Illawarra Shoalhaven Local Health District

Emergency Medicine Fellowship Program

Topic-Based Quiz: Qs and As

MEDICINE 2

Candidate Instructions

- Duration = 30min
- Props are included within the examination booklets
- Allocated marks for each question are shown
- Each mark is of equal weight
- There is no negative marking
- Write answers CLEARLY, and cross out any errors
- Answer within space provided
- Do not begin until instructed
- You may take examination book home with you

Good Luck!

Acknowledgement: Thank you to the trainees who have written these SAQs with the hope of making their colleagues sweat, but ultimately gain more exposure to exam practice. Good job.

Topic-Based SAQ Quiz: Medicine 2

Question 1

A 54 year old man is brought in by ambulance with bright red bleeding per rectum. He has a history of diverticulosis.

Name 4 causes of bright red PR bleeding (4 marks)

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List 4 features would make you concerned about massive rectal bleeding? (4 marks)

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List 4 parameters included in the Glasgow-Blatchford score (4 marks)

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Using the Glasgow-Blatchford Score, which patients can be considered 'low risk' and what does this mean?

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Question 2

You are the ED consultant working in a Regional Emergency Department. A 28 year old male solider has been brought in by ambulance following a prolonged training exercise in 35 degree heat. His vital signs are as follows:

HR 144
BP 88/67
Temp 41.7
Sats 97% RA
RR 22
GCS 12 (E3V4M5) - Combative, confused
BSL 7.3

What is your differential diagnosis for this patient's presentation?
(3 marks)

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Your resident has sent bloods which are as follows.

Hb	182	(115-165)
WCC	18.3	(11.0-17.0 X 10^9)
PLT	67	(150-400 X 10^9)
Na^+	147	(135-145)
K^+	5.8	(3.6-5.1)
Urea	23.5	(3.0-8.5)
Cr	330	(45-90)
CK	46,000	(45-200)
Total Ca^{2+}	1.80	(2.10-2.60)
Mg^{2+}	0.84	(0.70-1.10)
PO^{4+}	2.50	(0.75-1.80)

Topic-Based SAQ Quiz: Medicine 2

Outline 6 abnormalities and give an explanation for each
(6 marks)

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Outline 3 additional relevant investigations that need to be ordered and justify each (3 marks)

TEST	REASONING

Outline your 3 main management priorities for this patient's rhabdomyolysis (3 marks)

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Question 3

A 62-year-old male with a history of chronic pancreatitis presents to the Emergency Department with several days of nausea and vomiting. His VBG is attached:

FiO2 0.4
PH 7.62
PCO2 62
PO2 133
Bicarbonate 65
Base excess > 30
Sodium 149
Potassium 3.3
Chloride 53 (95-110)
Calcium ionised 0.74 mmol/L (1.12-1.32)
Lactate 2.7
Urea 44.7 mmol
Cr 431 micro mol

Outline your interpretation of the acid base status and any other significant abnormalities (4 marks)

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Based on history and the blood gas result provide an overall summary of clinical condition. (1 mark)

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What is the key finding of importance on this patient's ECG? (1 mark)

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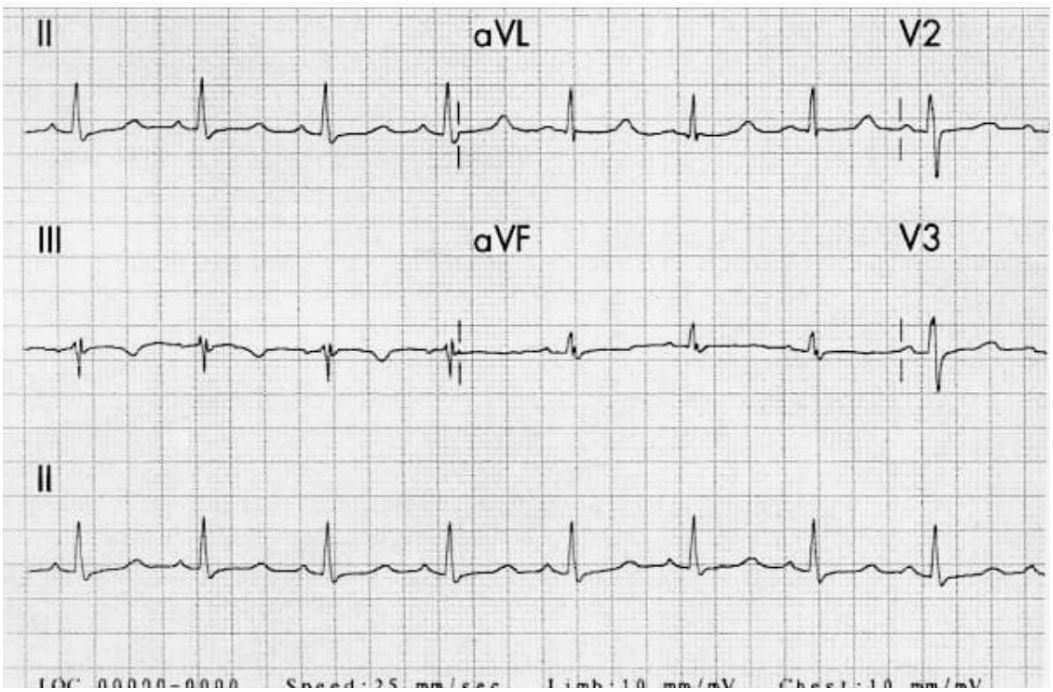
Topic-Based SAQ Quiz: Medicine 2



