STANDARDIZED PROCEDURE
NEONATAL / PEDIATRIC INTRAOSSEOUS LINE PLACEMENT
(Neonatal, Pediatric)

I. Definition

To place a large bore needle into the bone marrow for the purpose of emergency access for fluids and medications.

II. Background Information

A. Setting:

Inpatient neonatal / pediatric patients or outpatient during Emergency Transport of neonatal / pediatric patients.

If appropriate, implement procedural support, if available - make sure Child Life is involved, and use age appropriate language and age appropriate developmental needs with care of children

B. Supervision

The necessity of the procedure will be determined by the Advanced Health Practitioner (AHP) in verbal collaboration with the attending physician or his/her designee. Direct supervision is necessary until competency is determined and the minimum number of procedures is successfully completed, as provided for in the protocol. After that time, the attending physician or his/her designee must be available.

Designee is defined as another attending physician who works directly with the supervising physician and is authorized to oversee the procedures being done by the AHP.

C. Indications

This procedure may be performed in situations where emergency vascular access is needed and is not obtainable through other means.

D. Precautions/Contraindications

1. Bone without cortical integrity (recent fracture of involved bone, previous penetration); extravasation of infusate.
2. Infected burn or cellulitis overlying the site
3. Congenital or acquired deformities of the bone (Osteogenesis imperfecta)
4. Premature infants
5. Ability to establish intravascular access

The AHP will notify the physician immediately under the following circumstances:

1. Patient decompensation or intolerance to the procedure
2. Outcome of the procedure other than expected

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III. Materials

1. EZ IO setup or #16- or #18-gauge bone marrow needle with stylet (if not available, then large bore spinal needle [18-20 gauge with stylet])
2. ChloraPrep
3. (2) 5 ml syringes
4. TB syringe
5. 1% Lidocaine (without epinephrine)
6. Flush solution
7. Tape
8. Armboard
9. Sterile gloves
10. Sterile gauze pads

IV. Neonatal / Pediatric Intraosseous Line Placement

A. Pre-treatment evaluation

1. If time permits, premedicate patient for pain control and/or sedation. Assess need for further medication throughout the procedure.

B. Set up (if applicable)

1. Prepare equipment--
   a. Open equipment
   b. Don sterile gloves
   c. Draw up flush solution in 5 ml syringes.
   d. Draw up Lidocaine in TB syringe.

C. Patient Preparation

1. If time permits, inform the patient/family of the treatment plan, otherwise notify them after the procedure is completed.
2. Select site--For infants and children, the preferred site is the proximal tibia, two to three centimeters below the tibial tuberosity on the flat medial surface, with the needle pointed caudal. The distal femur may also be used (see Figure 1).

3. Restrain limbs--Place selected limb on armboard.

D. Procedure

1. Perform time out with all appropriate steps.
2. Sterilely prep site with ChloraPrep. Allow to dry.
3. If time permits, infiltrate site area with Lidocaine.
4. Place needle 1-2 cm above or below the knee, directing needle 10 – 15 degrees away from knee in order to avoid the growth plate.
5. Apply firm pressure, using a rotary motion with the needle at a 60% angle, until the marrow cavity is entered and a sudden loss of resistance is felt. Do not advance further.
6. Remove the stylet and check position by aspiration of blood and marrow contents.
7. Flush slowly with saline to check for extravasation.
8. Begin IV or medication infusion.
9. Once line is determined to be in place, medicate patient for pain control if needed and assess need for further pain medication while line is in place.
10. Place sterile dressing over site. If available, attach rubber support. Tape securely.

