UNIT X / Promoting Physiologic Health

**Diagnosing**

NANDA includes the following diagnostic labels that relate to fluid and acid–base imbalances:

- **Deficient Fluid Volume**: Decreased intravascular, interstitial, and/or intracellular fluid. This refers to dehydration, water loss alone without change in sodium.
- **Excess Fluid Volume**: Increased isotonic fluid retention.
- **Risk for Imbalanced Fluid Volume**: At risk for a decrease, increase, or rapid shift from one to the other of intravascular, interstitial, and/or intracellular fluid. This refers to body fluid loss, gain, or both.
- **Risk for Deficient Fluid Volume**: At risk for experiencing vascular, cellular, or intracellular dehydration.
- **Impaired Gas Exchange**: Excess or deficit in oxygenation and/or carbon dioxide elimination at the alveolar-capillary membrane.

**BOX 52–7 Interpreting ABGs — Do You Have a Match?**

1. Look at each number separately.
   - Label the pH:
     - If the pH is less than 7.35, the problem is acidosis.
     - If the pH is greater than 7.45, the problem is alkalosis.
   - Label the PaCO₂:
     - If the PaCO₂ is less than 35 mm Hg, more carbon dioxide is being exhaled than normal and indicates acidosis.
     - If the PaCO₂ is greater than 45 mm Hg, less carbon dioxide is being exhaled than normal and indicates alkalosis.
   - Label the bicarbonate:
     - If the HCO₃⁻ is less than 22 mEq/L, bicarbonate levels are lower than normal, indicating acidosis.
     - If the HCO₃⁻ is greater than 26 mEq/L, bicarbonate levels are higher than normal, indicating alkalosis.
2. Determine the cause of the acid–base imbalance.
   - Look at the pH—is it acidosis or alkalosis?
   - Check the PaCO₂ and HCO₃⁻ which one MATCHES the same acid–base status as the pH?

**EXAMPLE**

pH = 7.33 (acidosis)
PaCO₂ = 55 (acidosis)
HCO₃⁻ = 29 (alkalosis)

Cause of imbalance (hint: look at pH) = acidosis.

PaCO₂ (acidosis) MATCHES the pH (acidosis) = respiratory problem.
Client has respiratory acidosis.

3. Determine if the origin of the imbalance is respiratory or metabolic.
   - If it (e.g., PaCO₂ or HCO₃⁻) is within normal range, there is no compensation.
   - If it (e.g., PaCO₂ or HCO₃⁻) is above or below normal range, the body is compensating.

**EXAMPLES**

a. In respiratory acidosis (pH < 7.35, PaCO₂ > 45 mm Hg), if the HCO₃⁻ is greater than 26 mEq/L, the kidneys are retaining bicarbonate to minimize the acidosis: renal compensation.

b. In respiratory alkalosis (pH > 7.45, PaCO₂ < 35 mm Hg), if the HCO₃⁻ is less than 22 mEq/L, the kidneys are excreting bicarbonate to minimize the alkalosis: renal compensation.

c. In metabolic acidosis (pH < 7.35, HCO₃⁻ < 22 mEq/L), if the PaCO₂ is less than 35 mm Hg, carbon dioxide is being “blown off” to minimize the acidosis: respiratory compensation.

d. In metabolic alkalosis (pH > 7.45, HCO₃⁻ > 26 mEq/L), if the PaCO₂ is greater than 45 mm Hg, carbon dioxide is being retained to compensate for excess base: again, respiratory compensation.

4. Look for evidence of compensation.
   - Look at the value that does NOT match the pH:
     - If it (e.g., PaCO₂ or HCO₃⁻) is within normal range, there is no compensation.
     - If it (e.g., PaCO₂ or HCO₃⁻) is above or below normal range, the body is compensating.

**TABLE 52–9 Arterial Blood Gas Values in Common Acid–Base Disorders**

<table>
<thead>
<tr>
<th>DISORDER</th>
<th>ABG VALUES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory acidosis</td>
<td>pH &lt; 7.35&lt;br&gt;PaCO₂ &gt; 45 mm Hg (excess CO₂ and carbonic acid)&lt;br&gt;Normal; or &gt; 26 mEq/L with renal compensation</td>
</tr>
<tr>
<td>Respiratory alkalosis</td>
<td>pH &gt; 7.45&lt;br&gt;PaCO₂ &lt; 35 mm Hg (inadequate CO₂ and carbonic acid)&lt;br&gt;Normal; or &lt; 22 mEq/L with renal compensation</td>
</tr>
<tr>
<td>Metabolic acidosis</td>
<td>pH &lt; 7.35&lt;br&gt;HCO₃⁻ &lt; 22 mEq/L (inadequate bicarbonate)</td>
</tr>
<tr>
<td>Metabolic alkalosis</td>
<td>pH &gt; 7.45&lt;br&gt;HCO₃⁻ &gt; 26 mEq/L (excess bicarbonate)</td>
</tr>
</tbody>
</table>

Note: If the value that doesn’t match (e.g., PaCO₂ or HCO₃⁻) is above or below normal and the pH is within normal range, the body has completely compensated. Complete compensation takes time to develop and is the result of a chronic condition (e.g., chronic respiratory acidosis with COPD).