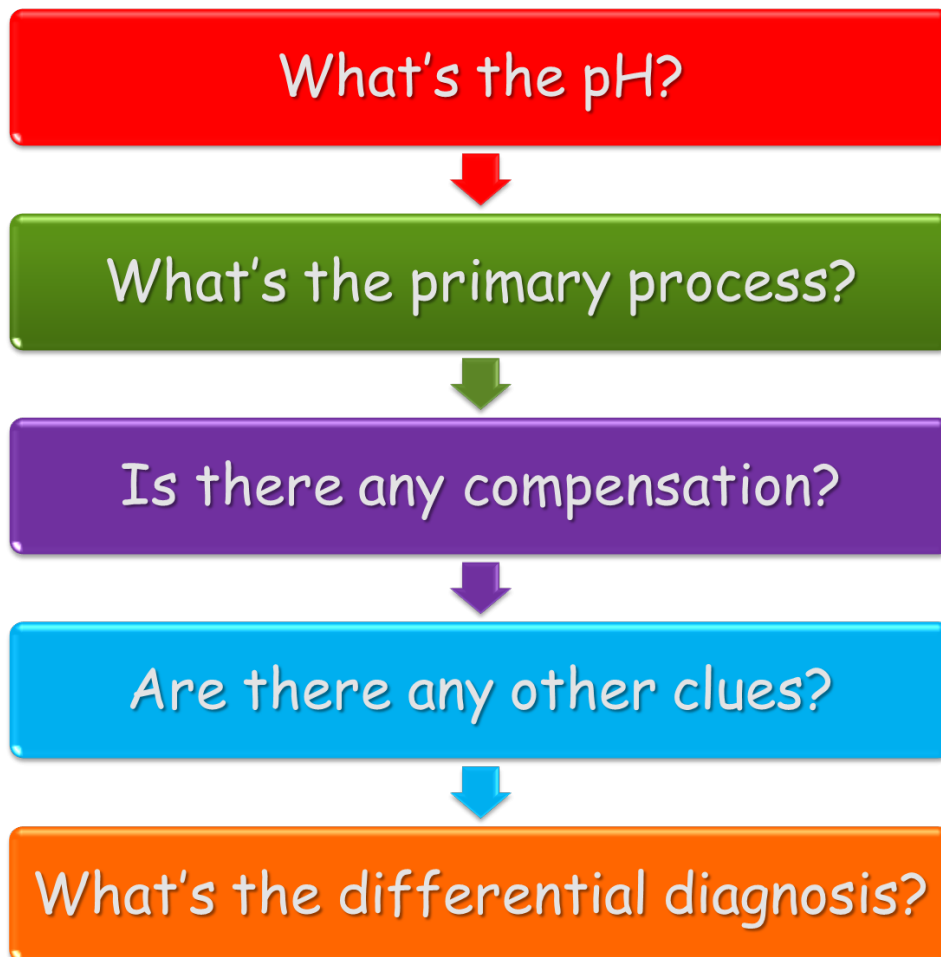


Blood Gas #11

History: A 35-year-old woman presents with acute dyspnoea. She has been taking an over-the-counter analgesic for a sore throat. Below is her venous blood gas on arrival:

pH 7.17	Na 136 mmol/L
pCO ₂ 20 mmHg	K 1.7 mmol/L
HCO ₃ 7 mmol/L	Cl 114 mmol/L
Lactate 1.1 mmol/L	Glucose 6.2 mmol/L

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What's the pH?

7.17 = severe acidaemia

What's the primary process?

HC03 7 = primary metabolic acidosis

Is there any compensation?

Expected pC02 = $1.5 \times \text{HC03} + 8 \pm 2$

= $1.5 \times 7 + 8 \pm 2$

= 16.5 – 20.5

Measured pC02 is 20, therefore there is maximal respiratory compensation.

Are there any other clues?

$$\text{Anion gap} = \text{Na} - (\text{Cl} + \text{HCO}_3)$$

$$= 136 - (114 + 7)$$

$$= 15$$

Therefore there is a normal anion gap.

Electrolyte clues:

Potassium is severely low. Chloride is elevated. Sodium, lactate and glucose are within the normal range.

What's the differential diagnosis?

Description: This venous blood gas reveals a severe, non-anion gap metabolic acidosis with maximal respiratory compensation. There is profound hypokalaemia and moderate hyperchloraemia. Sodium, lactate and glucose are all within normal limits.

Interpretation: In this clinical setting, this venous blood gas would be consistent with a [renal tubular acidosis](#) with hypokalaemia and hyperchloraemia. Such a picture could be seen with misuse of ibuprofen, or solvent abuse (toluene). Autoimmune conditions causing renal tubular acidosis such as [Sjögren's syndrome](#), renal abnormalities and hypercalciuric conditions should also be considered. Diarrhoea and adrenal insufficiency are possible differentials. Management is with potassium replacement +/- bicarbonate replacement and removal or control of the underlying cause.

Additional information: History of polysubstance misuse and chronic diarrhoea. The NAGMA resolved over 24 hours with potassium and bicarbonate replacement.