Respiratory – Obtaining Blood Samples: Arterial Blood Gases (ABGs)  
SECTION: 9.13  
Strength of Evidence Level: 3  

PURPOSE:  
To assess the adequacy of ventilation and oxygenation, and acid base status.

CONSIDERATIONS:  
1. Air bubbles should be dispelled from the syringe immediately upon obtaining sample. An air bubble can affect the sample by increasing or decreasing the PO₂ level.
2. Red blood cell metabolism in-vitro must be minimized. The sample should be placed on ice immediately to slow metabolism and transported as soon as possible to the blood gas laboratory.
3. If patient is receiving oxygen therapy and the ABG is to be drawn on room air, the oxygen therapy must be removed for at least 20 minutes before obtaining the ABG sample. Suctioning or respiratory treatments, i.e., IPPB, should not be done during this 20-minute time period.
4. Only radial and brachial punctures are done in the home. The radial artery is the site of choice because it does not lie immediately adjacent to a nerve.
5. An Allen Test is always performed before doing a radial puncture.
6. There should be a responsible person in the home.
7. Patients on anti-coagulant therapy or those with bleeding tendencies may have prolonged bleeding time and require a longer application of pressure to the puncture site following the procedure.
8. ABG values are affected by patient activity, oxygen concentration and body temperature.
9. When there is no feasible alternative to recapping or otherwise handling the contaminated needle, extreme care must be taken to prevent needle stick injuries. When inserting the needle into a needle cork or stopper, the stopper should be first placed on a hard surface rather than held in the opposite hand.
10. Label syringe with patient's name, doctor's name, date and time drawn. Label specimen slip with patient's name, doctor's name, address and phone number, name of person drawing specimen, patient's temperature, oxygen concentration and diagnostic analysis requested.
11. Only a trained certified professional staff performs this procedure.

EQUIPMENT:  
Arterial blood gas kit containing:
AutoStik 3 mL plastic syringe with plunger which contains 100 units of dry lithium heparin
23-gauge, 1-inch hypodermic needle, which contains dry lithium heparin
Needle cork
Syringe cap
Alcohol wipes
Hand towel (used as a roll to support arm at ABG site)
Alcohol applicator (wipe/swab/disk/ampule)
Antimicrobial applicator (wipe/swab/disk/ampule)
Hemostat
Gloves
Forceps
Adhesive bandage
Sterile gauze sponges
Container with ice
Puncture-proof container
Impervious trash bag
Disposable apron
Protective eye wear

PROCEDURE:  
Verify physician's order to obtain arterial blood gases.  
1. Adhere to Standard Precautions.  
2. Explain the procedure and purpose to the patient/caregiver.  
3. Assemble the equipment on a clean surface close to the patient.  
4. Place patient in comfortable position, making sure that site is accessible.  
5. Ensure adequate lighting.  
6. Assure that the patient is on oxygen concentration specified by the physician.  
7. Obtain patient's temperature.  
8. Open and prepare arterial blood gas kit using aseptic technique. Arrange supplies in the order in which they will be used.  
9. Preset AutoStik syringe for amount of blood desired (1.5 mL).  
10. Perform Allen Test, if doing radial stick. The purpose of the Allen Test is to assure that the ulnar artery is patent as determined by the prompt return of color to the skin of the hand while the radial artery is still compressed.  
   a. Patient places hand, palm side up on a firm surface, clenching fist.  
   b. Apply direct pressure for a few seconds over both the radial and the ulnar arteries.  
   c. Keeping fingers and pressure in place, the patient opens the hand, unclenching the fist. The palm is blanched due to impaired blood flow.  
   d. Release pressure over the patient's ulnar artery, while keeping pressure over the radial artery. Observe the hand for change of color from blanched to flushed within 15 seconds which indicates the flow of oxygenated blood to the hand.  
   e. If the hand does not become flushed, repeat the test on the other arm. If neither arm produces a
positive result, choose a brachial site for puncture.

11. Locate site for arterial stick. Position patient's arm comfortably. Use towel roll to gently hyper-extend wrist or brachial site. Palpate artery using index and middle finger (slight pressure may be required, depending on fatty tissue, muscle, edema and blood pressure).


13. Identify location and stabilize artery by palpatiing with index and middle finger.

14. Holding syringe at a 45-60 degree angle with the bevel of the needle up, puncture skin.

15. After skin is punctured, slowly advance the needle toward the artery. A flash of blood in the clear hub of the needle usually indicates the artery has been entered and blood should readily fill the syringe in a pulsating manner. (If aspiration is necessary it is likely that a vein rather than an artery has been punctured.)

16. Once blood enters the syringe, DO NOT advance needle. Allow syringe to fill 1.5 mL.

17. Remove needle from artery holding syringe at 45 degree angle while holding sterile gauze above puncture site. As the needle leaves the skin, apply the sterile gauze with firm digital pressure to puncture site.

18. Assure that direct digital pressure is maintained to the site for 5 minutes or until no further bleeding occurs.

19. Immediately expel any air bubbles from the blood sample.

20. With the needle cork on a stationary surface, insert the needle directly into the cork.

21. Gently rotate syringe back and forth between palms of hands mixing arterial blood with heparin.

22. Using the hemostat, remove the needle (with cork in place) from the syringe.

23. Seal syringe tightly with syringe cap.

24. Recheck blood specimen for air bubbles. If air bubbles are present, remove cap, expel bubbles and replace cap.

25. Place specimen in container with ice.

26. Apply adhesive bandage to puncture site.

27. Discard soiled supplies in appropriate containers.

AFTER CARE:

1. Review instructions with patient/caregiver to check arterial pressure site every 15 minutes for one hour and report any abnormal findings.

2. Transport immediately. (See Laboratory, Specimens and Venipuncture - Specimens, Obtaining and Transporting.)

3. Document in patient's record:
   a. Procedure and observation including: Allen test results, site of blood draw, time of blood draw, O2 concentration and patient's temperature.
   b. Identity and location of laboratory where specimen taken.
   c. Patient's response to procedure.
   d. Instructions given to patient/caregiver.
   e. Notify physician of the laboratory results.