Clinical Practice Guidelines

The Royal Children's Hospital Melbourne

Intraosseous Access

See also: Resuscitation

Notes

Intraosseous (IO) access is an effective route for fluid resuscitation, drug delivery and laboratory evaluation that may be attained in all age groups and has an acceptable safety profile.

Indications:

- IO access is the recommended technique for circulatory access in cardiac arrest.
- In decompensated shock IO access should be established if vascular access is not rapidly achieved (if other attempts at venous access fail, or if they will take longer than ninety seconds to carry out.)
- The exception is the newborn, where umbilical vein access continues to be the preferred route.

Contraindications:

- Proximal ipsilateral fracture
- Ipsilateral vascular injury
- Osteogenesis imperfecta

Complications:

- Failure to enter the bone marrow, with extravasation or subperiosteal infusion
- Through and through penetration of the bone
- Osteomyelitis (rare in short term use)
- Physeal plate injury
- Local infection, skin necrosis, pain, compartment syndrome, fat and bone microemboli have all been reported but are rare

Equipment

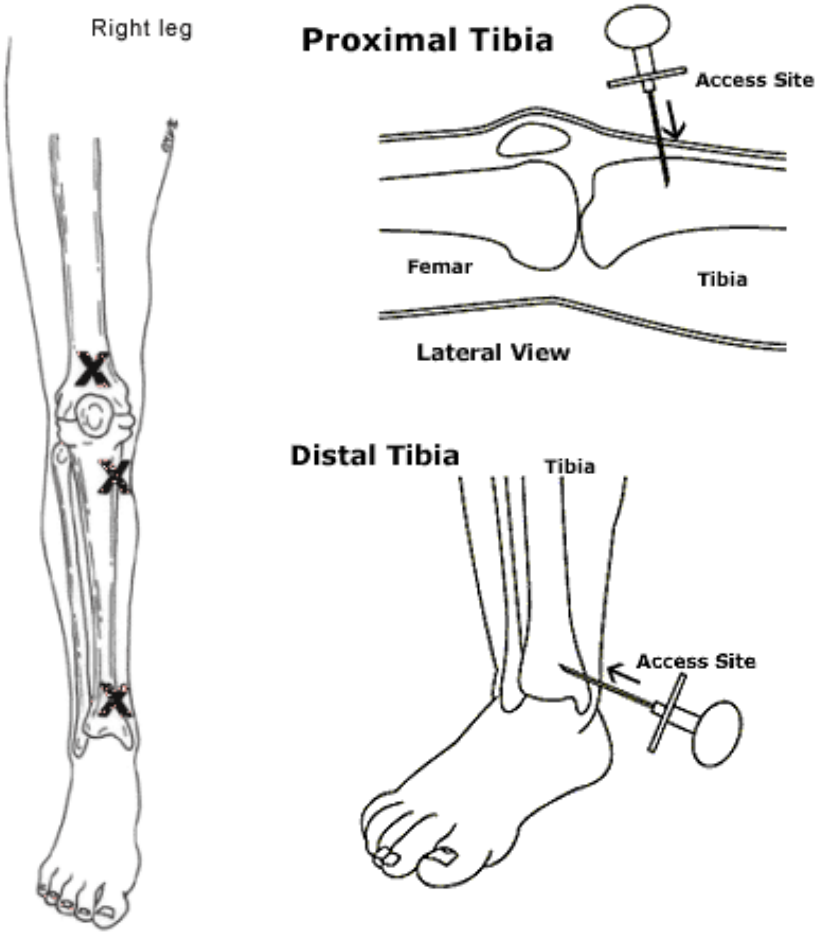
- Alcohol swabs
- 18G needle with trochar (at least 1.5 cm in length)
- 5 ml syringe
- 20 ml syringe
- Infusion fluid

Analgesia, Anaesthesia, Sedation

Local anaesthesia may be required if the patient is conscious.

Procedure

- Identify the appropriate site
  - Proximal tibia: Anteromedial surface, 2-3 cm below the tibial tuberosity
  - Distal tibia: Proximal to the medial malleolus
  - Distal femur: Midline, 2-3 cm above the external condyle



- Prepare the skin
- Insert the needle through the skin, and then with a screwing motion perpendicularly / slightly away from the physeal plate into the bone. There is a give as the marrow cavity is entered
- Remove the trocar and confirm position by aspirating bone marrow through a 5 ml syringe. Send marrow blood for laboratory sampling (suitable for most standard laboratory values, pH, pCO_2, HCO_3^-, and ABO and Rh typing.)
- Marrow cannot always be aspirated but it should flush easily.
- Secure the needle and start the infusion (this needs to be manually administered as boluses with the 20 ml syringe.)

Post-Procedure Care

Intraosseous infusion should be limited to emergency resuscitation of the child and discontinued as other venous access has been obtained.