Indications and Contraindications for Performing ABGs

Indications	Contraindications
• Acid-base monitoring • PaO2 and PaCO2 monitoring • Assess ongoing treatments (monitoring for DKA, for example) • Detection of abnormal hemoglobins • When venous sampling unavailable	• Abnormal modified Allen's test • Local infection at puncture site • Severe PVD • Active Raynaud's syndrome • Ischemia of arteries at site

Normal Lab Values

Ph	PaO2	PaCO2	HCO3	SaO2
7.35-7.45	80-100mmHg	35-45mmHg	22-26 mEq/L	95-100%

Significance and Causes

Respiratory Acidosis	Respiratory Alkalosis	Metabolic Acidosis	Metabolic Alkalosis
Too much acid in blood due to underexcretion of CO2 in lung alveoli (hypercapnia)	Too little acid in blood due to overexcretion of CO2 in lung alveoli (hypocapnia)	Too much acid in blood due to overproduction of acids	Too little acid in blood due to removal of acids or excess of bases
• Hypoventilation • Drug overdose • Airway obstruction	• Hyperventilation • Sepsis • Pain	• Lactic acidosis • DKA • Diarrhea	• NGT suction • Vomiting • Diuretics

Interpretation & Compensation

Ph < 7.35 = Acidosis		pH > 7.45 = Alkalosis	
PaCO2 > 45	HCO3 < 22	PaCO2 < 35	HCO3 > 26
Respiratory Acidosis	**Metabolic Acidosis**	**Respiratory Alkalosis**	**Metabolic Acidosis**
Uncompensated: • HCO3 normal	Uncompensated: • CO2 normal	Uncompensated: • HCO3 normal	Uncompensated: • CO2 normal
Metabolic Compensation: • HCO3 > 26	Respiratory Compensation: • CO2 < 35	Metabolic Compensation: • HCO3 < 22	Respiratory Compensation: • CO2 > 45
Full Compensation: • pH normal • PaCO2 > 45 • HCO3 > 26	Full Compensation: • pH normal • HCO3 < 22 • CO2 < 35	Full Compensation: • pH normal • PaCO2 < 35 • HCO3 < 22	Full Compensation: • pH normal • HCO3 > 26 • CO2 > 45

Severity of Hypoxemia

None	Mild	Moderate	Severe
PaO2 ≥ 80 mmHg	PaO2 60-79 mmHg	PaO2 40-59 mmHg	PaO2 < 40 mmHg

(Papadakis & McPhwee, 2018; Theodore, 2017)