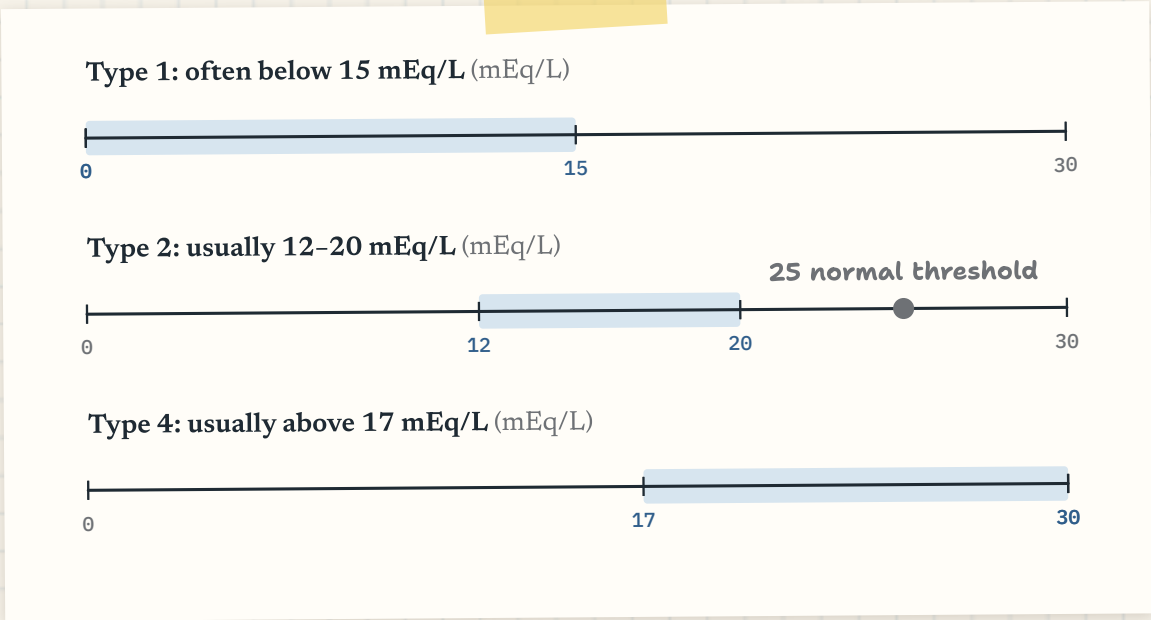
RTA types 1, 2 and 4

Same blood picture; separate by mechanism, urine pH and potassium



Step by step

1. Normal anion gap acidosis: HCO_3^- low, Cl^- high
2. Check the serum K^+: low (type 1 or 2) or high (type 4)
3. Check the urine pH against 5.5
4. Name the cause: Sjögren, Fanconi, diabetic kidney disease

Type	Defect	K^+	Urine pH
1 distal	H^+ secretion	Low	Above 5.5
2 proximal	HCO_3^- reabsorption	Low	Alkaline, then below 5.5
4	Aldosterone failure	High	Can be below 5.5

Three types of RTA

ANION GAP (NORMAL IN RTA)

$$AG = Na^+ - (Cl^- + HCO_3^-)$$

e.g. 135 – (108 + 17) = 10: normal gap (about 8–12, no K^+), so a hyperchloremic acidosis

Rule of thumb

Type 1 = distal: urine pH above 5.5, K^+ low

Type 2 = proximal: urine acidifies once HCO_3^- falls, K^+ low

Type 4 = aldosterone failure: K^+ high, low NH_4^+ excretion

Exam traps

- Type 2 urine pH falls below 5.5 once bicarbonate is below the lowered threshold.
- Type 4 urine pH can be below 5.5 even though ammonium excretion is low.
- A low potassium argues against type 4; a high potassium points to type 4, not types 1 or 2 or diarrhea.
- The urine anion gap is positive, or less negative, in types 1 and 4.

Renal tubular acidosis: tell RTA types 1, 2 and 4 apart

Video, written lesson, practice question and sources: medservatory.com/usmle-step-1/renal-acid-base/renal-tubular-acidosis-types-1-2-4

For exam study only, not medical advice. Follow local guidelines and your lab's ranges.
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