

ARTERIAL BLOOD SAMPLING TECHNIQUE

EXERCISE 1: Arterial Puncture

Equipment Needed:

1. blood gas kit
2. alcohol swabs
3. ice
4. sterile 4x4 inch gauze pads
5. arterial puncture simulator
6. material for a pressure dressing

Procedure:

1. Wash your hands before preparing equipment.
2. Prepare the syringe as directed by manufacturer. Prepare a label for the syringe as directed. Be sure to include on the label the patient's name, hospital number, time drawn, and FIO₂.
3. The following will be required for actual arterial sticks in the clinic. All of the following will be simulated when practicing on a simulator.
 - a. verify the order
 - b. note patient's diagnosis and status (especially clotting disorders)
 - c. note current medications (note if patient is receiving anticoagulants)
 - d. note values of previous arterial blood gases (ABG's)**Follow proper procedure for patient interaction:**
 - e. proper identification of patient using I.D. wristband
 - f. introduce yourself and explain the procedure you will perform
 - g. ask for questions and reassure patient
4. Setup equipment in close proximity (bedside table). Preset volume of syringe.
5. Wash your hands before beginning procedure.
6. Inspect and palpate the possible puncture sites. Radial puncture is the most preferred method for sampling ABG's. Note any scars over area, sites close to I.V. infusions, and arm restraints. Try to avoid these areas if possible. Perform a check for collateral circulation.

MODIFIED ALLEN'S test:

- a. Have the patient extend the arm from which you would prefer to draw ABG. The palm should be up and facing you.
 - b. By placing a thumb over the radial artery and the other thumb over the ulnar artery, apply pressure and obstruct the arterial blood flow.
 - c. While applying pressure over both arteries, have the patient squeeze and relax his hand. Repeat this procedure several times while maintaining a constant pressure on the arteries.
 - d. Have the patient open the hand to reveal the palm. It should appear blanched. Release the pressure from the ulnar artery. If collateral circulation is present, you should notice rapid return of color or flushing of the palm. If the Allen's test is negative (blood does not return after release of ulnar artery) that wrist should not be used.
7. Rest the patient's forearm comfortably with a small towel rolled-up under the wrist.
 8. Clean the site of the puncture and your finger tip with an alcohol swab. Note procedure in lab:
 9. Carefully palpate the artery to locate its position. By palpation try to visualize the location of the artery under the skin. Once location of the artery is attained, wipe the area once more with a clean alcohol swab.

10. **ARTERIAL STICK** Remove the cap from the needle. Hold the syringe so that the bevel of the needle is up. The syringe is held at a 30 - 40 degree angle to the wrist. The needle must enter the arm pointed in the direction of the elbow.
11. Reassess the position of the artery.
12. Indicate to the patient when you will insert the needle. Smoothly puncture the skin surface. You must be steady and in control of yourself, the syringe, and to a greater extent, the patient.
13. If blood "flashes" and begins to fill the syringe, congratulations are in order. Otherwise, remain calm, delete all expletives, and inform your patient that in a few short moments it will all be over.
14. Reassess the position of the artery and gently push the needle in the direction of the artery. **DO NOT** pivot the needle in the tissue if you miss the artery. Withdraw the needle until the bevel is almost visible, move the syringe at an angle to insert the needle into the artery, and reattempt to puncture the artery. **REMEMBER** Remain calm and reassure your patient.
15. Once the artery has been penetrated, stabilize your hand and the syringe to minimize any unnecessary movement of the needle. If you are using a plastic syringe, wait until the syringe fills to the preset level. If you are using a glass syringe the plunger should move from the pressure of the blood as it fills the syringe.
16. After the syringe is filled (normally 1 ml), place a folded 4x4 inch gauze over the site where the needle enters the skin. **SIMULTANEOUSLY** apply pressure and remove the needle. Pressure must be held over the puncture site for 3 to 5 minutes. Some patients require pressure longer than 5 minutes.
17. All air should be forced from the syringe by holding the syringe with the needle pointing up and gently forcing the plunger upwards. Holding pressure over the puncture site and removing air from the syringe does require some dexterity. Once the air is removed, cap the syringe using correct technique and place in an ice slurry mix.
18. After 3-5 minutes, recheck puncture site and palpate for a pulse. Report any changes in pulse, alterations of circulation, or swelling. If the skin begins to swell under the puncture site, **IMMEDIATELY** reapply pressure to the site. A pressure bandage or dressing may be necessary. Elevating the wrist will reduce pressure and swelling.
19. When you have determined that the puncture site is no longer bleeding, remove sample to be analyzed.
20. Be sure that the sample is properly labeled and you have noted and recorded the FIO₂.

