Indications

A route to administer fluids for volume expansion and for drug administration when IV access is not available.

Precautions

1. Unless there is no alternative, do not use in a leg that has fractures of the tibia or femur.
2. The actual insertion of an IO is a relatively low pain procedure. However, infusion of fluid into the bone stimulates pressure receptors and can be extremely painful. Consider premedication with Lidocaine (0.5mg/kg, max 50mg) prior to infusion of fluids in any patient capable of feeling pain.
3. Fluids will not typically drip into the intraosseous space at a significant rate. Use a pressure bag or IV pump to infuse fluids.
4. Do not attach a syringe directly to an IO. It creates too much leverage and could dislodge it. Always use an IV extension set pre-flushed with Normal Saline.

Manual IO Technique

1. Assemble equipment.
2. Observe universal precautions.
3. Locate the anteromedial aspect of the proximal tibia approximately 1-3 cm below the tibial tuberosity.
4. Cleanse the puncture site.
5. Using a twisting motion, insert I. O. or bone marrow biopsy needle with twisting motion 90° to long axis of tibia.
6. Remove the stylette.
7. Attach syringe and aspirate bone marrow to verify needle location.
8. If the patient is capable of feeling pain, administer Lidocaine as above, otherwise inject 5-10 ml Normal Saline to clear the lumen of the needle.
9. Attach I. V. tubing and adjust flow rate. Secure needle.
10. Following administration of medication, flush with Normal Saline to expedite absorption into circulatory system.

EZ IO Technique

Intraosseous Access

1. Determine needle length. 15mm for peds, 25mm for adults without excess adipose tissue, 45mm for large adults or those with significant adipose tissue.
2. Assemble needle and drill.
3. Locate IO site:
   a. Adults - 1 finger width medial to the tibial tuberosity
   b. Children – 2 finger widths below the patella, as far medially as necessary to be on the flat part of the upper tibia.
4. Clean site.
5. Drill needle through skin until the needle hits bone. Make sure the 5mm mark on the needle is visible.
6. Drill straight in. The drill requires very little downward force.
7. Pull out drill and remove stylette.
8. Attach IV extension tubing provided in EZ-IO kit pre-flushed with Normal Saline and attempt to aspirate.
9. If the patient is capable of feeling pain, administer Lidocaine as above, otherwise attach IV set and flush.
10. The EZ IO is low-profile and usually very secure. However it is wise to protect the site to insure that it does not become dislodged.

Notes

1. In the adult an alternative to the proximal tibia is to use the proximal humerus.
2. Any medication given by IV (including RSI drugs) can be given by IO. However due to its distal nature, some medications (such as adenosine) may not be as effective at normal doses.
3. Intraosseous fluid bolus may improve the search for venous access.

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