

ABG Card

① Check *pH* on blood gas: **acidemia** (\downarrow pH)? **alkalemia** (pH)? **eupHemia** (normal pH)?

② Check bicarb on chemistry panel and pCO_2 on gas. \downarrow pH with \downarrow [HCO₃⁻], or \uparrow pH with \uparrow [HCO₃⁻], is primary metabolic acidosis or alkalosis. \downarrow pH with \uparrow pCO₂, or \uparrow pH with \downarrow pCO₂, is primary respiratory acidosis or alkalosis.

③ Check for expected **compensation**.

For **metabolic acidosis**, **Winters' equation**:
 $pCO_2 = 1.5([HCO_3^-]) + 8 \pm 2 =$ last 2 digits of pH
(lactic may overcompensate 2' CNS effects.)

For **metabolic alkalosis or acidosis**:
 $pCO_2 =$ last 2 digits of the pH = [HCO₃⁻] + 15
(for [HCO₃⁻] from 8 to 35)

For **respiratory acidosis**:

$\uparrow pCO_2$ 10 = \downarrow pH .08 (acute)

$\uparrow pCO_2$ 10 = \downarrow pH .03 (later: metabolic comp.)

For **respiratory alkalosis**:

$\downarrow pCO_2$ 10 = \uparrow [HCO₃⁻] 2 (acute)

$\downarrow pCO_2$ 10 = \uparrow [HCO₃⁻] 5 (chronic/compensated)

④ For metabolic acidosis, is it **anion gap acidosis**? **non-anion gap acidosis**? mixed disorder? $AG = [Na^+] - ([Cl^-] + [HCO_3^-])$. If all acidosis from anion-gap acids, then \uparrow AG should = \downarrow [HCO₃⁻]. If AG 20 (nl 12), [HCO₃⁻] 19 (nl 27), then all acidosis (\downarrow [HCO₃⁻] 8) is from \uparrow AG from excess organic acids.

Normal Venous Blood Gas values:

pH 7.32-7.42 (0.03 < arterial: 7.35-7.45)

pCO₂ 46 (6 > arterial: 40)

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| | PaO ₂ @pH 7.3 | PaO ₂ @pH 7.4 | PaO ₂ @pH 7.5 |
|------------------|--------------------------|--------------------------|--------------------------|
| SaO ₂ | 171 | 158 | 143 |
| | 122 | 111 | 101 |
| | 101 | 92 | 84 |
| | 89 | 82 | 74 |
| | 82 | 74 | 68 |
| | 76 | 69 | 63 |
| | 72 | 66 | 60 |
| | 68 | 62 | 57 |
| | 66 | 60 | 55 |
| | 63 | 58 | 53 |
| | 59 | 54 | 49 |
| | 56 | 51 | 47 |
| | 53 | 49 | 44 |
| | 51 | 47 | 42 |
| | 49 | 45 | 41 |
| | 47 | 43 | 39 |
| | 45 | 41 | 38 |
| | 44 | 40 | 35 |
| | 42 | 39 | 34 |

High Anion Gap Metabolic Acidoses
 K ketoacidosis
 U uremia
 S salicylates
 M methanol/ethylene glycol/paraldehyde
 A alcohol (EtOH)
 L lactic acidosis

Normal Anion Gap (Hyperchloremic) Metabolic Acidoses
High K⁺
 hyperald, ↑amino acid catabolism p ↑pCO₂ (takes while for HCO₃⁻ to ↓)
 dilutional
 hypoaldo (↓ renin, adrenal dysfunction)
 NH₄Cl, CaCl₂, lysine, arginine (≈adds HCl)
Low K⁺
 GI - diarrhea, fistulas (K⁺ loss, aldo)
 GU - surgical ureteral conduits
 RTA - Renal Tubular Acidosis. Complex.

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