Intraosseous Infusion

Procedure

Douglas County KS EMS System **March 2022**

Approved Provider: AEMT, Paramedic

Reference Protocols: CAPE, General Trauma

Indications

- IV should be considered prior to IO attempt except under extreme circumstances
  - IV preferred in cardiac arrest
- IO is valid method to deliver large quantities of fluid or medication if IV is not obtainable

Precautions

- Watch carefully for swelling at the insertion site or soft tissue opposite the insertion site as the needle may not have penetrated bone or may have gone through both cortices.
- This is an emergency invasive procedure and should not be done for a prophylactic or TKO line.

Contraindications

- Recent fracture or infection at the insertion site
- IO within the past 48 hours in the targeted bone Excessive tissue at insertion site with the absence of anatomical landmarks (consider alternate site)
- Previous significant orthopedic procedures at insertion site (i.e. prosthetic limb or joint consider alternate site)
- Excessive tissue or absence of adequate anatomical landmarks

Procedure

- Wear approved BSI
- Determine EZ-IO Indications
- Rule out Contraindications
- Locate appropriate insertion site Multiple, sites are FDA cleared including:

Proximal Humerus: (Fig. 1)

- Insertion site is 1 cm above the surgical neck of the humerus on the greater tubercle
- Drill should be placed at a 45 degree angle with the humeral head

Proximal Tibia (Fig. 2)

- Insertion site is approximately 2cm below the patella and approximately 2cm medial to the tibial tuberosity along the flat aspect of the tibia (fig.3)
- In pediatrics, if NO tuberosity is present, the insertion is located approximately 2cm below the patella and 1cm medial, along the flat aspect of the tibia. Pinch the tibia between your fingers to identify the medial and lateral borders

Distal Tibia (Fig. 3)

- Insertion site is located approximately 2cm proximal to the most prominent aspect of the medical malleolus for adults and 1-2cm proximal for pediatrics. (fig.4)
- Palpate the anterior and posterior borders of the tibia to assure that your insertion site is on the flat center aspect of the bone

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Insertion

- Size
  - Pink for Pediatrics under 4 months
  - Blue for pediatrics (all sites) and adults (tibia)
  - Yellow for adults (humorous)
- Prepare insertion site using aseptic technique
- Prepare the EZ-IO® driver and appropriate needle set
- Gently push the needle set through the soft tissue at the insertion site until the needle set tip touches the bone.
- Inspect to ensure that at least one black line is visible above the skin-if no black line is visible, consider a longer needle set or an alternative site for insertion.
- Penetrate the bone cortex by squeezing driver's trigger and applying gentle, consistent, steady pressure *** Allow the driver to do the work***
- Release the driver's trigger and stop the insertion process when:
  - **Adult patients:** the hub is almost flush with the skin
  - **Pediatric patients:** you feel a decrease in resistance indicating the needle set has entered the medullary space-stop when you feel the "pop" or "give"
- Stabilize hub of the needle set with dominate hand, remove driver by pulling straight off.
  - Continue to stabilize the hub of the needle set and remove stylet by turning top of needle set counter-clockwise, then pull stylet up & out, the needle should feel firmly seated in the bone (1st confirmation of correct placement)Remove EZ-IO® driver from needle set while stabilizing catheter hub.
- Place stylet in shuttle or approved sharps container
- In alert patients, SLOWLY administer 2% Lidocaine per formulary dosage and allow to sit for 1 minute
- Connect primed EZ-Connect® lockset
- Confirm placement by aspirating marrow and flushing. IO should flush with some difficulty at first. Ensure no localized swelling due to extravasation of fluid
- Flush the EZ-IO® catheter with 10cc NS
- Utilize pressure (syringe bolus or pressure bag) for continuous infusions where applicable
- Begin infusion
- Dress site, secure tubing and apply wristbands as time allows
- Monitor EZ-IO® site and patient condition

Complications

- Extravasation of fluids
- Compartment syndrome
- Infection
- Marrow/Growth plate damage
- Fat embolism
- Fracture

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Documentation

- Indications for procedure
- Description of procedure
- Response to interventions
- PCR need to identify Time and Date of Insertion

Notes

- Flow rate: Due to the anatomy of the IO space, flow rates may appear to be slower than those achieved with an IV catheter.
- Ensure the administration of an appropriate rapid SYRINGE BOLUS (flush) prior to infusion NO FLUSH = NO FLOW
- Rapid syringe bolus (flush) with 10 ml of normal saline
- Repeat syringe bolus (flush) as needed
- To improve continuous infusion flow rates always use a syringe or pressure infuser bag
- The EZ-IO catheter is marked with a black line 5mm proximal to the hub. Prior to drilling, with the need inserted through the soft tissue, and the needle tip touching bone, adequate needle length is determined by the ability to see the 5mm black line above the skin.
- Only one attempt in given bone since infusion would leak out of the site of first attempt. If attempt unsuccessful, leave the needle in place.
- All IV medications and solutions can be infused via IO line. Fluids may have to be pressure infused to obtain an adequate flow rate.
- The marrow aspirate can be used for a rapid bedside glucose determination.

Fig. 1

Fig. 2

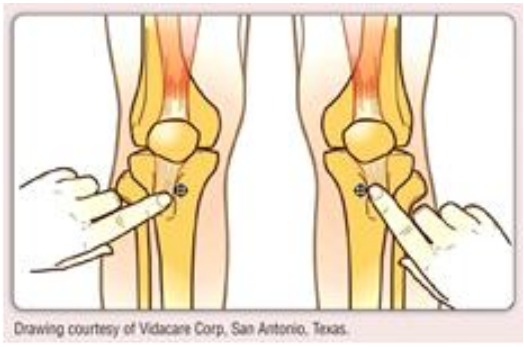

Fig. 3