



ABG #1

WAMSS SGR 2022



Trigger

A priority 1 call has come in to ED. A young woman has been found unconscious at home and is currently en route to ED via ambulance. The registrar is organising his team for the resuscitation and as everyone else will be wearing PPE, you, the resident, have been asked to run the ABG.

Task: Interpret the results, provide a working diagnosis and list other investigations/things you would like to do.



Blood gas values

↓ pH	7.30		[7.350 - 7.450]
↓ pCO ₂	31	mmHg	[35 - 45]
pO ₂	85	mmHg	[80 - 100]
↓ cHCO ₃ ⁻ (P) _c	13	mmol/L	[22.0 - 26.0]
↓ cBase(B) _c	-4	mmol/L	[-2.0 - 2.0]



sO ₂	98.6	%	
FO ₂ Hb	96.2	%	
FCOHb	1.7	%	
FMetHb	0.7	%	
FHHb	1.4	%	

Electrolyte values

cNa ⁺	138	mmol/L	[135 - 145]
cK ⁺	3.8	mmol/L	[3.5 - 4.5]
cCl ⁻	99	mmol/L	[98 - 107]
cCa ²⁺	1.13	mmol/L	[1.12 - 1.32]

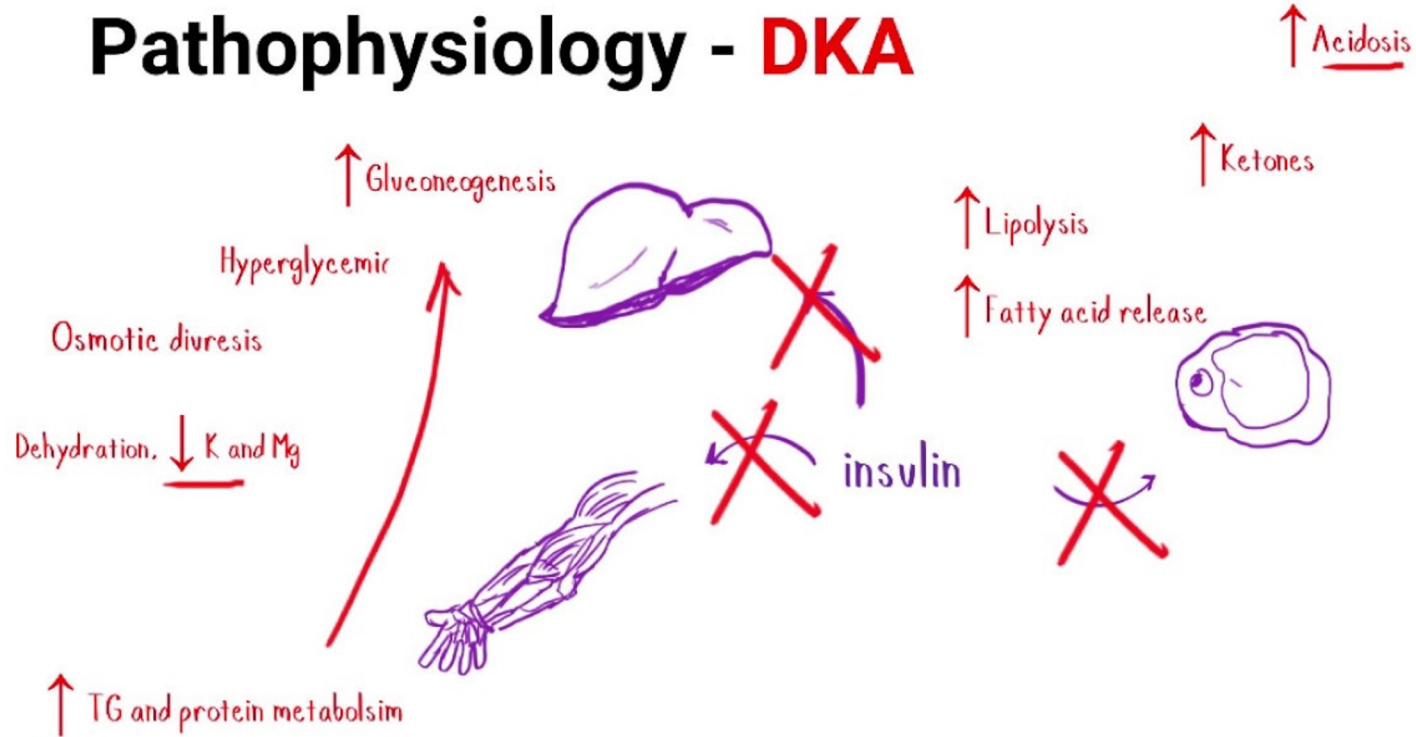
Metabolite values

↑ cGlu	25	mmol/L	[3.9 - 8.0]
cLac	1.3	mmol/L	[0.4 - 2.2]



