

Estimation of Blood Gases

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Lab -3- Metabolic Disorders

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Arterial Blood Gases (ABG) test:

An arterial blood gases (ABG) test measures the acidity (pH) and the levels of oxygen and carbon dioxide in the blood from an artery. This test is used to find out how well your lungs are able to move oxygen into the blood and remove carbon dioxide from the blood. As blood passes through your lungs, oxygen moves into the blood while carbon dioxide moves out of the blood into the lungs. An ABG test uses blood drawn from an artery, where the oxygen and carbon dioxide levels can be measured before they enter body tissues.

ABG measures:

-**Partial pressure of oxygen (PaO₂):** this measures the pressure of oxygen dissolved in the blood and how well oxygen is able to move from the airspace of the lungs into the blood.

-**Partial pressure of carbon dioxide (PaCO₂):** this measures the pressure of carbon dioxide dissolved in the blood and how well carbon dioxide is able to move out of the body.

-**pH:** the pH measures hydrogen ions (H⁺) in blood. The pH of blood is usually between 7.35 and 7.45. A pH of less than 7.0 is called acid and a pH greater than 7.0 is called basic (alkaline). So, blood is slightly basic.

-Bicarbonate (HCO_3): bicarbonate is a chemical (buffer) that keeps the pH of blood from becoming too acidic or too basic.

-Oxygen content (O_2CT) and oxygen saturation (O_2Sat) values: O_2 content measures the amount of oxygen in the blood. Oxygen saturation measures how much of the hemoglobin in the red blood cells is carrying oxygen (O_2).

Normal values include:

- Arterial blood pH: 7.35 to 7.45.
- Bicarbonate: 22 to 28 milliequivalents per liter.
- Partial pressure of oxygen: 75 to 100 mm Hg.
- Partial pressure of carbon dioxide: 38 to 42 mm Hg.
- Oxygen saturation: 94 to 100 percent.

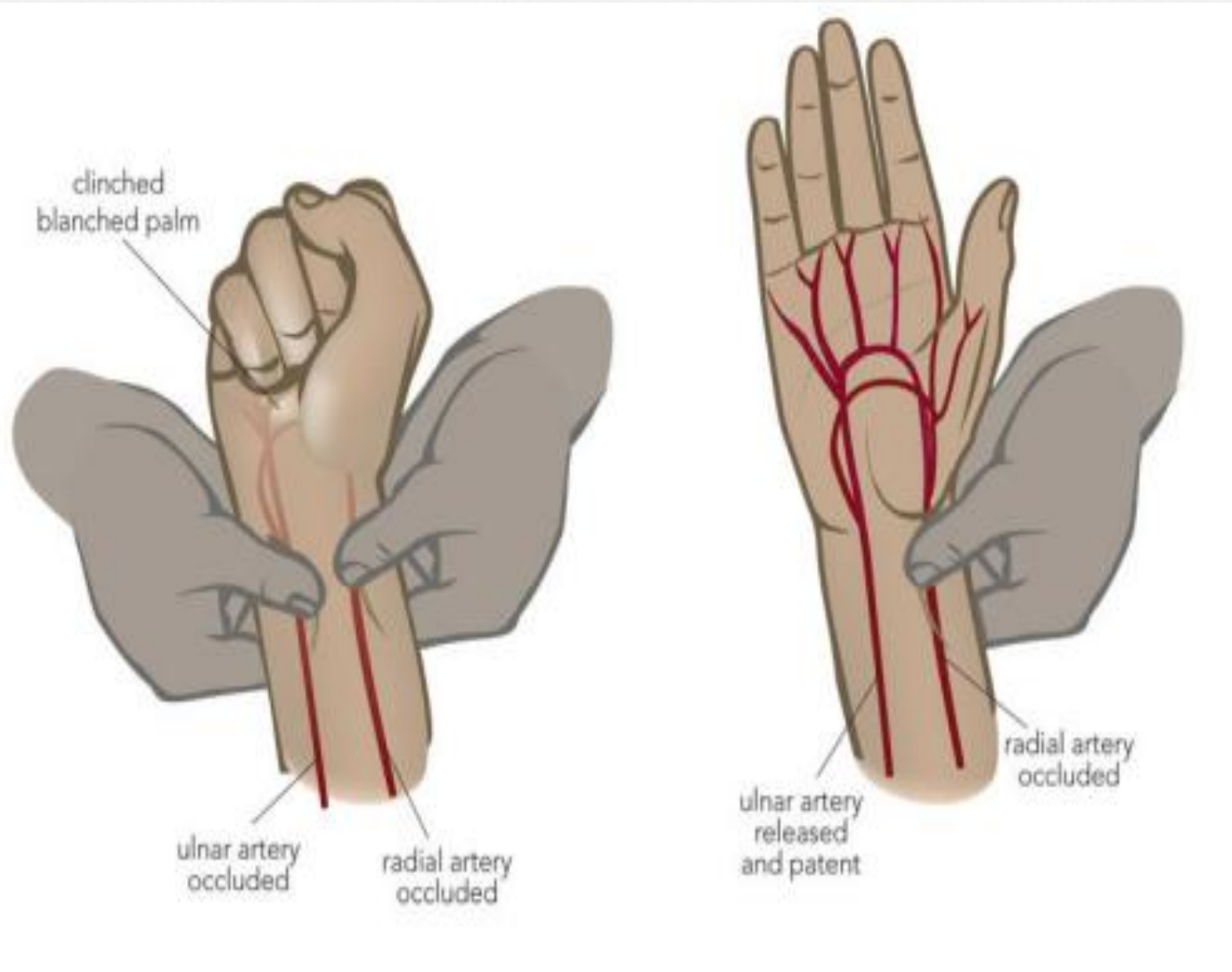
Collection of blood sample:

