HACKETTSTOWN REGIONAL MEDICAL CENTER
NURSING POLICY MANUAL
INTRAOSSEOUS VASCULAR ACCESS

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Effective Date: February 2, 2016	**Policy No: 8620.Intraosseous Vascular Access**
Cross Referenced:	**Origin: Division of Nursing**
Reviewed Date:	**Authority: Chief Nursing Officer**
Revised Date:	**Page: 1 of 5**

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SCOPE
ED Providers, ED Nurses and any RN providing intermediate care of the intaosseous access site.

PURPOSE
To provide procedural guidance for establishment of intraosseous vascular access.

DEFINITIONS
Intraosseous (IO)- situated within, occurring within or administered by entering a bone.

POLICY
The policy provides safe and standardized guideline for vascular access in emergencies and need for acute intravenous fluids resuscitation or emergency medications. The IO access is not to be used for more than 24 hours.

PROCEDURE
I. General Information- The ED physician or ED nurse can insert an IO.

A. Indications for Use

a. For Adult or pediatric patient to obtain vascular access emergently, or medically necessary situations for up to 24 hours

b. Adult sites
   a) Proximal humerus
   b) Proximal tibia
   c) Distal Tibia

c. Pediatric sites
   a) Distal Femur
   b) Proximal humerus
   c) Proximal tibia
   d) Distal tibia

B. Contraindications
   a. Fracture of the targeted bone
   b. Previous, significant orthopedic procedures at insertion site
   c. IO in the targeted bone within the past 48 hours
   d. Infection at area of insertion
   e. Excessive tissue or absence of adequate anatomical landmarks

C. Pain
   1. Adult
      a. IO infusion for conscious patients has been noted to cause discomfort. For patients who are responsive to pain, Lidocaine (2%, 100mg/5ml) can be used as a local anesthetic.

b. Confirm patient is not allergic to Lidocaine.
c. Prime the extension set with Lidocaine
d. Slowly infuse Lidocaine (2%, 100mg/5ml), 2ml IO over 120 seconds
e. Allow Lidocaine to dwell in IO space for 60 seconds
f. Flush with 10mL of normal saline
g. Slowly administer and additional 1ml of Lidocaine IO over 60 seconds if needed.
h. If patient is unresponsive to pain, assess behavioral signs of pain when flushing catheter and follow above if needed.

2. Pediatrics
   a. Confirm patient is not allergic to Lidocaine.
   b. Prime the extension set with Lidocaine
   c. Initial dose is 0.5mg/kg, not to exceed 40mg (2%, 100mg/5ml)
   d. Slowly infuse Lidocaine over 120 seconds
   e. Allow Lidocaine to dwell in IO space for 60 seconds
   f. Flush with 2-5mL of normal saline
   g. Slowly administer an additional 1ml of Lidocaine IO over 60 seconds if needed.
   h. If patient is unresponsive to pain, assess behavioral signs of pain when flushing catheter and follow above if needed.

II. Equipment
   A. IO Power Driver
   B. IO needle set and extension set
   C. Stabilizer dressing
   D. Gloves
   E. Skin antiseptic
   F. Normal saline flush(5-10mls for adults, 2-5 for infant/child)
   G. Needle selection
      1. 25mm Needle set: patients 3 kg and greater
      2. 15mm Needle set: patients 3-39 kg
      3. 45mm Needle Set: should be considered for proximal humerus insertion in patients 40kg and greater and patients with excessive tissue over any insertion site

III. Site Selection **(Adult)**
   A. Proximal Humerus– The preferred site
      1. Place the patient's hand over the abdomen
      2. Place your palm on the patient's shoulder anteriorly; the "ball" under your palm is the general target area. Push deeply if needed to this "ball"
      3. Place the ulnar aspect of your hand vertically over the axilla and the ulnar aspect of your other hand along the midline of the upper arm laterally.

      4. Place your thumbs together over your hand vertically over the axilla and the ulnar

aspect of your other hand along the midline of the upper arm laterally.

5. Palpate deeply up the humerus to the surgical neck. The insertion site is 1-2 cm above the surgical neck, on the most prominent aspect of the greater tubercle.

B. Proximal Tibia

1. Extend the leg
2. Insertion site is located approximately 2cm medial to the tibial tuberosity or approximately 3cm below the patella and approximately 2 cm medial along the flat aspect of the tibia.

