

APPENDIX: I

TITLE: INTRAOSSEOUS INFUSION PROCEDURES – EASY IO pending

REVISED: January 28, 2010

I. BACKGROUND

Intraosseous infusion is a method of gaining access to the circulatory system in infants and children, in which a specialized trocar is placed in the proximal tibia. All IV drugs and fluids may be given by the intraosseous route.

II. ADVANTAGES OVER PERIPHERAL IV ACCESS:

1. Non-collapsible route providing rapid access in patients with circulatory collapse, obesity, burns, or edema.
2. A low complication rate.
3. Safer and easier than central line placement.
4. Rapid IV access may decrease morbidity and mortality in the critical pediatric patient.
5. The procedure can be accomplished without interrupting CPR.

III. INDICATIONS:

1. Infant or child who appears to be 6 years of age or less. Children up to 8 years of age may be candidates for femoral site access.
2. A life or limb threatening condition exists.
 - Volume depletion (dehydration or hemorrhage)
 - Circulatory collapse
 - Cardiac arrest
 - Medication route if no other access is available
3. A peripheral IV cannot or is unlikely to be established.
4. Delay in administration of fluids or medications may increase risk to the patient.

IV. CONTRAINDICATIONS:

1. Cellulitis overlying the site.
2. Fracture in the same bone or a proximal vascular injury.
3. Severe pelvic trauma.
4. A previous intraosseous attempt in the same bone.

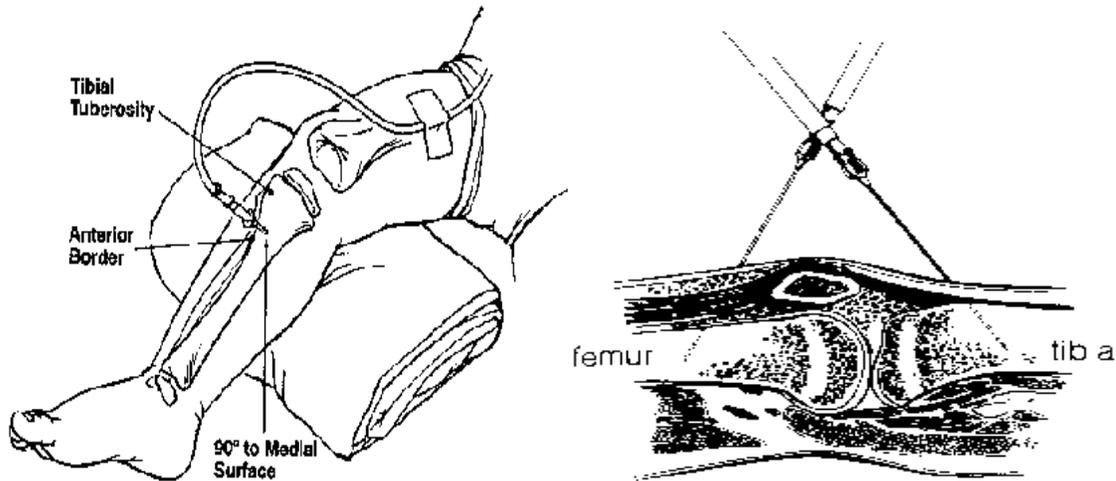
V. COMPLICATIONS:

1. Sub-periosteal infusion due to incorrect placement.
2. Extravasation due to prior attempt in same bone, or through-and-through puncture of the bone.
3. Plugging of needle with bone or marrow.
4. Growth plate damage.
5. Osteomyelitis (more common with hypertonic or irritating solutions or medications).

VI. PROCEDURE:

Note: The proximal tibia is the preferred insertion site. Alternatives sites exist and can be used in special situations (i.e. tibia fractures).

1. Place the infant supine and flex the knee to 30 degrees. Locate insertion site:
 - Flat anteriomedial surface of the tibia, 1 - 2 finger widths below the tibial tuberosity. After entering the skin, the needle should be directed at a slight angle (10-15° from the vertical) **caudad for proximal tibia insertion.**
 - The landmarks for femoral insertion are the lower third of the femur, approximately 3 cm above the lateral femoral epicondyles. After entering the skin, the needle should be directed at a slight angle (10-15° from the vertical): **cephalad for femoral insertions.**
 - This slight angulation minimizes the risk of trauma to the growth plate.



2. Using a 15-18-gauge IO bone marrow aspiration needle directed perpendicular and slightly caudal (or cephalad depending on approach) to the bone surface, penetrate the skin and periosteum using firm pressure. A back-and-forth twisting motion should be used in penetrating the cortex, and a “give” or “pop” will be felt as the medullary canal is entered.
3. Remove the stylet and using a syringe aspirate 1 cc of bone marrow. (This may best be accomplished by injecting 1 cc of IV solution prior to aspirating. Marrow will appear as pink or reddish aspirant.)
4. Attach the IV tubing and observe for good flow.
5. Stabilize the IO needle with 4 X 4's, kerlex rolls, and tape.

VII. REFERENCES:

1. Ada County EMS, “Paramedic Protocol for Intraosseous Infusion”. Standing Orders and Procedures for Paramedics. Boise, Idaho: 1987.
2. “Vascular Access”, Textbook of Pediatric Advanced Life Support. American Heart Association, 1994.