TITLE: **Monitoring Heparin Infusions** EMS Policy No. **5954**

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 & 1798.

POLICY:

I. ALS Ambulance providers must apply to and be approved by the San Joaquin County EMS Agency (SJCEMSA) prior to monitoring heparin infusions during interfacility transports.

II. The monitoring of heparin infusions is restricted to San Joaquin County accredited paramedics that have successfully completed a training program for monitoring heparin infusions and the use of infusion pumps.

III. Patients that are candidates for paramedic transport are limited to those with preexisting heparin infusions. Prehospital personnel may not initiate heparin infusions.

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. A completed Interfacility Transfer form signed by the transferring physician must be obtained prior to transport. The transferring physician must provide orders for maintaining the heparin infusion during transport and certify that the patient is stable for transfer or that the benefits of transport outweigh the risks of transport.

C. Infusion fluid must be D5W, NS or ½ NS.

D. Medication concentration shall not exceed100 units/ml of IV fluid or 50,000 units (e.g. 25,000 units/250 ml or 50,000 units/500ml).

E. Infusion rates must remain constant during transport except for the discontinuation the infusion.

F. Infusion rates shall be maintained as ordered by transferring physician.

Approved: Signature on file Signature on file
Medical Director EMS Administrator

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. Findings and data will be submitted to the SJCEMSA quarterly.

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;
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, uticaria (due to allergy).

G. Interactions:
1. Oral anticoagulants (coumadin, warfarin) - increase the actions of heparin;
2. Salicylates (aspirin) - increase the actions of heparin;
3. Corticosteriods - increase the actions of heparin;
4. Corticosteriods - actions are decreased;
5. Dextran - increases the action of heparin;
6. Nonsteriodal 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.
      (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.)