



Critical Care Skills

I. OBJECTIVES

By the end of this laboratory session participants should be able to . . .

- 1) Perform the techniques of oral intubation & surgical cricothyroidotomy.
- 2) Perform the technique of chest tube insertion.
- 3) Perform the techniques of arterial & central venous line access.
- 4) Understand the techniques of Swan-Ganz catheterization.
- 5) Understand the techniques of Advanced Cardiac Life Support (ACLS).

II. ASSUMPTIONS

Familiarity with scalpels and other surgical instruments, needles, catheters and syringes.

III. SUGGESTED READING

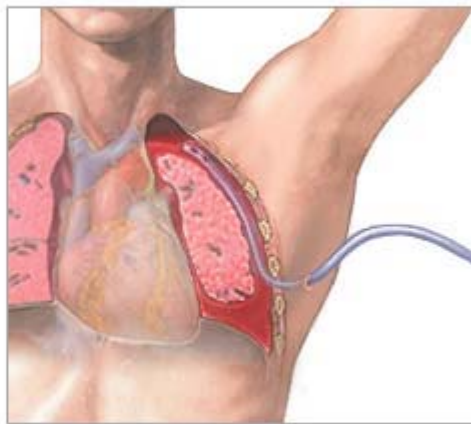
Anatomy atlas of your choice as well as any information regarding ACLS/ATLS procedures.

IV. ANATOMICAL CONSIDERATION

A. Chest tube



Chest tube
drains blood
from the lungs



B. Central Line Placement (subclavian)

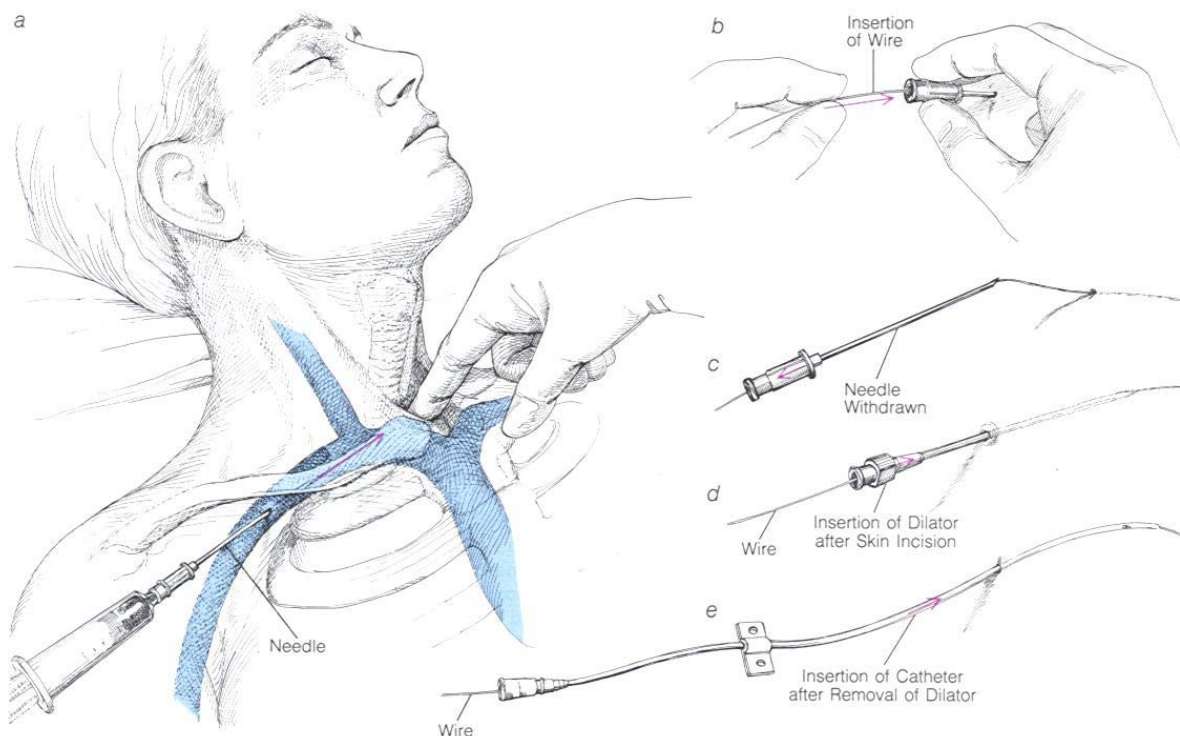


Figure 5 The subclavian approach to central venous catheterization is illustrated. The patient is placed in Trendelenburg's position to allow filling and dilatation of the subclavian vein (a). The shoulders are thrown back maximally (a small sheet roll may even be placed beneath the spinal column), and the head is rotated to the side opposite the insertion site. The upper chest and neck are prepared and draped using aseptic technique (the operator should wear hat, mask, gown, and gloves). Local anesthetic is infiltrated into the skin and underlying tissue along the inferior border of the clavicle at or slightly lateral to its midpoint. The needle found in a standard subclavian catheter insertion kit is attached to a syringe and advanced through the anesthetized area parallel to and beneath the clavicle but over the first rib. The tip of the needle is aimed at a fingertip pressed firmly into the suprasternal notch. With the needle shaft parallel to the frontal plane of the patient (i.e., parallel to the bed), the needle will enter the subclavian vein after advancing about 1.5 to 2.0 inches beneath the skin. Slight negative pressure applied to the syringe will allow the prompt inflow of blood when the vein is entered. The needle is advanced a few millimeters after venous blood is obtained to ensure that the entire beveled tip is within the vein lumen.

As the patient performs the Valsalva maneuver to prevent air embolism, the syringe is removed and the guide wire inserted (b). The wire should advance into the venous system without resistance or pain to the patient. After at least one half of the wire has been advanced into the vein, the needle is removed over the guide wire (c). A small incision is made at the entrance site into the skin, and a dilator is passed over the wire and into the soft tissue (d). In a well-muscled person, some resistance may be met; the fascia is best traversed by using a screwlike motion and firm, constant pressure on the dilator. As the dilator is advanced, the wire should always remain freely movable within the dilator's lumen. The dilator is then removed over the wire and replaced by the catheter, an appropriate length of which is advanced over the wire into the patient (e). This length can be approximated before insertion by measuring the distance between the insertion site and the point on the sternum at the level of the second intercostal space. The wire is then removed, and the catheter lumen is aspirated free of all air and flushed with saline. The catheter is sutured into position (f), the exit site cleaned, and a dressing applied.

V. DESCRIPTION OF LABORATORY MODULE

- (1) Residents, under instruction from attending surgical faculty, will assist each other in performing ACLS skills listed above in mannequins & the SimMan simulators.

VI. DESCRIPTION OF TECHNIQUE/PROCEDURE

- (1) Locate the cricothyroid membrane, insert endotracheal tube and assess ventilation. Practice oral intubation. Discuss airway management
- (2) Insert chest tubes. Discuss management.
- (3) Using multiple-lumen catheter kits, practice establishment of femoral arterial & subclavian central venous lines.
- (4) Discuss deployment of Swan-Ganz catheter.
- (5) Using the SimMan patient simulator, practice various ACLS procedures.

VII. EQUIPMENT NEEDED

- (1) SimMan patient simulator(s)
- (2) Mannequins: torso (subclavian & femoral iv access), heads (intubation), arms (peripheral arterial access)
- (3) Multiple-lumen catheter kits, chest tubes (32 Fr) & hemostats or Kelly clamps, ET tubes (6-0)

VIII. REFERENCES

- Surgical skills manual.
Surgical Atlas of your choice.