ABG/Ventilation Workshop Handout

Respiratory dysfunction differentials:

1. Acidosis: CNS depression, hypoventilation, sedatives, pulmonary issues (↑dead space)
2. Alkalosis: CNS stimulation, pain, agitation, drugs, hypoxia, sepsis, pregnancy, liver failure, thyroid

Intervention selection:

Hypoxia
- Oxygen Therapy
- CPAP

Hypercapnia
- Bilevel NIV
- Mechanical ventilation

↑WOB
- High Flow O_2
- Bilevel NIV
- Mechanical Ventilation

Airway Protection
- Mechanical Ventilation

ABG analysis:

1. pH
   - < 7.4: Acidosis
   - > 7.4: Alkalosis
   - = 7.4: normal or mixed disorder
2. pCO_2 and HCO_3
   a. both high: resp. acidosis or metabolic alkalosis
   b. both low: resp. alkalosis or metabolic acidosis
   c. opposite directions: mixed disorder
3. Calculate Compensation
   a. pH changes by 0.08 q10 mmHg pCO_2 change in either direction ACUTE ONLY
   b. Acute Respiratory Acidosis: 1 for 10 rule (1 mEq HCO_3 change for 10 mmHg pCO_2)
   c. Acute Respiratory Alkalosis: 2 for 10 rule (2 mEq HCO_3 change for 10 mmHg pCO_2)
   d. Chronic Respiratory Acidosis: 4 for 10 rule (4 mEq HCO_3 change for 10 mmHg pCO_2)
   e. Chronic Respiratory Alkalosis: 5 for 10 rule (5 mEq HCO_3 change for 10 mmHg pCO_2)
   f. Metabolic Acidosis: Winter's Formula = (1.5 x HCO_3) +8 +/- 2
   g. Metabolic Alkalosis: 0.7 x HCO_3 + 20 +/- 5 (rarely used)

4. Optional: Calculated to corrected Anion Gap
    a. Calculated AG = (Na) – (Cl + HCO_3)
    b. Corrected AG = (2 x albumin) + (0.5 x phosphate) +/- 2
        i. Alternatively, corrected AG = 3 x albumin
    c. If calculated AG > corrAG = high anion gap acidosis is present
        i. MUDPILES: Methanol, Uremia, DKA, Propylene Glycol (a solvent in drugs like Ativan and Phenytoin), Iron/Isoniazid, Lactate, Ethanol/Ethylene Glycol, Salicylate/Starvation
    d. Delta Gap = (calculated AG – corrAG) + HCO_3
        i. If sum < 24 = NAGMA present
            1. NAGMA: usually RTA, diarrhea, hyperchloremia
        ii. If sum > 24 = additional metabolic alkalosis present
            1. Metabolic Alkalosis: GI losses, NG suction, diuretics, potassium depletion, Cushing's, or Bartter Syndrome