



تقنيات اجهزة تخدير الكورس الاول

BLOOD GASES ANALYSIS

Sawa University

College of health and medical
techniques

Department of Anesthesia

Four Stage

جامعة ساوة

الاهلية

كلية التقنيات الصحية

والطبية

قسم تقنيات التخدير

المرحلة الرابعة

محاضرة رقم 7

الجانب النظري

Lecture No 7. Theoretical

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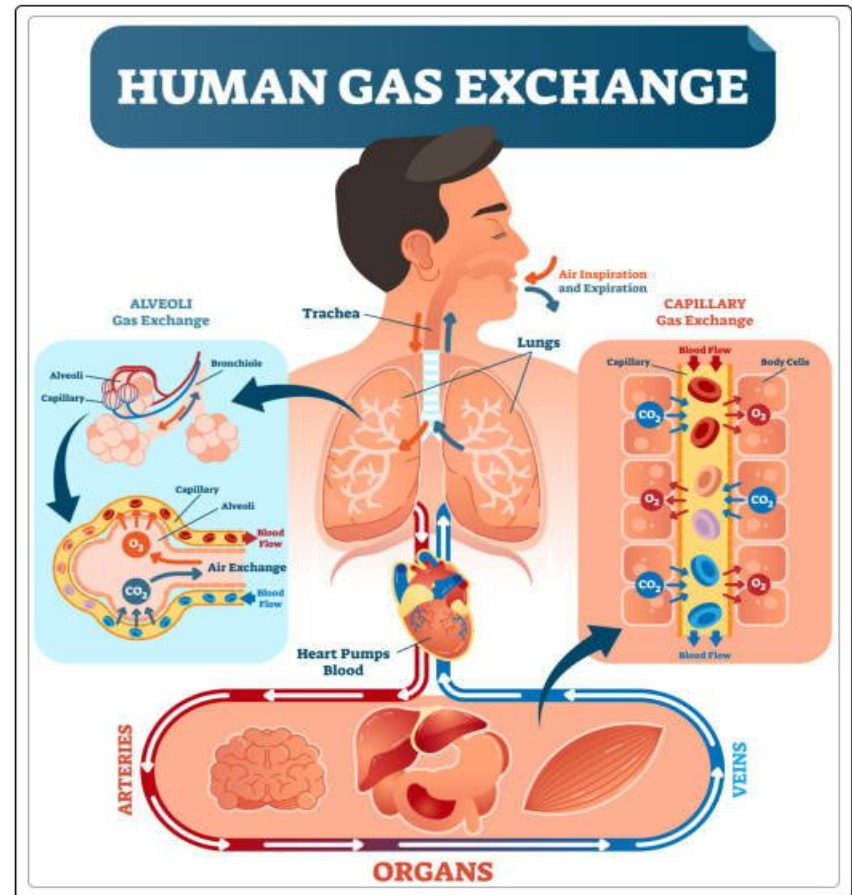
Definition

Arterial Blood Gas (ABG) analysis measures the levels of oxygen (O_2), carbon dioxide (CO_2), and the body's acid-base balance (pH) from arterial blood.



Purpose of Blood Gas Analysis

1. Assess ventilation and oxygenation status
2. Evaluate acid-base balance
3. Guide ventilator and oxygen therapy management
4. Monitor critically ill or anesthetized patients