Describe the clinical features of severe hypocalcaemia. (3 marks)

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Describe the clinical features of severe hypocalcaemia. (3 marks)

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Outline your management of symptomatic hypocalcaemia. (2 marks)

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Question 4

A 2 week old male child is rushed to your emergency room by his concerned parents. The child is floppy and listless. He is taken to the resuscitation bay and where his nursing staff are rapidly getting preliminary observations.
His parents note he was born at term after an uneventful pregnancy, he was immunised and has been becoming more listless since discharge 10 days ago.

His observations are as follows:

HR	220/min
CRT	5 seconds
RR	33/min
Disability	Responds to pain
Temperature	36.5

IV access is obtained and a venous gas collected:

pH	7.07
pCO2	55mmHg
pO2	90mmHg
HCO3	17
BE	-7
Na	120
K	7.2
Cl	90
Urea	3.1
Creatinine	62
Lactate	6.26
Glucose	1.6mmol/L

What is the most likely diagnosis (1mark)?

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Outline your management of 3 critical issues you have identified in your initial assessment (6 marks)

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Topic-Based SAQ Quiz: Medicine 2

What is the preferred corticosteroid, its dose and frequency of administration in this child (1 mark)?

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Adrenal insufficiency can be primary, due to a failure of secretion of the adrenal cortex, or secondary to hypothalamic or pituitary dysfunction. Excluding idiopathic and congenital causes, what other patient groups are at risk of adrenal crisis (4 marks)?

Primary:

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Secondary:

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Question 5

A 58yo man presents to the emergency department with nausea, vomiting, pruritis, back pain and reduced urine output over the last 2 days. He is currently being investigated for a retroperitoneal mass. His VBG shows a creatinine of 634.

What are the main causes of AKI? Include 2 examples of each (3 marks)

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Complete the table regarding the RIFLE Classification of Acute Renal Failure? (10 marks)

Stage	Serum creatinine (SCr) concentration	Urine output

Outline 3 investigations you would perform in the ED for this patient. Justify each (3 marks)

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Topic-Based SAQ Quiz: Medicine 2

List 5 indications for Continuous Renal Replacement Therapy (5 marks)

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Topic-Based SAQ Quiz: Medicine 2

ANSWERS

Question 1

Name 4 causes of bright red PR bleeding (4 marks)

- Diverticular bleed
- Malignancy
- Haemorrhoids
- Massive Upper gastrointestinal bleeding
- Anal fistula, anal fissures
- Aortoenteric fistula
- Meckels diverticulum
- Infective colitis
- Angiodysplasia

List 4 features would make you concerned about massive rectal bleeding? (4 marks)

- SBP <90
- HR>100
- UO<0.5ml/kg/hr
- Lactate >2.5
- Hb <8g/dl r Hct <18% or acute drop >6%
- Symptomatic anaemia
- Significant postural drop

List 4 parameters included in the Glasgow-Blatchford score (4 marks)

Glasgow-Blatchford Score

Admission risk marker	Score component value
Blood Urea	
≥6·5 <8·0 (18-22.4mg/dL)	2
≥8·0 <10·0 (22.4-28mg/dL)	3
≥10·0 <25·0 (28-70mg/dL)	4
≥25 (≥70mg/dL)	6
Hemoglobin (g/L) for men	
≥12.0 <13.0	1
≥10.0 <12.0	3
<10.0	6
Hemoglobin (g/L) for women	
≥10.0 <12.0	1
<10.0	6
Systolic blood pressure (mm Hg)	
100–109	1
90–99	2
<90	3
Other markers	
Pulse ≥100 (per min)	1
Presentation with melaena	1
Presentation with syncope	2
Hepatic disease	2
Cardiac failure	2

Topic-Based SAQ Quiz: Medicine 2

Using the Glasgow-Blatchford Score, which patients can be considered 'low risk' and what does this mean?

0-1

No need for intervention / no increased mortality

Question 2

What is your differential diagnosis for this patient's presentation?
(3 marks)

Environmental - Heat Stroke / Heat Exhaustion
Infective - CNS infection, Sepsis
Trauma - Head Injury
Neurological - Seizure, SOL, SAH
Metabolic - Dehydration, Hypoglycaemia, Thyroid Storm
Drugs - Amphetamines, Anticholinergic syndrome, Neuroleptic Malignant Syndrome

Your resident has sent bloods which are as follows. Outline 6 abnormalities and give an explanation for each (6 marks)

