Policy:	**Intravenous Heparin Infusions during Inter-facility Transfer**		**#552.81**
		Creation Date:	6-24-99
Medical Director:	_____	Revision Date:	
EMS Coordinator:	_____	Review Date:	6-30-2002

I. AUTHORITY

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

II. PURPOSE

The purpose of this policy is to authorize paramedics to monitor intravenous heparin infusions during inter-facility transport.

III. POLICY

A. Paramedics, in accordance with the provisions of this policy, may accept patients for inter-facility transport with pre-existing intravenous heparin infusions.

B. Heparin drips may not be initiated by paramedics.

C. Every paramedic accredited in Tuolumne County must complete a training course in monitoring heparin infusions during inter-facility transport.

IV. PROCEDURE

A. Patients shall be placed and maintained on a cardiac monitor, blood pressure monitor and pulse oximetry monitor 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. Paramedic may re-start 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 orders.

D. Heparin drips must be in the form of a piggyback monitored by a mechanical pump familiar to the paramedic. If a pump failure occurs and cannot be corrected, the paramedic is to discontinue the heparin infusion and notify the transferring hospital.

E. The following parameters shall apply to all patients with pre-existing heparin infusions:

1. Infusion fluid must D5W, NS or ½ NS.
2. Medication concentration shall be 50 units/cc of IV fluid such as 25,000 units/500 cc.
3. Infusion rates must remain constant during transport with no regulation rates being performed by the paramedic, except for the discontinuation the infusion.
4. Infusion rates may not exceed 1600 units per hour.
5. Vital signs shall be monitored and documented every 15-20 minutes during transport.

V. Quality Assurance:

A. All calls involving the transfer of patients with pre-existing heparin infusions shall be reviewed through the ambulance provider's QA/QI program to determine compliance with policy and transferring physician orders. Reports of audits will be submitted to the EMS agency on request.

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. Sub-acute 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, epitaxis, 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. Corticosteroids - increase the actions of heparin;
4. Corticosteroids - 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. Heparin lock (TKO): 100 units IV push in IV lock site after IV established and after each bolus of medication.
3. 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.
2. Overdoses are treated in hospital with protamine sulfate 1:1 solution (protamine is not authorized for paramedic use.)