Vidacare EZ-IO

McHenry Western Lake County EMS System
Why use the EZ-IO?

- Most seriously ill or injured patients have little or no peripheral circulation.
- IO takes seconds to establish
Why use the EZ-IO?

- Venous access in one attempt with one catheter.
- Veins within the IO space do not collapse.
Physiology

- The IO space is very vascular
- Blood flow is steady and generally continues even in the shock state
- Pressure in the IO space is about 1/3 the pressure of the systemic pressure
- Drugs and fluids are rapidly absorbed and transported into the central circulation
Indications

- Inability to gain vascular access after 2 attempts in the following situations:
  - Altered level of consciousness
  - Respiratory compromise
  - Hemodynamic instability

- Cardiac Arrest is an absolute indication per ACLS Guidelines
Contraindications

- Fracture of the tibia or femur
- Previous orthopedic procedures
- Pre existing medical condition (osteo genesis imperfecta)
- Infection at the site of the insertion
- Unable to locate the 3 landmarks
- Excessive tissue over the site
Landmarks

1\textsuperscript{st} landmark - Patella

2\textsuperscript{nd} landmark - Tibial tuberosity, a round/oval “bump” on the front surface of the lower leg, approximately 2 finger widths below the patella

3\textsuperscript{rd} landmark - 1 finger width medial of the tibial tuberosity. This would be the correct spot.
Tibial Access
Insertion

- Determine if EZ-IO is indicated
- BSI and aseptic technique
- Ensure there are no contraindications
- Locate proper site for insertion
  - Patella
  - Tibial Tuberosity (2 fingers below Patella)
  - 1 finger width medially
Insertion

- Prepare your luer lock extension tubing by flushing with a pre filled syringe of saline.
  - Once you have flushed the tubing, set it aside until after insertion of needle
- Prime your IV tubing and place IV on a pressure infuser pumped up to 300mmHg
- Cleanse the site using alcohol prep or Betadine swab
Confirm and clean insertion site
Insertion

- Prepare driver and needle set
  - Remove the driver and one IO needle cartridge
  - 3-39kg is “Pink” Needle Set
  - 40kg and higher is “Blue” Needle Set
  - Open the cartridge and attach driver to the needle. (You should feel the magnet attach the needle to the driver)
  - Remove the needle set from the cartridge
Insertion

- Remove the safety cap from the needle set by grasping the cap and twisting clockwise to remove the cap.
  - Pulling the cap off may cause the needle set to come off the driver.
  - Rotating the cap counter clockwise may cause the catheter to separate from the stylet.
Insertion

The cap can also be removed by momentarily powering the driver while holding the cap.

This will break the “seal” and allow you to remove the cap once the driver and needle set have stopped turning.
Insertion

- Hold the driver in one hand and stabilize the patient's leg with the other hand.
  - Be cautious of sudden movement of the patient during insertion
- Position driver at the insertion site with the needle at a 90 degree angle to the surface of the bone.
Insert EZ-IO needle set – power driver

Position the EZ-IO Driver at a 90-degree angle to the bone

Do not force the needle set into position “allow the driver to do the work”!
Push the needle into the skin until the needle meets the bone.

Verify that you can see the 5mm mark on the needle (this is the mark closest to the flange on the needle).

If this mark is not visible, you must abandon the procedure as the needle will not be long enough.
Must see the 5mm Mark!

Note that the 5 mm mark is NOT visible above the skin.
Depth gauge on needle
5mm Mark on Needle Set

EZ-I0\textsuperscript{®} sterile needle set attaches to the Power Driver for patient insertion.

- Power Driver
- Safety Cap
- 5 mm Mark
- Catheter Hub
- Needle-Sets
- Stylet Hub

EZ-I0 Power Driver and Needle Sets
Three sizes of needles

- EZ-IO PD 15 mm Needle Set
- EZ-IO AD 25 mm Needle Set
- EZ-IO LD 45 mm Needle Set
Insertion

Apply minor pressure to the driver and power through the hard outer surface of the bone, maintaining the 90 degree angle at all times.

- Do not force the needle into position!
- Allow the driver to do the work!

STOP when the needle flange touches the skin or a sudden decrease in resistance is felt.
Insertion

- Remove the driver from the needle set
  - While supporting the needle with one hand, gently pull on the driver to release the magnet
- Return the driver to the case
Insertion

- Remove the stylet from the catheter
- Grasp the hub firmly with one hand, rotate the stylet counter clockwise. Pull the stylet out of the catheter place in the needle box as soon as possible.
Placement Confirmation

- The IO catheter should be at a 90 degree angle and is firmly seated against the skin.
  - Do not rock the needle back and forth
- Blood at the tip of the catheter
- Aspiration of bone marrow with a syringe
- Free flow of medications and fluids with no extravasation
Placement Confirmation

Attach the primed luer lock extension set to the hub and then syringe flush the IO space with 10 mL of fluid.

FAILURE TO FLUSH MAY RESULT IN LIMITED OR NO-FLOW SITUATION.
Remove the stylet and syringe flush catheter

Syringe flush the catheter with 10 ml of a sterile solution

Flush = Flow
Fluid administration

- Administer fluids or medications per protocol. Use of a pressure infuser is recommended to maintain adequate flow rates. Pressure bag should be inflated to 300mmHg.

- If the patient is complaining of pain due to intramedullary pressure, Lidocaine 1mg/kg can be administered up to 50mg

- Apply dressing and stabilize needle

- Apply the wrist band to patient
Begin infusion with pressure

A pressure bag or infusion pump will improve the flow rate
Possible complications

- Extravasation – Leakage
- Dislodgement
- Compartment syndrome
- Fracture
- Pain
- Reduced flow rate
- Infection
Pediatrics
Site Location

- Tibia
  - Most commonly used
  - Marrow cavity is well developed even in the neonate
  - Readily accessible
  - Tibia has less overlying tissue
  - Peds needle is approved for 3 kg patient
Summary of Insertions

- BSI
- Identify indications
- Check for contraindications
- Prepare luer lock extension and flush
- Locate landmarks
- Cleanse site
- Prepare Driver and Needle set
- Stabilize the leg
- Insert Needle Set
- Remove driver from Needle set
Summary of Insertions

- Remove driver from Needle set
- Confirm placement
- Connect luer lock extension set
- Remove stylet from catheter
- Consider Lidocaine for conscious patient
- Flush with 10ml of saline
- Start infusion using pressure bag 300mmHg
- Secure tubing and catheter
- Apply the wrist band
Removal of EZ-IO

To remove the EZ-IO catheter from ANY APPROVED location attach a sterile syringe then rotate clockwise while gently pulling.

During removal maintain a 90 degree angle. Do not rock the catheter!

Remove the catheter within 24 hours
Special Thanks!

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