Intraosseous Infusion (Pediatric and Adult)

Intraosseous infusion may be performed by EMT-P’s who have successfully completed a Contra Costa County EMS approved training course.

» Indications
  • After evaluation of potential IV sites, it is determined that an IV attempt would not be successful;
  • One of the following conditions exists:
    o cardiac or respiratory arrest, impending arrest, or unstable dysrhythmia
    o shock or evolving shock, regardless of cause

» Absolute Contraindications
  • Fracture or suspected vascular compromise of the selected tibia
  • Inability to locate anatomical landmarks for insertion

» Relative Contraindications
  • Skin infection or burn overlying the area of insertion

» Equipment
  ✓ Povodine-based prep solution
  ✓ IV of NS attached to 500ml bag in pediatric patients
  ✓ IV NS 1 liter in adult patients
  ✓ 10/12 ml syringe filled with normal saline
  ✓ Sterile gloves
  ✓ Pressure bag for IV fluid administration
  ✓ Intraosseous needle (suitable to age 8) - OR -
  ✓ Automated IO insertion device (EZ-IO PD) up to 40 kg
  ✓ Automated IO insertion device (EZ-IO AD) if over 40 kg
  ✓ Lidocaine 2% for injection

» Procedure
  1) Locate and prep the insertion site. For children, place supine with a rolled towel under the knee, restrain if necessary. Select extremity (if applicable) without evidence of trauma or infection.
  2) Put on gloves and thoroughly prep the area with the antiseptic solution.
  3) Locate insertion site:
    a. In small children (3-12 kg), the tibial tuberosity cannot be palpated as a landmark, so the insertion site is two finger-breadths below the patella in the flat aspect of the medial tibia.
    b. In larger children (13-39 kg), the insertion site is located on the flat aspect of the medial tibia one finger-breadth below the level of the tibial tuberosity. If tibial tuberosity not palpable, insert two finger-breadths below the patella in the flat aspect of the medial tibia.
    c. For adults, proximal or distal tibial sites may be utilized.
      i. The proximal tibial site is one finger-breadth medial to the tibial tuberosity.
      ii. The distal tibial site is 2 finger-breadths above the medial malleolus (inside aspect of ankle) in the midline of the shaft of the tibia.
  4) Introduce the intraosseous needle at a 90° angle, to the flat surface of the tibia.
  5) For manual insertion, pierce the bony cortex using a firm rotary or drilling motion (do not move needle side to side or up and down). A distinct change in resistance will be felt upon entry into the medullary space.
  6) Remove the stylet and confirm intramedullary placement by injecting, without marked resistance, 10 ml normal saline.
7) Attach IV tubing to the intraosseous hub.
8) Anchor needle to overlying skin with tape.
9) If unable to establish on first attempt, make one attempt on opposite leg, no more than two (2) attempts total.
10) Monitor pulses distal to area of placement
11) Monitor leg for signs of swelling or cool temperature which may indicate infiltration of fluids into surrounding tissue.
12) For adult patients who awaken and have pain related to infusion, slowly administer LIDOCAINE 20 mg IO. May repeat dose once.
13) For pediatric patients with pain related to infusion, slowly administer LIDOCAINE 0.5 mg/kg IO (max dose 20 mg).

» Possible Complications
- Local infiltration of fluids/drugs into the subcutaneous tissue due to improper needle placement
- Cessation of the infusion due to clotting in the needle, or the bevel of the needle being lodged against the posterior cortex
- Osteomyelitis or sepsis
- Fluid overload
- Fat or bone emboli
- Fracture