

DEPARTMENT: Poudre Valley Hospital Emergency Medical Services	POLICY DESCRIPTION: Vascular Access Techniques
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APPROVED: 3/11	RETIRED:
EFFECTIVE DATE: 4/11	REFERENCE NUMBER: 713

SCOPE:

Poudre Valley Hospital EMS Division

PURPOSE: To define vascular access techniques

Protocol: Vascular Access [IV and IO]

Indications

- A. IV access is indicated when a patient needs immediate IV fluids or medications, or when a patient has a moderate to high likelihood of needing IV fluids or medications.
- B. EZ-IO Adult or EZ-IO Pediatric should be considered when a peripheral IV cannot be established in 2 attempts in patients with immediately life threatening problems who immediately need IV fluids or medications.
- C. EZ-IO Adult or EZ-IO Pediatric should be considered after at least 1 peripheral IV attempt in patients in cardiac arrest.
- D. If the initial IO attempt is unsuccessful, attempt at another site.
- E. Use a Saline Lock unless fluid bolus is indicated

Contraindications

- A. Do not start IVs in sites distal to a fracture or major injury, in sites with signs of infection, at the site of AV fistula, or on the side of a previous ipsilateral mastectomy/lymph node dissection.
- B. Contraindications to IO placement include fractures of the selected bone, excessive tissue at the insertion site, previous orthopedic surgery at selected site, overlying cellulitis or infection at the selected site, or a history of Osteogenesis Imperfecta

Technique [Extremity IV/Saline Lock]

- A. Use PPE and sterile technique. Apply venous tourniquet proximal to proposed site.
- B. Connect tubing to IV solution bag; Fill drip-chamber one-half full by squeezing.
- C. Tear sufficient tape to anchor IV.
- D. For pediatric patients consider applying an arm board or splint prior to venipuncture.
- E. Scrub insertion site with Chloraprep SEPP. Use sterile technique.
- F. Hold vein in place by applying gentle traction on vein distal to point of entry.

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- G. Puncture the skin with the bevel of the needle upward about 0.5 to 1 cm from the vein and enter the vein either from the side or from above.
- H. Note blood return and advance the catheter over the needle and remove tourniquet. [Do not rethread the catheter onto the needle]. Draw blood tubes if needed.
- I. If starting saline lock, note blood return, remove needle from catheter and insert saline lock which has been prefilled with sodium chloride. Then flush saline lock with 2-5 ml of sodium chloride.
- J. If starting fluids, remove the needle after blood return is noted and connect tubing.
- K. Open full to check flow, and then slow to TKO unless bolus is indicated. Make sure IV flushes easily without causing swelling at the IV site before administering a bolus or medication.
- L. Secure tubing with tape, making sure of at least one 180-degree turn in the tubing when taping to be sure any traction on the tubing is not transmitted to the cannula itself.
- M. Anchor with arm board or splint as needed to minimize chance of losing line with movement.
- N. Recheck to be sure IV rate is as desired.
- O. If local pain and swelling occur at the venipuncture site with infusion, discontinue the IV.

Technique: External Jugular Vein [Paramedic Only]

- A. Prepare fluid and IV tubing as discussed in above extremity technique.
- B. Position the patient supine, head down. Turn patient's head opposite side of procedure. Scrub insertion site with Chloraprep SEPP.
- C. Align the cannula in the direction of the vein, with the point aimed toward the ipsilateral shoulder. Make puncture between the angle of the jaw and the midclavicular line.
- D. Puncture the skin with the needle bevel upward.
- E. Note blood return and advance the catheter over the needle [Do not rethread the catheter over the needle].
- F. Secure IV with tape and connect to IV tubing. Make sure IV flushes easily without causing swelling at the IV site before administering a fluid bolus or medications.
- G. Do not use a saline lock in the external jugular vein.
- H. If local pain and swelling occur at the venipuncture site with infusion, discontinue the IV.

Technique: Intraosseus [Paramedic Only]

- A. EZ-IO Adult is used for patients over 40 kg and EZ-IO Pediatric in patients 3-40kg.

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- B. Use appropriate BSI
- C. Locate appropriate insertion site [Proximal tibial plateau is primary choice-one finger breadth below the tuberosity on the anteromedial surface].
- D. Prepare insertion site using aseptic technique with chloraprep.
- E. Prepare the EZ-IO driver and appropriate needle set by placing IO needle perpendicular to the bone and applying downward pressure while stabilizing the site. A “screwing motion” facilitates advancement of the needle. Entrance into the bone marrow is indicated by a sudden loss of resistance.
- F. Puncture site to be covered with a dressing
- G. Remove EZ-IO driver from needle set while stabilizing catheter hub
- H. Remove stylet from catheter, place stylet in shuttle or approved sharps container
- I. Confirm placement and connect primed EZ-connect.
- J. Slowly administer appropriate dose of Lidocaine 2% (Preservative Free) IO to conscious patients **Prior to IO syringe bolus in alert patients, administer 2% Lidocaine (preservative free) through the EZ-IO hub.** EZ-IO Adult administer 20–40 mg 2% Lidocaine; EZ-IO Pediatric administer 0.5 mg /kg 2% Lidocaine
- K. Syringe bolus the EZ-IO catheter with the appropriate amount of normal saline.
- L. Administer a rapid syringe bolus of saline prior to infusion NO FLUSH = NO FLOW. Use 10ml Normal saline flush for EZ-IO Adult, and 5ml Normal saline flush for EZ-IO Pediatric. Repeat flush as needed.
- M. Begin infusion. Utilize pressure bag or pump for continuous infusions
- N. Dress site, secure tubing and apply wristband as directed
- O. Monitor EZ-IO site and patient condition. The needle must be secured and the IV tubing taped. The IO needle should be stabilized at all times. A person should be assigned to monitor the site at all times.

Specific Information

- A. Use sterile technique.
- B. Lower extremity peripheral IVs should be rare events as they are more subject to infection and thrombosis. Only paramedics are to start lower extremity peripheral IVs, and only in unusual circumstances with a direct order.
- C. Complications of IVs include hematomas, infection, thrombosis, phlebitis, sepsis, pulmonary embolism, catheter fragment emboli, pyogenic reactions, and chronic pain.
- D. Trauma patients are to have IVs started en-route, unless undergoing extrication.
- E. Treatment protocols describe situations where IV access is indicated. It is the EMS

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provider's responsibility to make judgments as to the best treatment course for a particular patient based on factors specific to the case. These factors include: medical necessity, time and distance from the hospital, patient wishes, etc.

- F. QRT EMT-IV certified providers may start a peripheral IV in the upper extremity when indicated. The QRT EMT-IV is limited to 2 attempts on one arm.
- G. In situations where hypovolemic shock is present or anticipated, the paramedic should establish 2 large bore IVs [16 gauge or bigger] if possible.
- H. If starting an EZ-IO on a conscious patient, advise of EMERGENT NEED for this procedure and obtain informed consent
- I. Only one IO attempt is to be done in each extremity.
- J. The drugs and fluids that can be infused through an IO include resuscitation drugs, crystalloids and pain medications.
- K. Complications of IO include fractures, infections, compartment syndrome.

Protocol: Vascular Access	EMT- B	EMT - IV	EMT-P
Peripheral IV-Arms [All indications]			
Adult and pediatric		SO	SO
Peripheral IV-Feet [All indications]			
Adult			DO
Pediatric			SO
External jugular vein [All indications]			
Adult			SO
IO catheter [All indications]			
Adult and pediatric			SO

REFERENCES: