ACID BASE ANALYSIS by Nick Mark MD

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What's the primary disturbance?

1. pH

- >7.4 → alkalemia
- <7.4 → acidemia

What's the pCO2?

2. pCO_2

- ↑ → respiratory acidosis
- ↓ → respiratory alkalosis

Acute or chronic?

What is the chronicity?
Look at metabolic compensation
Acute: 10 Δ pCO_2 → 0.08 Δ pH
Chronic: 10 Δ pCO_2 → 0.03 Δ pH

Airflow obstruction
- COPD, asthma
- ↓Drive
- Medications
- Central
- ↑CO2 production

↑ drive
- Hypoxemia
- Pain/anxiety
- Hepatic enceph
- Pregnancy
- Salicylates

What's the bicarb?

3. HCO_3^-

- ↑ → metabolic alkalosis
- ↓ → metabolic acidosis

"BLVD PLACE"
- B - Bartter's
- L – Laxative
- V – Vomitting
- D - Diarrhea/diuretics
- P - Post-hypercapnea
- L - Licorice
- A - Alkali ingestion
- C - Contraction alkalosis
- E - Endocrine (Conn's or Cushing's)

Is the anion gap increased?
AG = [Na] + ([Cl] + [HCO_3])
Expected AG = 2.5 x Albumin
If AG > expected AG, there is an anion gap present

Is there compensation?

If there is a metabolic acidosis or alkalosis present is there appropriate respiratory compensation?
Use one of two rules of find out:
1. Expected pCO_2 = 1.5 x [HCO3] + 8 ± 2 (Winter's)
2. Expected pCO_2 = last two digits of pH
If the measured pCO2 does not match the expected value, there is also a respiratory derangement.

- metabolic acidosis → non anion gap metabolic acidosis
- metabolic acidosis → anion gap metabolic acidosis

"RAGES"
- R – RTA
- A – Ammonia, Acetazolamide, HyperAlimentation
- G – GI losses
- E – Endocrine
- S – Saline

"GOLDMARKeT"
- G – Glycols
- O – Oxoproline
- L – Lactic acid
- D – Lactic acid
- M – Methanol
- A – Aspirin
- R – Renal fail, Rhabdo
- Ke – Ketones
- T – Toluene

Does the change in AG account for the change in HCO_3?
Used to determine if there is another derangement.

4. $\frac{\Delta AG}{\Delta HCO_3}$

Does $\Delta HCO_3 \approx \Delta AG$?

- NO
  - ↑ΔΔ > 1.5 → superimposed metabolic alkalosis
  - ↓ΔΔ < 0.8 → superimposed NAGMA
    - Salicylate poisoning
    - DKA w/ dehydration
- YES → No other derangement

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