EXERCISE 2: Sampling from an Arterial Line

Equipment needed:

1. 1 ABG syringe
2. 1 3-6 ml disposable syringe
3. syringe cap
4. crushed ice
5. sterile gauze
6. arterial line will be prepared for laboratory

Procedure:

1. Wash hands before preparing equipment.
2. Sample syringe should be prepared as above but without a needle.
3. The following will be required for actual arterial sticks in the clinic. All of the following will be simulated when practicing on simulator.
 - a. verify the order
 - b. note patient's diagnosis and status (especially clotting disorders)

- c. note current medications (note if patient is receiving anticoagulants)
 - d. note values of previous ABG's
 - Follow proper procedure for patient interaction:**
 - e. introduce yourself and explain the procedure you are going to do
 - f. proper identification of patient using I.D. wristband
 - g. ask for questions and reassure patient
4. Place the equipment on the patient's bedside table within easy reach. Wash your hands before implementing procedure.
 5. Remove the cap from the sampling port and place it on a sterile gauze pad.
 6. Using the syringe without heparin, remove the needle from the syringe and insert the syringe into the sampling port.
 7. The stopcock should be turned so that only the sampling port and tube to the indwelling catheter is open. Aspirate 2 - 3 ml of blood and return the stopcock to the original position. With a preset ABG syringe most arterial pressures will fill syringe.
 8. Discard the first syringe used to fill the arterial line with blood.
 9. Connect your sample syringe to the sampling port on the stopcock and repeat steps 6 and 7. Be sure to turn stopcock back to the original position before removing the syringe.
 10. Remove any air bubbles from the syringe and cap.
 11. Label the syringe and place it in the ice slurry mix.
 12. Flush the arterial line. Note procedure in laboratory.
 13. Transport sample to be analyzed.

EXERCISE 3: Capillary Sticks

Equipment needed:

1. capillary tubes (pre-heparinized)
2. lancets
3. magnet and "flea"
4. capillary caps
5. alcohol swabs
6. a method for warming tissue
7. sterile gauze

Procedure:

1. Wash your hands before preparing equipment.
2. Prepare equipment and transport to the nursery.
3. Follow hospital procedure for hand washing and gowning before going into nursery.
4. The following will be required for actual capillary sticks in the clinic. All of the following will be simulated when practicing this procedure.
 - a. verify the order
 - b. note patient's diagnosis and status
 - c. note current medications (note if patient is receiving anti-coagulants)
 - d. note values of previous arterial blood gases
5. Wash hands before starting procedure.
6. Observe the infant's fingers for previous sampling sites. The right hand is usually preferred by most physicians. The lateral surfaces of the finger tips are the primary areas for obtaining capillary samples.
7. Avoid lancing previous sites and areas adjacent to the finger nail.
8. Warm the finger and hand with a warm towel or heat pack for 5 minutes.
9. Clean the site with an alcohol swab, open the lancet and lance the desired site. Squeeze the finger gently to form a drop of blood.

10. Hold a capillary tube horizontal with the distal end slightly lowered. Position the proximal end of the tube into the drop of blood at the lanced site. Note that the tube should fill without entraining air. Gently squeeze the finger to obtain a sample and then relax pressure on the finger. Repeat the procedure to milk the site to obtain a full sample.
11. If the site stops bleeding, clean the site with alcohol and repeat step #10.
12. Once the tube is filled to prescribed volume, cap one end of the capillary tube. Hold capped end down and insert metal flea. Cap the open end and with a magnet move the flea from one end of the capillary tube to the other. Continue to mix the blood with the flea as often as you can until the sample is analyzed.
13. Clean the lanced site with an alcohol swab and dry with clean gauze. Properly dispose of lancet and other wastes.
14. Transport sample to be analyzed. Continue to mix blood in capillary tube.