

Fexnet Endocrine

Question 1:

A 13 year old female presents to your tertiary Emergency Department with abdominal pain, nausea and extreme lethargy. She is in the resuscitation bay with full cardiorespiratory monitoring.

A venous blood gas has been sent:

pH	6.93
pCO ₂	9 mmHg
pO ₂	44.9 mmHg
HCO ₃	2 mmol/L
BE	-25.5 mmol/L
Na	124 mmol/L
K	6.2 mmol/L
Cl	79 mmol/L
Hb	162 g/L
Glc	43.5 mmol/L
Ketones	6

Question 1 (4 marks)

Analyse and interpret the VBG.

Question 2 (3 Marks)

Excluding infection state three (3) other potential precipitants for this diagnosis.

Her vital signs are below:

GCS	14/15 (E3, V5, M6)
HR	145 bpm
RR	38 /min
BP	100/80 mmHg
Temp	38.5 °C

Question 3 (7 marks)

State your management priorities for this patient.

Additional Considerations: (For reference only)

- If the patient drops GCS to 6: state differential diagnosis and immediate management.
- Describe fluid deficit calculation in a mild/moderate/severely dehydrated child, or complete a table for different levels of dehydration signs.
- List supportive care features in paediatric DKA (e.g., head up, NBM, catheterisation).

Question 2:

A 32-year-old female has been brought to your tertiary ED with a 2-day history of increased drowsiness, confusion, and hypothermia at 33 °C. Her mother reports she has not taken any of her medications for the last month.

Medications: Sodium Valproate 500mg BD, Thyroxine 100mcg OD, Methadone 100mg OD.

GCS	14
Temp	33 °C
HR	66 bpm
BP	92/62 mmHg
RR	16 /min
Sats	95% on 1L NP

Her VBG is below. You suspect a myxoedema coma.

pH	7.387
PO2	15.3 mmHg
PCO2	35.8 mmHg
HCO3	21.1 mmol/L
Hb	129 g/L
Cr	73 µmol/L
Na	130 mmol/L
K	4.0 mmol/L
Cl	105 mmol/L
iCa	0.66 mmol/l

Question 1: (Total: 4.0 marks)

Excluding infection, state three (3) other potential precipitants for this diagnosis.

- 1.
- 2.
- 3.

Question 2: (Total: 2.0 marks)

Her Thyroid function tests are below;

TSH 25.0 Miu/L (H) Thyroxine free <3pmol/L (L) Triiodothyronine Free <1.5pmol/L

Apart from medication non-compliance, list 4 possible triggers for this presentation

- 1.
- 2.
- 3.
- 4.

Question 3: (Total: 5.0 marks)

No other trigger or cause for the patient's presentation has been found and you are confident it is due to omitted medication causing a myxoedema coma. Outline your treatment of this patient in the ED

Question 3:

A 48 year old woman with a history of thyrotoxicosis presents with fever and confusion. You are concerned she may have thyroid storm.

Question 1 (3 Marks)

What are 3 diagnostic criteria for thyroid storm?

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Question 2 (3 marks)

What factors may have precipitated this episode? Give 6 examples

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Question 4 (4 marks)

Describe 4 specific treatments for thyroid storm and their mechanism of action

i.	
ii.	
iii.	
iv.	

For Reference:

DDX for thyroid storm - Different diagnosis for altered febrile patient - thyroid storm, toxic - sympathomimetic, neuroleptic malignant syndrome, sepsis, environmental, thalamic stroke

Answers: Q1 – Mine

$AG = Na - (Cl + HCO_3) = 124 - 81 = 43$

$\Delta \text{ratio} = \frac{\text{change AG}}{\text{Change } HCO_3} = \frac{43 - 12}{24 - 2} = \frac{31}{22} = 1.5$ pure HAGMA

$K_{cor} = 0.1 \text{ pH change} = 0.5 \text{ k change} = K = 3.7$

lifethreatening high anion gap metabolic acidosis with maximally compensated respiratory system.

severely elevated glucose and elevated ketones

consistent with lifethreatening DKA

non-compliance with insulin or new diagnosis

trauma

pregnancy (can occur at 13)

10ml/kg NaCl 0.9% bolus given evidence of shock

then 10ml/kg over 1 hour NaCl 0.9%

provide broad spectrum antibiotics cefuroxime 1.5g IV + Gentamicin 5mg/kg

after 1 hour of rehydration therapy initiate insulin infusion at rate of 0.1 u/kg/hr

once $K^+ < 5.5$ initiate potassium replacement at 20mmol/hr

Q1H blood gas checks aim to reduce BSL no faster than 3mmol/L/hr

referral to ICU for ongoing care