

**PURPOSE:** The purpose of this policy is to authorize paramedics to monitor intravenous heparin infusions during interfacility transport.

**AUTHORITY:** Health and Safety Code, Division 2.5, Sections 1797.220 & 1797.221; California Code of regulation, Division 9, Section 100144; and State EMS Authority Guideline #125

**POLICY:**

- I. Only those ALS Ambulance providers approved by the San Joaquin County EMS Agency will be permitted to provide the service of monitoring heparin infusions during interfacility transports from approved hospital(s) within their service area.
- II. Only those paramedics who have successfully completed training program(s) approved by the San Joaquin County EMS Agency on heparin infusions will be permitted to monitor them during interfacility transports. Training must include the use of mechanical infusion pumps.
- III. Patients that are candidates for paramedic transport will have preexisting heparin drips in peripheral lines. Prehospital personnel will not initiate heparin drips.
- IV. Paramedics may restart heparin infusions if the heparin infusion is interrupted due to infiltration, accidental disconnection of the IV line, malfunctioning pump, etc. All lines must be restarted in accordance with the transferring physician's orders. Paramedics will ensure new IV line is patent prior to re-starting the infusion.
- V. Heparin Infusions:  
The following parameters shall apply in all cases where paramedics transport patients with preexisting heparin drips:
  - A. Patient shall be placed on cardiac, blood pressure and pulse oximetry monitors and monitored continuously during transport.
  - B. Signed transfer orders from the transferring physician must be obtained prior to transport. Transfer orders must certify that the patient is stable for transfer and provide orders for maintaining the heparin infusion during transport.
  - C. Infusion fluid must be D5W, NS or ½ NS.
  - D. Medication concentration shall be 100 units/ml of IV fluid such as 25,000 units/250 ml.
  - E. Infusion rates must remain constant during transport with no regulation rates being performed by the paramedic, except for the discontinuation the

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infusion.

- F. Infusion rates may not exceed 1600 units per hour.
- G. Vital signs shall be monitored and documented every 15-20 minutes during transport.

VI. Continuous Quality Improvement:

All calls involving the transfer of patients with preexisting heparin infusions shall be reviewed through the ambulance provider's CQI program to determine compliance with policy and transferring physician orders. Reports of audits will be submitted to the EMS agency on a monthly basis.

VI. General Information on Heparin:

- A. Heparin is an anticoagulant which acts to: prevent the conversion of fibrinogen to fibrin, prevent the conversion of prothrombin to thrombin, inactivate Factor X and enhance the inhibitory effects of antithrombin III.
- B. Pharmacokinetics:
  - 1. SC: Onset 20-60 minutes; duration 8-12 hours;
  - 2. IV: Onset immediate; peak 5 minutes; duration 2-6 hours;
  - 3. Metabolized in the liver and the spleen;
  - 4. Excreted in urine;
  - 5. Half-life of 1.5 hours.
- C. Indications for the use of Heparin:
  - 1. In preventing additional clot formation or growth in DVT, MI, pulmonary embolism, DIC, stroke or arterial thrombosis;
  - 2. Prophylactically to keep IV lines open (i.e. heparin flushes and locks);
  - 3. Prophylactically before open heart surgery;
  - 4. Prophylactically post DVT, PE and MI to prevent clotting;
  - 5. Atrial fibrillation to prevent embolization;
  - 6. As an anticoagulant in transfusion and dialysis.
- D. Contraindications:
  - 1. Allergy to heparin;
  - 2. Bleeding disorders - hemophilia, etc.
  - 3. Blood dyscrasias such as leukemia with bleeding;
  - 4. Peptic ulcer disease;
  - 5. Severe hypertension;
  - 6. Severe hepatic disease;

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7. Severe renal disease;
  8. Subacute bacterial endocarditis;
  9. Active bleeding from any site.
- E. Precautions:
1. Pregnancy (class C);
  2. Alcoholism (due to decreased liver function);
  3. Elderly (due to decrease liver and renal function and increased injury capability).
- F. Adverse Effects:
1. Hemorrhage from any site. May manifest as easy bruising, petechiae, epistaxis, bleeding gums, hemoptysis, hematuria, melena;
  2. Fever, chills (due to allergy);
  3. Abdominal cramps, nausea, vomiting, diarrhea (due to allergy);
  4. Anorexia (secondary to above);
  5. Rash, urticaria (due to allergy).
- G. Interactions:
1. Oral anticoagulants (coumadin, warfarin) - increase the actions of heparin;
  2. Salicylates (aspirin) - increase the actions of heparin;
  3. Corticosteroids - increase the actions of heparin;
  4. Corticosteroids - actions are decreased;
  5. Dextran - increases the action of heparin;
  6. Nonsteroidal anti-inflammatory drugs (ibuprofen, Aleve, Midol, naprosyn, toradol, voltaren, feldene, indocin, clinoril) - increase the actions of heparin;
  7. Diazepam - action increase by heparin.
- H. Standard Dosages and Routes:
1. DVT/PE prophylaxis: 5,000 units subcutaneous every 8-12 hours.
  2. Active Clot Suppression:
    - a) Loading Dose
      - (1) Adult: 5000-7000 units IVP.
      - (2) Child: 50-100 units/kg IVP.
    - b) Maintenance
      - (1) Adult: 1000-1600 units per hour IV titrated to PTT/ACT/INR level.

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(2) Child 15-25 units per hour IV titrated to PTT/ACT/INR level.

I. Special Considerations:

1. Avoid IM injections or other procedures which may cause bleeding. Overdoses are treated in hospital with protamine sulfate 1:1 solution (protamine is not authorized for paramedic use.)

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