The need for intraosseous access

Tarah Cormack RN, BSN, CEN

Indications & Contraindications:

**Indications:**
- Safe, fast and efficient vascular access for emergent, urgent and medically necessary situations where IV access is delayed or difficult
- Used frequently by EMS prehospital
- All medications, blood and fluids can be infused and at the same dose, rate and concentration if given peripherally
- The absorption is equivalent or better than peripheral access
- Used in adult and pediatric population
- Decrease in unnecessary central line placement which can lead to potential CLABs

**Contraindications:**
- Trauma or suspected fracture
- Previous/recent surgery
- IO insertion within 48hrs at same site
- Infection, inflammatory process, burns
- Prostheses
- Unable to locate bony landmarks
- Presence of bone disease

Anatomy and Physiology:

**The bone marrow space is described as the “non-collapsible vein”**
- A rapid saline flush is essential before infusing fluids through catheter
  - 5-10ml normal saline in adults
  - 2-5ml normal saline in pediatrics
  - Helps clear the marrow and fibrin from the medullary space, allowing for effective infusion rates

Site Selection:

**Proximal humerus:**
- Flow rates average 5L/hr
- 3 seconds to the heart
- Lower insertion and infusion pain
- Similar to a 16g IV catheter

**Proximal tibia:**
- Flow rates average 900ml/hr
- Similar to a 22 gauge IV catheter

Choosing the correct needle size:

- 15mm(PINK): 3-39kg—thin tissue depth
- 25mm(BLUE): >40kg—moderate tissue depth
- 45mm(YELLOW): >40kg—thick tissue depth and humeral insertions

Pain Management:

- The pain of IO insertions is compared to peripheral insertions
- Most pain felt with the initial rapid flush and infusions
- 2% preservative free and epinephrine free lidocaine used to prime the extension tubing and infused slowly prior to rapid flush for anesthetic
- Can be repeated PRN
- Consider systemic pain control for patients not responding to IO lidocaine
**Care and Maintenance:**

- Assess site at minimum every 2 hours for swelling/infiltration especially posterior of the insertion (compartment syndrome/necrosis)
- Repeat rapid saline flush as needed for optimal infusion rates
- Need for additional lidocaine for pain control
- Catheter may remain in place up to 24 hours
- Not MRI compatible

**Here at UPMC Mercy:**

*The IV team has been trained in IO insertion, care, and maintenance*

*Initially focused on tibial insertion during an emergent situation (Condition A or C)*

*Increasing humeral insertions*

*Tracking all IO insertions*

*Educational and reference materials available in IV team office*

*Working with critical care department, emergency room and nursing education to make current and future plans to improve IO success and education*