

SAN FRANCISCO EMERGENCY MEDICAL SERVICES AGENCY

Effective: 01/07/13

Protocol: #P-052.1

Supersedes: 09/01/05

ADULT AND PEDIATRIC VASCULAR ACCESS WITH INTRAOSSEOUS (IO) DEVICE

SUBJECTIVE and OBJECTIVE FINDINGS

Critically ill or injured patient as defined in this protocol below:

BLS Treatment	ALS Treatment
• Routine Medical Care. • Follow appropriate treatment guideline consistent with BLS standard of care	Critically ill or injured patients are defined in this protocol as: 1. Unable to obtain pulse; 2. Unresponsive; 3. Apneic; 4. Hypotension with shock; 5. Acute deteriorating level of consciousness. • EMT-Ps may initiate vascular access for fluid or medication administration. Primary vascular access shall be through a peripheral intravenous catheter. If vascular access cannot be established via peripheral IV in 2 attempts or less than 90 seconds, then proceed with either IO or PVAD access. Less invasive route of medication administration (PO, IN, IM) is preferred for stable patients prior to attempting an IO insertion. • Intraosseous (IO) Device or Pre-Existing Vascular Access Devices (See P-52.2 Vascular Access with Pre-Existing Access Devices) may be utilized only on critically ill or injured patients. It is NOT to be used when routine IV access is unsuccessful or difficult to establish.

DOCUMENTATION

1. Document each IO insertion attempt (successful or unsuccessful) on patient care record and also reported as an infrequently used skill per EMS provider QI. Include details about procedures used for site preparation, placement, methods for securing the device and assessment of patency.
2. Document pedal pulses and skin color bilaterally before and after procedure (IO).

CONSIDERATIONS

- IO insertion attempts shall not prolong on-scene time or transport time.
- Follow manufacturer's recommendations for insertion. If an automatic IO device is utilized.
- Infusion via IO may cause moderate to severe pain for conscious patients.
- Flow rates will be inherently slower than IV access, but will be maximized with a rapid bolus of 5-10 ml prior to infusion.

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- Use a pressure bag or BP cuff to ensure continuous infusion.
- In pediatric and adolescent patients, special care should be taken to avoid growth plate areas located at both ends of the long bones.

CONTRAINDICATIONS

1. Fracture of bone assessed for placement.
2. Prior orthopedic procedures (e.g. Knee replacement).
3. Previous IO or attempt in same extremity within 24 hours.
4. Splint or cast in place proximal/distal to site.
5. Preexisting medical condition involving that extremity, e.g. tumor or significant peripheral vascular disease.
6. Infection or burn at insertion site.
7. Inability to locate landmarks due to a) significant edema, or b) adipose tissue.
8. A maximum of 2 - IO attempts shall be made for peripheral placement.

PROCEDURE

Equipment Required:

1. Appropriate PPE for blood-borne pathogens.
2. 16-18 gauge IO needle or automatic IO insertion device.
3. Betadine or alcohol swabs.
4. Sterile gauze pads.
5. Two 5 ml syringes or primed IV line with or without stopcock.
6. IV fluids.
7. Tape.
8. Splinting device (i.e., cardboard splint, SAM splint, long leg splint or Long Back Board).

Insertion:

1. Assemble needed equipment.
2. Locate and prepare the appropriate insertion site: Non-traumatized proximal tibia. Locate the landmarks 2-3 cm below the tibial tuberosity on the anteromedial flat bony surface of the proximal tibia.
3. Insert the IO needle holding the leg steady:
 - a. Grasp the needle with the obturator still in place and insert it through the skin at the selected site at a 90-degree angle to the skin surface.
 - b. Once the periosteum of the bone has been reached, direct the needle 10-15 degrees away from the knee, rotating, and gently pushing the needle forward.
4. When the needle is felt to 'pop' into the bone marrow space:
 - a. Remove the obturator, attach a dry 5 ml syringe, and attempt to aspirate bone marrow.
 - b. Attach a syringe with 0.5 mg/kg of 2% lidocaine solution (max dose 50 mg) and flush the IO needle in patients who are conscious.

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- c. Attach a 5 ml syringe containing IV solution, to flush the IO needle 30 to 60 seconds following lidocaine administration.
 - OR**
 - d. Remove the obturator; attach a primed IV solution set with or without a stop cock. Pinch the tubing or close the stopcock and attempt to aspirate bone marrow.
 - e. Draw 5 ml of fluid from the IV bag then pinch or close the stopcock and flush IO needle.
- 5. If unable to flush, continue procedure and watch carefully for extravasation and swelling while infusing fluids and/or medications.
 - 6. Secure the needle by taping and splint the leg.
 - 7. Active pushing of fluids may be more successful than gravity infusion. Use the same size syringe for fluid boluses.
 - 8. If infiltration occurs or needle removed, stop the infusion, remove the needle, and apply a pressure bandage to the IO site if another IO will be attempted, use a different bone.
 - 9. An insertion device pre-approved by the EMS Agency Medical Director may be utilized according to manufacturer instructions substituting for steps 2 through 4 above.