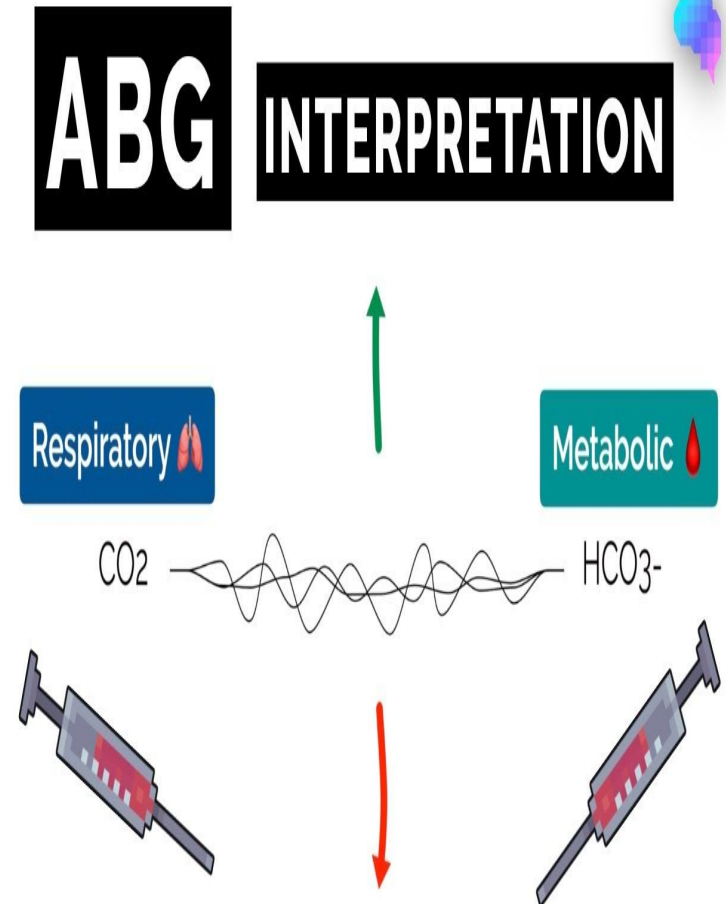
Normal ABG Values

- ❖ pH: 7.35 – 7.45
- ❖ PaO₂: 80 – 100 mmHg
- ❖ PaCO₂: 35 – 45 mmHg
- ❖ HCO₃⁻: 22 – 26 mEq/L
- ❖ SaO₂: 95 – 100%



ABG Component Meaning

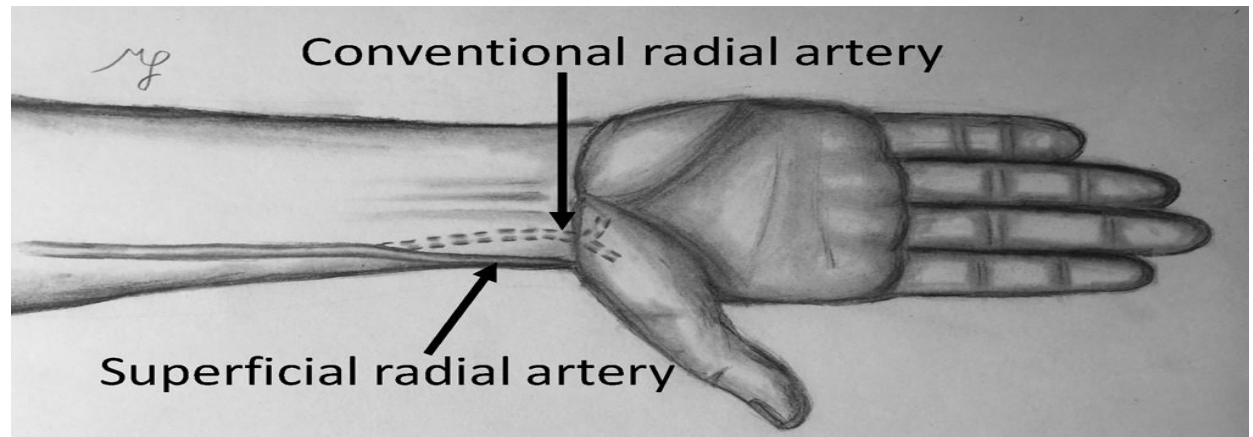
- pH: Indicates acid-base status
- PaCO₂: Respiratory component (CO₂ retention = acidosis)
- HCO₃⁻: Metabolic component (Base regulated by kidneys)
- PaO₂ and SaO₂: Oxygenation levels



