction (STEMI) as an adjunct to thrombolysis; unstable angina/non-STEMI (UA/NSTEMI); anticoagulant used during percutaneous coronary intervention (PCI)

Available dosage form in the hospital: 1000 IU/ML VIAL, 5000 IU/ML VIAL, 5000 I.U /5ML, 25000 I.U /5ML

Dosage:

Note: Many concentrations of heparin are available ranging from 1 unit/mL to 20,000 units/mL. Carefully examine each prefilled syringe or vial prior to use ensuring that the correct concentration is chosen. Heparin lock flush solution is intended only to maintain patency of I.V. devices and is not to be used for anticoagulant therapy.

-Acute coronary syndromes: I.V. infusion (weight-based dosing per institutional nomogram recommended):

-*STEMI:* Adjunct to fibrinolysis (full-dose alteplase, reteplase, or tenecteplase) (Antman, 2008): Initial bolus of 60 units/kg (maximum: 4000 units), then 12 units/kg/hour (maximum: 1000 units/hour) as continuous infusion. Check aPTT every 4-6 hours; adjust to target of 1.5-2 times the upper limit of control (50-70 seconds). Duration of heparin therapy depends on concurrent therapy and the specific patient risks for systemic or venous thromboembolism.

-*Unstable angina (UA)/non-ST-elevation myocardial infarction (NSTEMI) (Anderson, 2007):* Initial bolus of 60 units/kg (maximum: 4000 units), followed by an initial infusion of 12 units/kg/hour (maximum: 1000 units/hour). Check aPTT every 4-6 hours; adjust to target of 1.5-2 times the upper limit of control (50-70 seconds). Continue for 48 hours in low risk patients managed with a conservative strategy (ie, no diagnostic angiography or PCI) (Jneid, 2012).

-Percutaneous coronary intervention :

-No prior anticoagulant therapy:*If no GPIIb/IIIa inhibitor use planned:* Initial bolus of 70-100 units/kg (target ACT 250-300 seconds)

Or *If planning GPIIb/IIIa inhibitor use:* Initial bolus of 50-70 units/kg (target ACT 200-250 seconds

-Prior anticoagulant therapy:*If no GPIIb/IIIa inhibitor use planned:* Additional heparin as needed (eg, 2000-5000 units) (target ACT 250-300 seconds)

Or *If planning GPIIb/IIIa inhibitor use:* Additional heparin as needed (eg, 2000-5000 units) (target ACT 200-250)

-Thromboprophylaxis (low-dose heparin): SubQ: 5000 units every 8-12 hours. **Note:** The American College of Chest Physicians recommends a minimum of 10-14 days for patients undergoing total hip arthroplasty, total knee arthroplasty, or hip fracture surgery .

-Treatment of venous thromboembolism: Note: Start warfarin on the first or second treatment day and continue heparin until INR is ≥2 for at least 24 hours (usually 5-7 days)

-DVT/PE (unlabeled dosing): I.V.: 80 units/kg (or alternatively 5000 units) I.V. push followed by continuous infusion of 18 units/kg/hour (or alternatively 1000 units/hour)

Or DVT/PE (unlabeled dosing): SubQ: *Unmonitored dosing regimen:* Initial: 333 units/kg then 250 units/kg every 12 hours

-Intermittent I.V. Anticoagulation: Intermittent I.V.: Initial: 10,000 units, then 50-70 units/kg (5000-10,000 units) every 4-6 hours

-Maintenance of line patency (line flushing): When using daily flushes of heparin to maintain patency of single and double lumen central catheters, 10 units/mL is commonly used for younger infants (eg, <10 kg) while 100 units/mL is used for older infants, children, and adults. Capped PVC catheters and peripheral heparin locks require flushing more frequently (eg, every 6-8 hours). Volume of heparin flush is usually similar to volume of catheter (or slightly greater). Additional flushes should be given when stagnant blood is observed in catheter, after catheter is used for drug or blood administration, and after blood withdrawal from catheter.

-Parenteral nutrition: Addition of heparin (0.5-3 unit/mL) to peripheral and central parenteral nutrition has not been shown to decrease catheter-related thrombosis. The final concentration of heparin used for TPN solutions may need to be decreased to 0.5 units/mL in small infants receiving larger amounts of volume in order to avoid approaching therapeutic amounts. Arterial lines are heparinized with a final concentration of 1 unit/mL.

Common side effect: Cardiovascular: Allergic vasospastic reaction (possibly related to thrombosis), chest pain, hemorrhagic shock, shock, thrombosis

Central nervous system: Chills, fever, headache

Dermatologic: Alopecia (delayed, transient), bruising (unexplained), cutaneous necrosis, dysesthesia pedis, erythematous plaques (case reports), eczema, urticaria, purpura

Endocrine & metabolic: Adrenal hemorrhage, hyperkalemia (suppression of aldosterone synthesis), ovarian hemorrhage, rebound hyperlipidemia on discontinuation

Gastrointestinal: Constipation, hematemesis, nausea, tarry stools, vomiting

Genitourinary: Frequent or persistent erection

Hematologic: Bleeding from gums, epistaxis, hemorrhage, ovarian hemorrhage, retroperitoneal hemorrhage, thrombocytopenia (see note)

Hepatic: Liver enzymes increased

Pregnancy Risk Factor: C