

Practical ABG Interpretation Steps

***intended to be used as a GUIDE**

Stephanie Jalaba, MMS, PA-C

Andrew Walker, PSM, MS, PA-C

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pH = 7.4
pCO₂ = 40 mm Hg
HCO₃⁻ = 24 mEq/L

1. Look at the **pH**
 - a. pH < 7.4 = Acidosis
 - b. pH > 7.4 = Alkalosis
2. Determine Primary Disorder = Look at **PCO₂ and pH**
 - a. If pH and PCO₂ move in *opposite* directions, respiratory disorder is primary
 - b. If pH and PCO₂ move in the *same* direction, metabolic disorder is primary
3. Look for Mixed Disorder = Look at **pCO₂ and HCO₃** (BMP panel more accurate than ABG) *this step may confirm what you've already found in steps 1-2 if no mixed disorder present*
 - a. If both pCO₂ and HCO₃ are *high* = respiratory acidosis OR metabolic alkalosis
 - b. If both pCO₂ and HCO₃ are *low* = respiratory alkalosis OR metabolic acidosis
 - c. If pCO₂ and HCO₃ move in *opposite* direction = mixed disorder is present
4. Look for expected compensatory change/Apply compensation rules
 - a. **Respiratory Rule #1** = pH changes by 0.08 for 10 mmHg pCO₂ change in either direction
 - i. In ACUTE situations only...DO NOT USE IT IN CHRONIC CASES. Usually, in chronic situations pH corrects/compensates to normal
 - b. **Boston Rule**
 - i. Acute Respiratory Acidosis: 1 for 10 rule (1 mEq HCO₃ change for 10 mmHg pCO₂)
 - ii. Acute Respiratory Alkalosis: 2 for 10 rule (2 mEq HCO₃ change for 10 mmHg pCO₂)
 - iii. Chronic Respiratory Acidosis: 4 for 10 rule (4 mEq HCO₃ change for 10 mmHg pCO₂)
 - iv. Chronic Respiratory Alkalosis: 5 for 10 rule (5 mEq HCO₃ change for 10 mmHg pCO₂)
 - c. **Winter's Formula = (1.5 x HCO₃) + 8 (+/- 2)** – use for metabolic acidosis
 - d. 0.7 x HCO₃ + 20 (+/- 5) (rarely used) – use for metabolic alkalosis
5. Compare Calculated to Corrected Anion Gap
 - a. **Calculated AG = (Na + K) – (Cl + HCO₃)**
 - b. **Corrected AG = (2 x albumin) + (0.5 x phosphate) +/- 2**
 - i. Alternatively, Corrected AG = 3 x albumin
 - ii. Pay attention to the Corrected AG when phos or albumin are low
 - c. If calculated AG > corrected AG = high anion gap acidosis is present
6. Calculate **Delta Gap = (calculated AG – corrected AG) + HCO₃** in the presence of HAGMA to determine if coexisting disorder present
 - a. If net sum = 24, only HAGMA present
 - b. If net sum < 24 = NAGMA also present
 - i. NAGMA: usually RTA, diarrhea, hyperchloremia
 - c. If net sum > 24 = metabolic alkalosis also present