

Acid-base

→ with Alkalemia \Rightarrow \downarrow free Ca^{++} \Rightarrow Acute hyperventilation
 \uparrow bound Ca^{++} numbness
muscle spasm

→ to differentiate between GI HCO_3^- & Renal tubular acidosis
we use (UAG)

used to estimate **UAGMA** $\leftarrow \downarrow (Na^+ + K^+ - Cl^-)$ \rightarrow (+) RTA (low NH_4^+)
(-) & negative GI $\leftarrow = \uparrow NH_4^+$

→ **Osmolal Gap** $\rightarrow Na^+ / BUN / glucose$.

$$cb\ c\ Osm = 2Na^+ + \frac{BUN}{2.8} + \frac{glucose}{18}$$

$$OG = \text{measured Osm} - \text{calculated Osm}$$

\uparrow OG \rightarrow **CKD**, **lactic acidosis**, **Keto acidosis**

\uparrow OG with normal AG = **mannitol**, **sorbitol**, **acetone**, **glycerol**

\rightarrow **NAGMA** \rightarrow \uparrow or \downarrow on the measured ions
 $\uparrow Cl^-$, $\downarrow HCO_3^-$

\rightarrow **HAGMA** \rightarrow \uparrow or \downarrow on the unmeasured ions

-ketone, lactate, albumin \leftarrow

NAGMA + $\uparrow K^+$ \rightarrow hypoadosteronism.

metabolic Acidosis



NAGMA

RTA 1

diarrhea

↑ organic acids NH_4^+

RF, distal RTA

HAGMA

- DKA pos Cl^- , ↓ vol, ↑ G

- AKA ↓ G, ↓ PO_4

- LAA

- Uremia ↑ Sul, Ur, Phos

- toxins

toxic metabolites ← Ethylene glycol
Methanol

propylene glycol

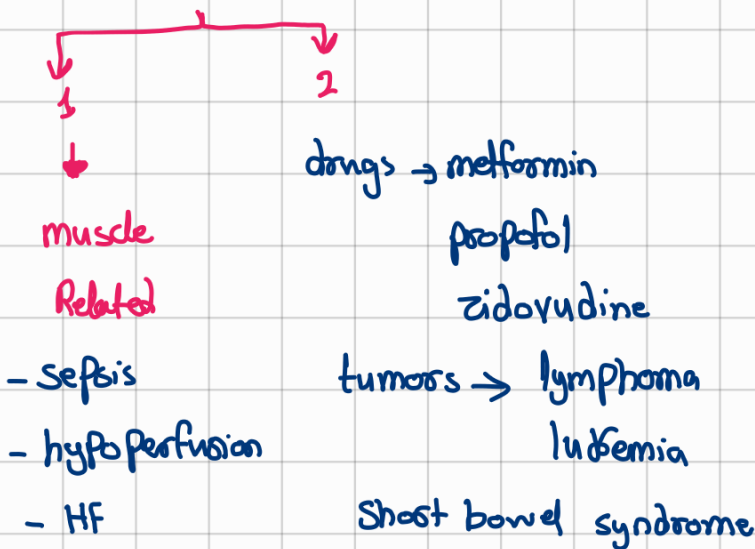
all can cause ↑ OG & ↑ AG

* Salicylate poisoning

↳ treated with

$\text{Na}^+ \text{H}_2\text{CO}_3$

LAA



Metabolic Alkalosis:-

↳ loss of bicarb free fluid ↓ ECF ⇒ ↑ $[\text{HCO}_3^-]$

↳ volume depletion ⇒ high aldo ⇒ loss of H^+/K^+

↳ vomiting suction

↳ paradoxical aciduria

↳ ↑ hyperaldosteronism

2 types of MAI