Arterial blood is usually taken from an artery in the wrist called the radial artery. This is the major artery in line with the thumb, where you can feel your pulse. Or, blood can be collected from the brachial artery in the elbow or the femoral artery in the groin. The sample can be obtained either through a catheter placed in an artery, or by using a needle and syringe to puncture an artery. These syringes are pre-heparinized and handled to minimize air exposure that will alter the blood gas values. If a plastic blood gas syringe is used, the sample should be transported and kept at room temperature and analyzed within 30 min. If prolonged time delays are expected (i.e., greater than 30 min) to analysis, the sample should be drawn in a glass syringe and immediately placed on ice.

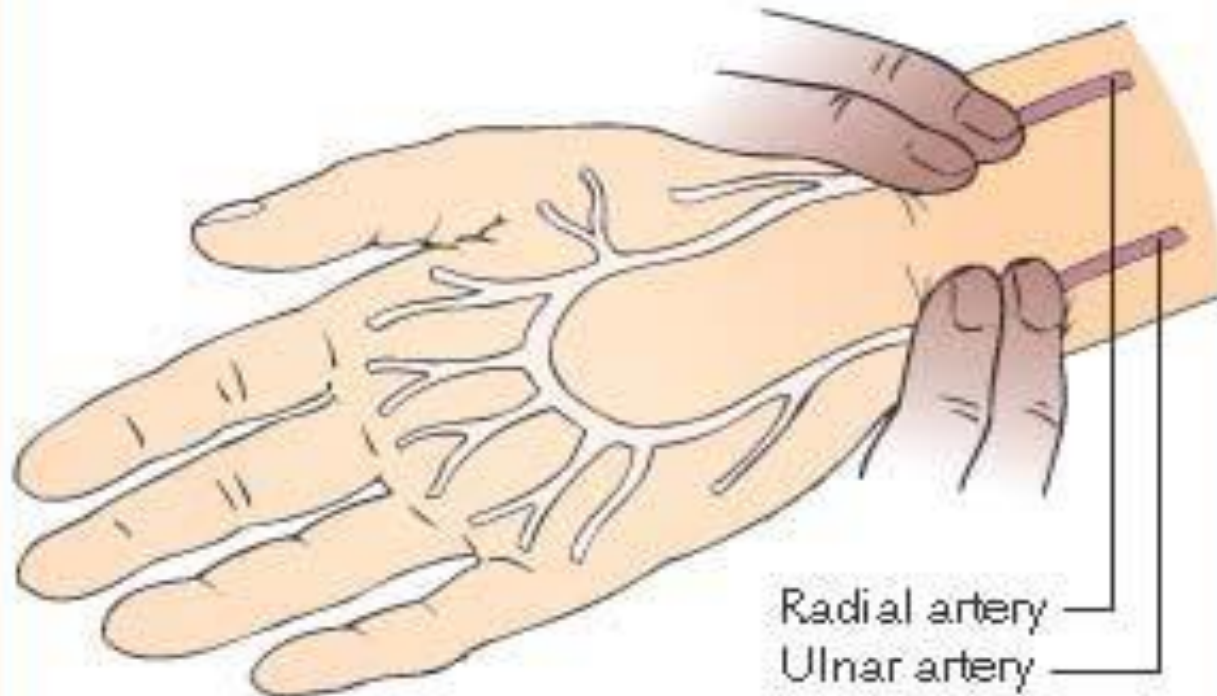
Sampling errors:

Inappropriate collection and handling of arterial blood specimens can produce incorrect results. Reasons for an inaccurate blood result include:

- Presence of air in the sample.
- Collection of venous rather than arterial blood.
- An improper quantity of heparin in the syringe.
- A delay in specimen transportation.



Blanched palm







Thank you for listening