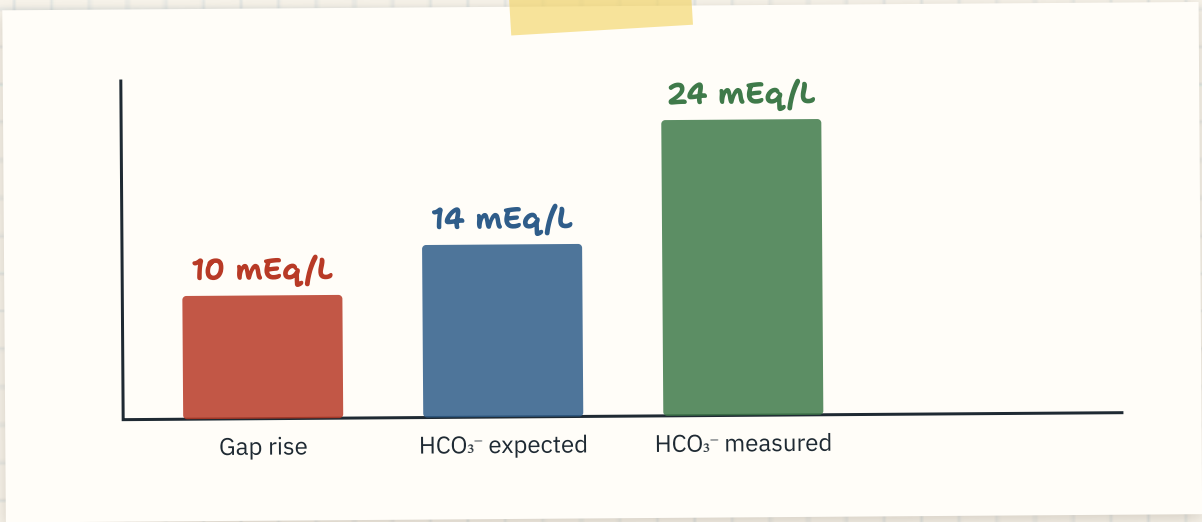
Acid-base cases: the six steps

One algorithm for one, two or three disorders



Step by step

1. pH: below 7.35 acidemia, above 7.45 alkalemia
2. Primary disorder: the change that explains the pH
3. Compensation: a miss points to a second disorder
4. Anion gap: $Na^+ - (Cl^- + HCO_3^-)$
5. Delta ratio, only if the gap is high
6. Does the story explain every finding?

Delta ratio	Meaning
Below 1	Adds a normal gap acidosis
1 to 2	Pure high-gap acidosis
Above 2	Adds a metabolic alkalosis

Delta ratio = (gap − 12) / (24 − HCO_3^-)

WINTERS' FORMULA

$$PaCO_2 = 1.5 \times HCO_3^- + 8 \pm 2$$

anion gap = $Na^+ - (Cl^- + HCO_3^-)$, normal about 12

Rule of thumb

A miss points to a second disorder

Normal gap skips the delta ratio; high gap always runs it

Exam traps

- ! A normal bicarbonate can hide a metabolic alkalosis behind a high gap.
- ! Do not stop at step 3 when compensation fits: run the gap and delta ratio.
- ! Cut-offs differ between sources; the ratio is a strong clue, not proof.

Acid-base practice cases: three ABG vignettes, one algorithm

Video, written lesson, practice question and sources: medservatory.com/usmle-step-1/renal-acid-base/acid-base-practice-cases-abg-vignettes

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