

PRACTICE GUIDELINE

Effective Date: 9-17-04

Manual Reference: **Deaconess Trauma Services**

TITLE: INTRAVENOUS LINE INSERTION: PERIPHERAL AND CENTRAL

PURPOSE: To outline the indications and options for intravenous access, provide guidelines for the performance of procedures, and provide emergent intravenous access to trauma patients.

DEFINITIONS:

1. Intravenous access: A catheter that has been placed in a sterile manner into a vein to provide a route by which fluid, blood product and medications can be administered.
2. Peripheral: A superficial vein of the arm, hand, neck or foot that can be accessed percutaneously.
3. Central: The subclavian, jugular or femoral vein that can be accessed percutaneously; the saphenous or brachial vein that is accessed with a cut-down.

GUIDELINES:

1. In general, intravenous access should be obtained early in the resuscitation of all trauma patients. The easiest site should be used first, and usually this is the forearm, or antecubital veins. If these are difficult to use, then consideration should be given to alternative sites including:
 - a. Femoral vein.
 - b. Subclavian vein.
 - c. Internal jugular vein.
 - d. Saphenous vein:
 - i. At the ankle.
 - ii. At the groin.
2. For trauma patients, the largest IV that is feasible should be used. In peripheral sites, this will be a 14 or 16 gauge IV line. For central vein use, this will be a multi-lumen catheter.
3. Sterility is important; however, getting the line in is even more important. Do your best to maintain sterile conditions but do not let it impair the urgency with which a line should be inserted.
4. Line placements:
 - a. Peripheral IV:
 - i. Two 14 or 16 gauge angiocaths in all adult patients.
 - ii. All IV's should be inserted after adequate skin prep with chloraprep.
 - iii. Peripheral IV's in children should utilize at least an 18 gauge angiocath whenever possible.
 - iv. Avoid placement in an injured extremities.

- b. Saphenous vein cut-down:
 - i. Indications:
 - a) Cardiac arrest from exsanguinations.
 - b) Inability to obtain adequate IV flow from other IV sites.
 - ii. Provides: Line out of way of chest, upper arms and neck.
 - iii. Preparation:
 - a) Cut-down tray, silk ligatures, xylocaine, chloraprep.
 - b) IV tubing, extension tubing, 14 gauge intracath.
 - c) Lactated ringers or saline for infusion.
 - iv. Procedure:
 - a) Select site two finger-breadths superior and two finger-breadths anterior to the medial malleolus (ankle) OR two finger-breadths lateral and two fingerbreadths caudal to the public tubercle (groin).
 - b) Prep with chloraprep.
 - c) Infiltrate area with 1% xylocaine.
 - d) Transverse incision (ankle) or curvilinear incision (groin) over saphenous vein.
 - e) Bluntly dissect saphenous vein and encircle with proximal and distal silk ligature.
 - f) Tie distal silk ligature.
 - g) Partially incise vein with #11 scalpel blade.
 - h) Insert #14 gauge intracath or IV “connecting tubing” and tie proximal silk ligature.
 - i) Run IV fluid wide open, with pressure bag if necessary.
 - j) Close cut down incision with suture of choice.
 - k) Apply sterile dressing.
- c. Femoral access:
 - i. Should be done with an introducer or a 14 gauge angiocath in adults and a 16 or 18 gauge in children.
 - ii. The area is prepped with betadine and a syringe is placed on the angiocath.
 - iii. The angiocath or needle is inserted while aspirating the syringe.
 - iv. When blood return is obtained, the catheter is gently inserted into the vein or a wire is placed for introducer insertion.
- d. Subclavian access:
 - i. Indications: for adequate fluid administration, introducer catheters must be used.
 - ii. Procedure:

- a) With the patient in mild Trendelenberg, prepare the skin with chloraprep and drape the shoulder and chest with towels.
- b) Infiltrate the area where the catheter is to be inserted and the clavicular periosteum with 1% lidocaine.
- c) Note the landmarks:
 - i) The junction of medial and middle one-third of the clavicle.
 - ii) The minor supraclavicular fossa as defined by the sternal and clavicular heads of the sterno-cleidomastoid muscle and the superior border of the clavicle.
- d) The kit is opened and the syringe, needle and wire are removed.
- e) A 10 ml syringe (non-Luer lock) is connected to the needle.
- f) With the needle perpendicular to the patient, the skin is penetrated for approximately 1 cm. After the tip of the needle has reached the clavicle, the inferior border is located by gentle probing and then the needle is advanced posterior to the clavicle. The entire maneuver so far is 1-1.5 cm from the skin surface.
- g) The direction of the needle is then changed and aimed at the suprasternal notch. At this time, the syringe is almost parallel to the patient's skin surface since the needle has to be as close to the clavicle as possible.
- h) While applying gentle suction, the needle is slowly advanced in the direction of the notch, which is superior and medial to the site of puncture. Upon entering the vein, free flow of blood should be noted.
- i) The syringe is removed and the gloved thumb promptly applied over the open hub to avoid air embolus.
- j) The wire, previously placed in readiness, is threaded through the needle and advanced into the right atrium. If any resistance is encountered, STOP!
- k) The needle is removed from the wire, making sure that the wire is always controlled. A small stab incision is made next to the wire and the dilator placed over the wire. Gentle rotation usually facilitates entry of the dilator into the vein. The dilator is with drawn and the

introducer/dilator unit is inserted over the wire.
The dilator is removed.

l) The line is then flushed and sutured into place.

m) A sterile dressing is applied.

n) Chest x-ray is done to confirm placement.

iii. Complications:

a) Venous hematoma

b) Arterial puncture

c) Pneumothorax

d) Hemothorax

e) Unsuccessful puncture

iv. The vein is usually reached by the last 2 cm of the needle and depression of the skin may be required.

v. Right subclavian vein puncture is easier to perform for a right-handed person and also reduces the risk of thoracic duct puncture. If the patient has a pre-existing pneumothorax, use that side to place the subclavian catheter. Try to avoid inserting subclavian lines in the areas of clavicle fractures or in close proximity to penetrating trauma.

REFERENCES:

- ❖ Deaconess Trauma Guideline Manual, RESUSCITATION PRIORITIES FOR THE MULTIPLE OR SERIOUSLY INJURED PATIENT.

REVIEWED DATE	REVISED DATE
JAN 05	JAN 08
JAN 06	
JAN 07	

