

MODULE

TITLE OF SKILL :ARTERIAL PUNCTURE

INTRODUCTION (RATIONALE):

Since an arterial blood sample is necessary for the blood gas analysis, the procedure of arterial puncture is one of the most important skills that professional should possess.

LEARNING OBJECTIVES:

At the end of the session students should be able to:

- ❖ Enlist the equipment required for arterial puncture.
- ❖ Demonstrate correct aseptic technique of arterial puncture.
- ❖ Demonstrate the correct handling of arterial blood sample.

EQUIPMENT/MATERIAL NEEDED:

1. Syringe(heparin zed)
2. Spirit swab
3. Disposable gloves
4. Adhesive tapes
5. Ice for transport
6. Sharp container

VIDEO DEMONSTRATION

PROCEDURE

- 1) Identify the patient.
- 2) Introduce yourself to the patient, explain procedure and take informed consent.
- 3) Perform Allen's test on the chosen hand of the patient.
- 4) Wash your hands and put on disposable gloves.

Locate the approximate position of the artery by slowly rolling your index finger from side to side. See figure 1.

- 5) Clean the skin over the proposed site of puncture.

- 6) Identify again the point of maximal pulsation of the radial artery.
- 7) Pull back the plunger.
- 8) With your dominant hand hold the syringe and the needle puncture. (pre heparin zed) and insert the needle at 45 degrees to the skin with needle's bevel edge injected at the point of maximum pulsation.
- 9) When you pierce the artery there will be a sudden gush of arterial blood into the hub of the needle. Obtain an adequate blood sample(only 1-2 ml).if no blood is obtained with these maneuvers, withdraw the needle to a position just under the skin and try again. This can be done with butterfly, as in figure 2.
- 10) Once you have taken blood sample remove the needle from the artery and apply direct pressure over the site for a few minutes.
- 11) Carefully cap the needle. Don't forget to label the tube with patient's name, place the sample in the bag containing ice and send it to the lab as quickly as possible.
- 12) Thank the patient.

BACKGROUND INFORMATION (THEORETICAL INFORMATION TO BE READ BY THE STUDENT)

ALLEN'S TEST:

To ensure adequate collateral circulation, the Allen test should be performed on all patients when evaluating the radial artery as a possible puncture site. A positive Allen test will provide documentation of collateral circulation from the ulnar artery and the test must be positive before the radial artery can be used for collection site. Puncture site selection criteria should be strictly followed since the complication rate and the severity of complications is directly related to the presence of collateral circulation to the hand via the ulnar artery. The brachial artery bifurcates at the level of the elbow into the radial artery (which runs along the lateral aspect of the forearm) and the ulnar artery (which runs along the medial aspect of the forearm). This arterial blood supply system provides collateral circulation to the distal aspects of the forearm and the hand. In the event that either artery becomes occluded, blood flow to the limb and hand will continue through the other artery.

ALLEN TEST PROCEDURE:

1. Compress the radial artery and ulnar artery of the same hand to obliterate pulses.
2. Choose one of the following methods to promote blanching of the hand:
 - a) Have patient clench and release fist until blanching of the hand occurs and then with radial artery still compressed, release pressure on ulnar artery.
 - b) In the unconscious or uncooperative patient, elevate, squeeze and lower patient's hand until blanching occurs.
3. If good collateral circulation is present, blood should return to the hand within 15 seconds as evidenced by the hand returning to its normal pink colour. If a pink colour fails to appear, collateral circulation may be assumed to be inadequate and the radial artery for a collection site, must not be used.

ANATOMICAL REVIEW:

The radial artery runs along the lateral aspect of the forearm deep to the superficial fascia. The artery runs between the styloid process of the radius and the flexor Carpi radialis tendon. The point of maximum pulsation of the radial artery can usually be palpated just proximal to the wrist. see figure 3 for anatomical relations.

INDICATIONS:

- Respiratory failure
- Proper management of patients on ventilator
- Metabolic disturbances requiring accurate levels of pH and some of the electrolytes(esp. bicarbonate)for management as renal failure.

CONTRAINDICATIONS:

- Skin infection
- Patient on anticoagulants and those with coagulopathies are at risk for severe bleeding.
- Negative Allen's test

COMPLICATIONS:

- Hemorrhage
- Trauma to the vessels
- Arterial occlusion
- Vasovagal response
- Pain
- Hematoma
- Arteriospasm
- Air or clotted-blood emboli

CAVEATS:

- It is very important to check about 20 minutes later for adequate perfusion of the hand and for the possible hematoma formation.