Results	Low pH with $\text{HCO}_3 < 15$ mmol/L, low CO_2 and high anion gap: $138 - 13 - 99 = 26$. This indicates high anion gap metabolic acidosis (HAGMA) with partial respiratory compensation. Glucose is elevated at 25 mmol/L
Working diagnosis	My working diagnosis is diabetic ketoacidosis. Diagnostic criteria: <ul style="list-style-type: none">• pH < 7.3• Ketosis: ketonuria or ketonaemia• $\text{HCO}_3 < 15$ due to high anion gap metabolic acidosis• Hyperglycaemia
Further investigations and workup	Confirm ketone levels: finger prick + urinalysis Routine bloods: FBC, UEC Ix to rule out other causes: B-hCG, ECG, CXR

Pathophysiology - **DKA**





Follow-up Questions

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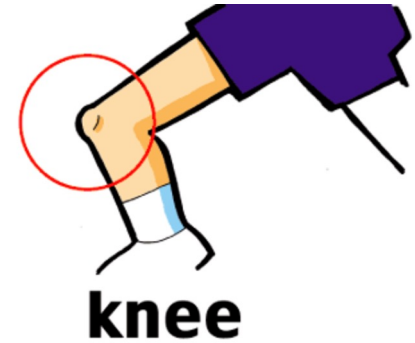


1. What are common causes of high and normal anion gap metabolic acidosis (HAGMA/NAGMA)?
2. Explain your immediate and continued management of the patient.
3. List 4 potential triggers for DKA in this patient.

Question 1: HAGMA

- **L**actate: sepsis, anaerobic metabolism
- **T**oxins: methanol, ethylene glycol, salicylates, isoniazid, iron
- **K**etones elevated: DKA, alcoholic ketoacidosis, starvation (rare)
- **R**enal: uraemia/renal failure

- **L**eft **T**otal **K**nee **R**eplacement



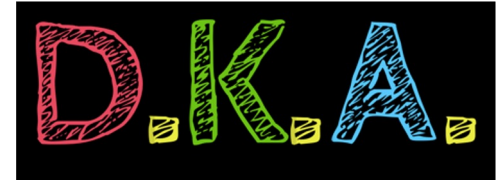
Question 1: NAGMA

- Addison's disease
- **B**icarbonate loss: vomiting, diarrhoea, renal tubular acidosis
- **C**hloride excess: excess saline
- **D**iuretics: acetazolamide



Question 2

Initial management: resuscitation



- ABCDE
 - A: GCS < 8 → intubate
 - B: O₂ if SpO₂ < 94%
 - C: IV access → fluid boluses (20mL/kg bolus of normal saline/Hartmann's)
 - D: Check disability (GCS or AVPU), drug chart/patient records, (?Hx of T1DM)
 - E: Check for DVT, skin changes e.g. mottled skin
- Urinary catheter
- Investigations:
 - Confirm ketone levels: finger prick + urinalysis
 - Routine bloods: FBC, UEC
 - Ix to rule out other causes: B-hCG, ECG, CXR
- Confirm diagnosis:
 - DKA

Question 2 cont.

Continued management:

- Consider **electrolyte** abnormalities: **K⁺ deficiency**
- **Start insulin** infusion (avoid bolus) **0.1u/kg/hr** → aim to lower glucose by **1-2mmol/L/hr**
- Fluid resuscitation with balanced salt solution
- Once glucose **< 15mmol/L** -> provide dextrose (5%) **100mL/hr**

Treat underlying cause



Question 3

- Infection
- Non-compliance with medication or failure to increase insulin dose with illness/exercise etc.
- Ischaemia (ACS, CVA, PVD, mesenteric ischaemia)
- Pregnancy





Thank you!

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