C. Distal Tibia

1. Insertion site is located approximately 3cm proximal to the most prominent aspect of the medial malleolous.
2. Palpate the anterior and posterior borders of the tibia to assure insertion site is on the flat center aspect of the bone.

IV. Site Selection (Pediatrics)

A. Distal Femur

1. Secure the leg out-stretched to ensure the knee does not bend
2. Identify the patella by palpation. The insertion site is just proximal to the patella (maximum 1 cm) and approximately 1-2 cm medial to midline.

B. Proximal Humerus

1. Place the patient's hand over the abdomen (elbow adducted and humerus internally rotated)
2. Place your palm on the patient's should anteriorly; the ball under your palm is the general target area. You should feel this ball even on obese patients by pushing deeply.
3. Place the ulnar aspect of your hand vertically over the axilla and the ulnar aspect of your other hand along the midline of the upper arm laterally.
4. Place your thumbs together over the arm, this identifies the vertical line of insertion on the proximal humerus
5. Palpate deeply up the humerus to the surgical nect. This may feel like a golf ball on a tee. The insertion site is 1 to 2 cm above the surgical nexk, on the most prominent aspect of the greater tubercle.

C. Proximal Tibia

1. Extend the leg. Pinch the tibia between your fingers to identify the medial and lateral borders.

2. Insertion site is approximately 1 cm medial to the tibial tuberosity, or just below the

patella (approximately 1 cm) and slightly medial (approximately 1 cm) along the flat aspect of the tibia.

D. Distal Tibia
1. Insertion site is located approximately 1-2 cm proximal to the most prominent aspect of the medial malleolus.
2. Palpate the anterior and posterior borders of the tibia to assure insertion site is on the flat center aspect of the bone.

V. Procedure for Insertion

A. Adult

1. Aim the needle set at a 45 degree angle to the anterior plane and posteromedial if using the Proximal Humerus site; Aim the needle set at a 90 degree angle to the bone if using the Tibia as the site.
2. Push the needle set tip through the skin until the tip rests against the bone.
3. The 5mm mark must be visible above the skin for confirmation of adequate needle set length.
4. Gently drill, into the humerus approximately 2 cm or until the hub is close to the skin. The hub of the needles set should be perpendicular to the skin.
5. For the Tibia site, gently drill, advancing the needle set approximately 1-2cm after entry into the medullary space or until the needle set hub is close to the skin.
6. Hold the hub in place and pull the driver straight off; continue to hold the hub while twisting the stylet off the hub with counter clockwise rotations; catheter should feel firmly seated in the bone. This is considered the 1st confirmation correct placement.
7. Place the IO stabilizer dressing over the hub
8. Attach a primed extension set to the catheter hub and secure by twisting clockwise
9. Pull the tabs off the dressing to expose the adhesive, apply to the skin
10. Aspirate for blood/bone marrow. This is the 2nd confirmation of correct placement
11. Note that inability to withdraw blood from the catheter doesn't always mean the insertion was unsuccessful
12. Flush the IO catheter with normal saline. (10mLs for adults, 2-5 for pediatrics)
13. Monitor the site and limb for extravasation or other complications every 4 hours.
14. Document insertion events and ongoing monitoring findings.
15. For proximal humerus insertions, an arm immobilizer may be needed to stabilize the site.
16. For distal femur insertions, an immobilizing device for the leg may be needed to ensure the knee does not bend.

Pediatric

1. Aim the needle set tip at a 45-dgree angle the anterior plane and posteromedial for proximal humerus site and aim at a 90 degree angle to the bone for the Femur or Tibia site.
2. Push the needle set tip through the skin until the tip rests against the bone.
3. The 5mm mark must be visible above the skin for confirmation of adequate needle set length
4. Gently drill. Immediately release the trigger when you feel the loss of resistance as the needle set enters the medullary space. Avoid recoil- DO NOT pull back on the driver when releasing the trigger.
5. Follow #6- #16 adult steps above.

VI. Removal

A. Remove extension set and dressing
B. Stabilize catheter hub and attach a Luer lock syringe to the hub
C. Maintaining axial alignment, twist clockwise and pull straight out, DO NOT rock the syringe
D. Dispose of catheter with syringe attached into sharps container
E. Apply pressure to the site as needed to control bleeding
F. Apply dry sterile dressing

REFERENCE

Arrow EZ IO Vascular Access System procedure guidelines, Teleflex Incorporated 2014
EZ-IO by Diacare, Intraosseous Vascular Access Pocket Guide 2012