Sampling Sites

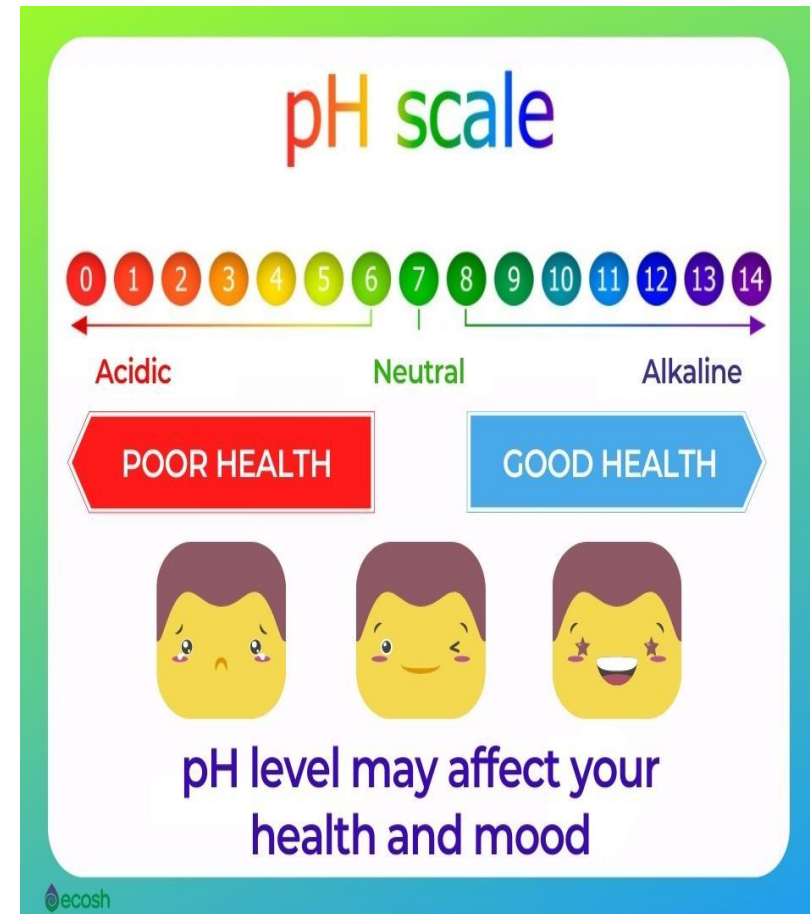
- Radial Artery (most common)
- Brachial Artery
- Femoral Artery

Check collateral circulation before radial puncture (Allen's Test).



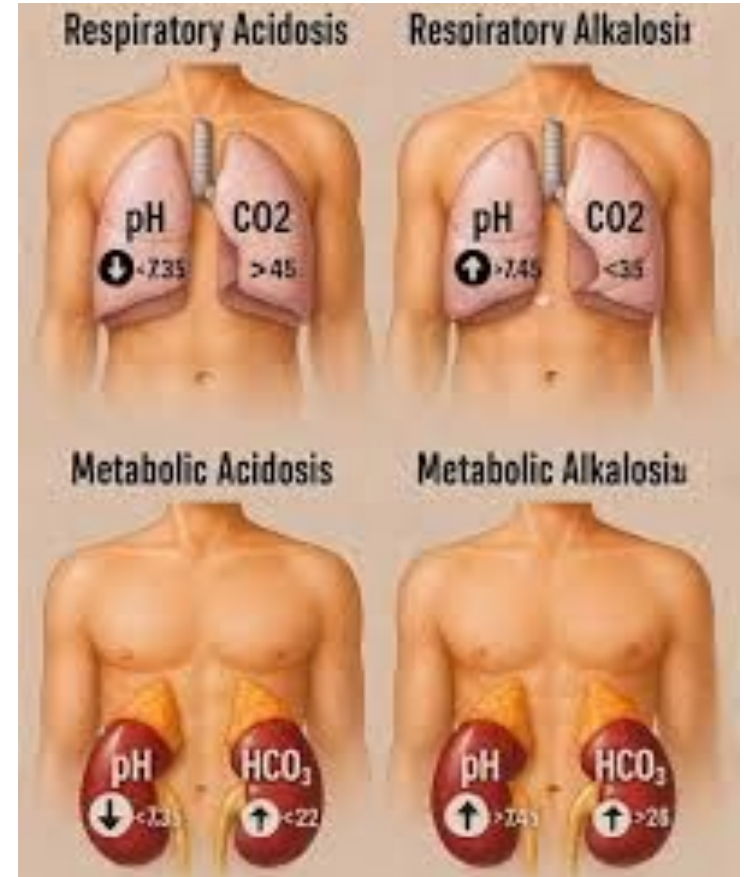
Steps to Interpret ABG

1. Check pH (Acidemia / Alkalemia)
2. Evaluate PaCO_2 (Respiratory component)
3. Evaluate HCO_3^- (Metabolic component)
4. Determine whether compensation is occurring



Acid-Base Disorders

- Respiratory Acidosis: $\uparrow$ PaCO_2 , $\downarrow$ pH
- Respiratory Alkalosis: $\downarrow$ PaCO_2 , $\uparrow$ pH
- Metabolic Acidosis: $\downarrow$ HCO_3^- , $\downarrow$ pH
- Metabolic Alkalosis: $\uparrow$ HCO_3^- , $\uparrow$ pH



Example Case

ABG: pH = 7.30, PaCO₂ = 50 mmHg, HCO₃⁻ = 24 mEq/L

Interpretation:

- pH low → Acidosis
- PaCO₂ high → Respiratory cause
→ Respiratory Acidosis

