EL DORADO COUNTY EMS AGENCY
FIELD PROCEDURES

809

(on file)

EMS Agency Medical Director

Effective: July 1, 2015
Last Revised: September 2024
Scope: ALS

INTRAOSSEOUS INFUSION

PURPOSE:
To establish immediate vascular access in the critically ill or injured patient. Intraosseous infusion provides rapid access to the circulatory system to provide fluid resuscitation and cardiotonic medications.

INDICATIONS:
• Patients in which vascular access is difficult to obtain in emergent, urgent, or medically necessary cases.

COMPLICATIONS:
• Local infiltration of fluids and/or medications into the subcutaneous tissue from improper needle placement
• Possible fat or bone emboli
• Osteomyelitis may be found when device is left in over 24 hours.

CONTRAINDICATIONS:
• Recent fracture of involved bone (fluid may extravasate into SQ tissue)
• Infection at the site selected for insertion.
• Excessive tissue at insertion site with the absence of anatomical landmarks
• Previous significant orthopedic procedures in insertion area (prosthetics)
• Previous IO within 24 hours on that extremity
• Compromised extremity.

CONSIDERATIONS:
1. The non-traumatized humerus is the preferred site for IO insertion.
2. One attempt per extremity and no more than two (2) attempts per patient prior to base order.
3. Do not delay transport to establish IO.
4. **Flow rate:** Ensure the administration of a rapid and vigorous 10ml flush with normal saline prior to infusion **"NO FLUSH=NO FLOW".** Repeat syringe bolus (flush) as needed.
5. **Pain:** In patients responsive to pain, 2% preservative free lidocaine should be administered for pain before infusing any fluids into the IO.

***Adult dose:** 2 mL (40 mg)

***Pediatric dose:** 0.5 mg/kg

2% LIDOCAINE
MUST be administered slowly to prevent distribution into the central circulation. It is intended to remain in the medullary space as a local anesthetic.

If a second dose is required for pain management, it will be half the initial dose and again administered very slowly.

EDCEMS has approved the EZ-IO® and the BD™ IO Access System for use in El Dorado County. Provider agencies may use either and shall ensure providers' competency in the system they elect to utilize.

EZ-IO® GUIDELINE:

EQUIPMENT NEEDED:
- EZ-IO® driver
- EZ-IO® needle sets: 15mm (3-39 Kg), 25mm (40 Kg and greater) and 45mm (excessive tissue)
- Chlorohexidine swab/prep
- EZ-Connect® or IV extension tubing extension set
- 10 mL syringe
- Normal saline
- Pressure bag (may use BP cuff @ 300 mmHg)
- EZ-Stabilizer® for pediatric and proximal humeral insertions

PROCEDURE:

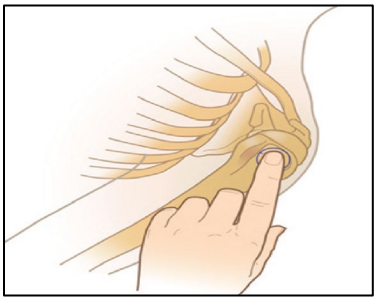
1. USE STANDARD PRECAUTIONS.

2. Assemble the needed equipment.

3. Fill syringe with 10 mL normal saline and prime EZ-Connect/extension tubing (leaving syringe attached to EZ-Connect port). If patient is responsive to pain, prime EZ-Connect/extension tubing with 2% lidocaine (40 mg for adults or 0.5 mg/kg for peds). Keep in mind the tubing holds 1mL of fluid.

4. Locate an appropriate insertion site:

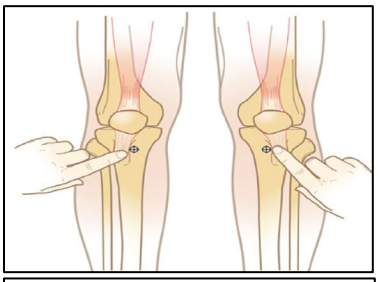
A non-traumatized humerus



Adult: Identify the greater tubercle insertion site approximately two finger widths inferior to the coracoid process and the acromion. All humeral insertions on adult patients should be done with the 45mm needle to reduce accidental dislodgement. If you have difficulty locating landmarks use different appropriate insertion site instead.

Pediatric: Same as adult insertion site, but if you have difficulty locating landmarks use different appropriate insertion site instead.

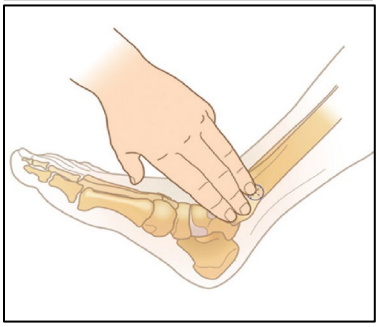
A non-traumatized proximal tibia



Adult: The insertion site is one finger width medial to the tibial tuberosity.