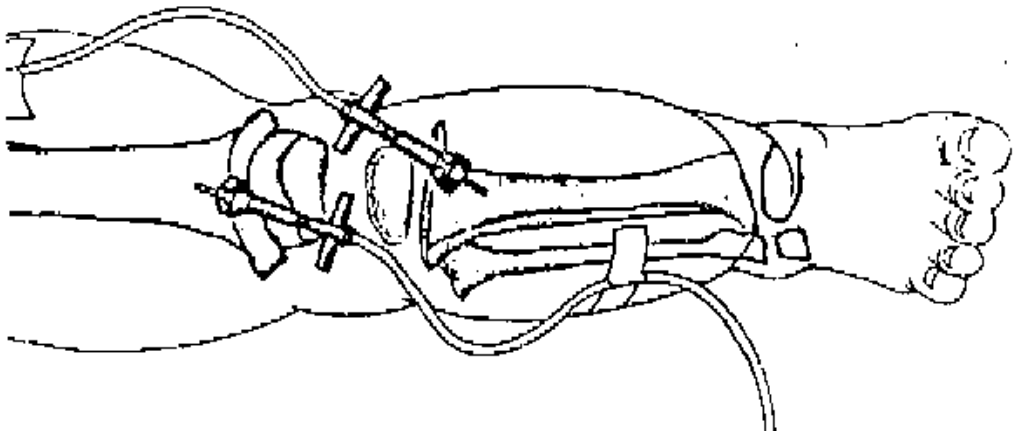

FIGURE 1 - Preferred Sites For Intraosseous Infusions. Diagram from Manley, L. "Intraosseous infusion: Rapid vascular access for critically ill or injured infants and children." Journal of Emergency Nursing, 1988, 14(2): 66.

E. Follow-up treatment

1. Remove line once adequate standard vascular access is secured. To remove, place sterile 2x2 over site, pull needle, and apply pressure for five minutes. Apply antibiotic dressing. Prior to using leg for arterial/venous sticks, an assessment of distal portion of leg and pulses must be made.

F. Termination of treatment

1. If extravasation occurs, withdraw needle and select a different bone.

2. Discontinue intraosseous infusion as soon as alternate venous access is established to lessen the risk of osteomyelitis.

G. Potential Complications:

1. Osteomyelitis or Sepsis

2. Fracture of bone

3. Localized periosteal or bone marrow inflammation

4. Local infiltration of fluid/medications

5. Local bleeding

6. Incorrect placement of the needle, leading to bone growth plate damage

7. Fat embolism (theoretical--never documented)

8. Vascular or nerve damage

9. Compartment syndrome

IV. Documentation

A. Documentation is in the electronic medical record

1. Documentation of the pretreatment evaluation and any abnormal physical findings.
2. Record the time out, indication for the procedure, procedure, type and size of needle used, method used, EBL, the outcome, how the patient tolerated the procedure, medications (drug, dose, route, & time) / fluids given, placement of needle, complications, and the plan in the note.

B. All abnormal findings are reviewed with Attending or supervising physician

V. Competency Assessment

A. Initial Competence

1. The AHP will observe the procedure in its entirety at least once. Under the direct supervision of the attending physician the AHP will perform neonatal /pediatric intraosseous line placement successfully **three** times and will be evaluated for competence and technical skill.
2. The AHP will demonstrate knowledge of the following:
   a. Medical indication and contraindications of intraosseous line placement
   b. Risks and benefits of the procedure
   c. Related anatomy and physiology
   d. Consent process (if applicable)
   e. Steps in performing the procedure
   f. Documentation of the procedure
   g. Ability to interpret results and implications in management.
3. The AHP will ensure the completion of competency sign off documents and send them directly to the medical staff office.

B. Continued proficiency

1. The AHP will demonstrate competence by successful completion of the initial competency.
2. Each candidate will be initially proctored and signed off by an attending physician. AHPs must perform this procedure at least **three** times per year. In cases where this minimum is not met, the AHP must demonstrate skill with this procedure in a simulation or skills lab, or the attending, must again sign off the procedure for the AHP. The AHP will be signed off after demonstrating 100% accuracy in completing the procedure.
3. Demonstration of continued proficiency shall be monitored through the annual evaluation.
4. A clinical practice outcomes log is to be submitted with each renewal of credentials. It will include the number of procedures performed per year and any adverse outcomes. If an adverse outcome occurred, a copy of the procedure note will be submitted.

VII. RESPONSIBILITY

Questions about this procedure should be directed to the Chief Nursing and Patient Care Services Officer at 353-4380.

VIII. HISTORY OF POLICY

Initial policy approved 1986 by CIDP and EMB
Revised 4/89, 1/93, 5/01, 7/03, 12/05, 6/08, 2/11
Revised most recently July 2012 by Subcommittee of the Committee for Interdisciplinary Practice
Reviewed most recently July 2012 by the Committee on Interdisciplinary Practice
Approved most recently July 2012 by the Executive Medical Board and the Governance Advisory Council.