Pediatric: <u>Less than 12 kg or without an identifiable tibial tuberosity:</u> The insertion site is two centimeters distal from the patella and then medial along the flat aspect of the tibia.
<u>Pediatrics with an identifiable tibial tuberosity:</u> The insertion site is the same as for adults.

A non-traumatized distal tibia



Adult: The insertion site is two centimeters proximal to the medial malleolus and positioned midline on the medial shaft making certain you are at the flat center aspect of the tibia. This can be confirmed by palpating the anterior and posterior borders of the distal tibia and feeling for the flat aspect of the bone.

Pediatric: The insertion site is the same as for adults.

5. Position the patient so that the site is accessible (for humeral insertions – adduct humerus with arm against patient's body resting on gurney or backboard. Forearm resting on the abdomen).

6. Prepare the insertion site using aseptic technique. Allow to air dry thoroughly.

7. A "snap" should be felt when the needle is fully seated on the driver. Do not touch the patient or the EZ-IO needle with the hand that touches the driver.

8. Stabilize site and remove needle cap.

9. Position the driver at the insertion site with the needle set at an appropriate angle, determined by insertion site, to the bone surface. Gently pierce the skin with the needle set and insert EZ-IO needle until it touches the bone. IMPORTANT: Keep hand and fingers away from needle set.

10. Penetrate the bone cortex by squeezing driver's trigger and applying gentle, consistent, steady, downward pressure (allow driver to do the work).

Do not use excessive force: In some patients insertion may take greater than 10 seconds, if the driver sounds like it is slowing down during insertion; reduce pressure on the driver to allow the RPM's of the needle tip to do the work.

In the unlikely event that the battery on the driver fails, paramedics may manually finish inserting the EZ-IO needle set. Grasp the needle set and rotate arm, while pushing the needle into the intraosseous space. This may take several minutes.

11. Release the driver's trigger and stop the insertion process when a sudden "give or pop" is felt upon entry into the medullary space or when desired depth is obtained.

12. Remove EZ-IO power driver from needle set while stabilizing the catheter hub and remove stylet from catheter by turning counter-clockwise and immediately dispose of stylet in appropriate biohazard sharps container.

***NEVER** return used stylet or cartridge to the EZ-IO kit.

13. Secure site with EZ-stabilizer and connect primed EZ-connect to exposed luer-lock hub.

14. Confirm placement with a syringe bolus of 10 mL *normal saline.

***If the patient is responsive to pain, the paramedic may consider 2% lidocaine without preservatives for anesthetic effect prior to the 10mL normal saline flush.

15. Assess for potential complications.

16. Disconnect 10 mL syringe from EZ-connect extension set and connect to primed IV tubing and begin infusing utilizing a pressure delivery system.

17. Dress site, secure tubing, and monitor intraosseous site and patient condition.

BD™ INTRAOSSEOUS VASCULAR ACCESS SYSTEM GUIDELINE:

EQUIPMENT NEEDED:
- BD™ IO Driver
- Appropriately sized BD™ Intraosseous Needle
- Chlorohexidine or alcohol swab/prep
- 3-way stopcock
- IV extension tubing extension set.
- 10 mL syringe
- Normal saline
- Pressure bag or infusion pump (may use BP cuff @ 300 mmHg)
- Transpore tape

PROCEDURE:

1. Don personal protective equipment.
2. Prepare intraosseous supplies and prime extension set.
3. Properly locate insertion site.
4. Clean insertion site with CHG or alcohol pad.
5. Select appropriately sized BD™ Intraosseous needle.

6. Check battery life indicator on powered driver.
7. Connect BD™ Intraosseous Needle Set to the powered drill.
8. Correctly insert the needle set into medullary capillary.
    - Position the needle at a 90-degree angle to the skin.
    - Insert the needle set until the needle tip touches bone.
    - Confirm that you see at least 5 mm mark of the needle visible outside of the skin.
    - Apply moderate, steady pressure when squeezing the trigger to penetrate the bone cortex.

9. Place the drive adapter hub assembly in sharps container.
10. Attach primed extension set to the needle hub.
11. Aspirate marrow/blood to confirm proper placement of needle.
12. Use BD™ securement device to properly secure the needle.
    - Confirm skin around insertion site is intact.
        a) Properly clean and dry the insertion area for optimal adhesion.
        b) Open the center snap feature of the securement dressing.
        c) Snap the feature closed around the needle hub.
        d) Attach the adhesive of the securement dressing by pulling the tabs.
        e) Press adhesive against the skin for proper stabilization.

13. Clean BD™ Intraosseous Powered Driver following Instructions For Use.