Hb	182	(115-165)
WCC	18.3	(11.0-17.0 X 10^9)
PLT	67	(150-400 X 10^9)
Na^+	147	(135-145)
K^+	5.8	(3.6-5.1)
Urea	23.5	(3.0-8.5)
Cr	330	(45-90)
CK	46,000	(45-200)
Total Ca^{2+}	1.80	(2.10-2.60)
Mg^{2+}	0.84	(0.70-1.10)
PO^{4+}	2.50	(0.75-1.80)

Hb 180 - Haemoconcentration, secondary to dehydration
WCC 18.3 - Infective process, possible stress response
PLT 67 - Severe thrombocytopenia, possible DIC
Cr 330 - Acute Renal Failure with elevated Urea - Severe Dehydration
CK 46,000 - Rhabdomyolysis
Hyperphosphataemia and Hypocalcaemia indicative of Rhabdo

Overall suggestive of Acute renal failure and Rhabdomyolysis secondary to severe dehydration and head stroke - Medical emergency

Outline 3 additional relevant investigations that need to be ordered and justify each (3 marks)

TEST	REASONING
ECG	Assess for ECG changes given Hyperkalaemia and Hypocalcaemia

Coag Profile / fibrinogen	Assess for DIC given low platelets
ABG / VBG	Assess acid base status including evidence of metabolic acidosis (Lactate and Bicarbonate)

Outline your 3 main management priorities for this patient's rhabdomyolysis (3 marks)

- Mx Hyperkalaemia: CaCl if ECG changes / otherwise insulin-dextrose, salbutamol, NaHCO3 if acidotic
- Aggressive IV fluid rehydration with isotonic crystalloid. Bolus until end organ perfusion restored and Urine output 1-2mL/kg/hr
- Given established AKI: Consider CRRT / logistically difficult in ALOC may need I&V

No marks for:

- Urinary Alkalinisation - consider HCO3 (150mL of 8.4%) to achieve urine pH >6.5 (contraindicated in severe hypocalaceamia)
- Avoid / withhold nephrotoxic agents

Question 3

Outline your interpretation of the acid base status and any other significant abnormalities (4 marks)

Metabolic alkalosis
Expected CO2: 0.7x HCO3+ 21 =66.5
Hypochloremia
= > compensated hypochloremic metabolic alkalosis
Normal sodium
Expected K: 5-(2x0.5**): 4 =>** hypokalaemia
Marked hypocalceamia
Mildly elevated lactate
High Cr
U/C: 44.7/0.431 -> 100 prerenal

Based on history and the blood gas result provide an overall summary of clinical condition. (1 mark)

Moderate hyperchloremic metabolic alkalosis secondary to several days of vomiting
Marked hypocalcaemia secondary to chronic pancreatitis

What is the key finding of importance on this patient's ECG? (1 mark)

Prolonged QT interval

Topic-Based SAQ Quiz: Medicine 2

Describe the clinical features of severe hypocalcaemia. (3 marks)

Peripheral Neuro: Tetany / Trousseau's sign / Chvostek's sign / Hyper-reflexia
Cardiovascular: Arrythmia (prolonged QT)-> pVT
Central Neuro: Seizure / ALOC
Other: Laryngospasm

Outline your management of symptomatic hypocalcaemia. (2 marks)

- Oral calcium: Effervescent 4 tabs = 2g
- IV calcium
  - Gluconate peripherally: 30mL 10% calcium gluconate= 3g
  - Chloride (ideally central): 10mL 10% CaCl ~3g
- In this patient also consider:
  - MgSO4 20 mmol in 250 mL 0.9% NaCl over 2hrs
  - Antiemetic escalation (be careful prolonged QTc): Metoclopramide / Ondansetron /NG tube
  - IV Rehydration – balanced solution ideal

Question 4

What is the most likely diagnosis (1mark)?

Adrenal crisis, likely due to CAH, precipitating hypovolemic shock with critical hyperkalemia and hypoglycaemia

(Adrenal crisis alone unacceptable)

Detail your management of 3 critical issues you have identified in your initial assessment (6 marks)

Expectation of weight ~ 4kg at birth, need to calculate appropriate doses

Hypovolemia:
- 20ml/kg 0.9% NaCl (Hartmanns or plasmalyte equally acceptable)
- Repeat at completion if necessary / titrating to HR, CRT, level of alertness and UO

Hyperkalemia:
- 0.5 mL/kg of 10% calcium gluconate over 3-5 minutes
- 0.1 unit/kg/hr of insulin + 5 mL/kg/hr of 10% dextrose infusion

Hypoglycemia:
- Neonate/infant: 2mL/kg of 10% dextrose IV bolus + repeat until BSL > 4
  (5mL/kg 10% also acceptable initial dose)

What is the preferred corticosteroid, its dose and frequency of administration in this child? (1 mark)

25 mg IV stat., then 10–25 mg 6-hourly
(initial dose hydrocortisone = 5mg/kg, has both mineralocorticoid and glucocorticoid effects)

(note: dexamethasone has NO mineralocorticoid effect)

Excluding idiopathic and congenital causes, what other patient groups are at risk of adrenal crisis? (4 marks)

Primary:
Addisons disease, adrenal infarction secondary to sepsis/haemorrhage, trauma, tumour, post surgical

Secondary:
CNS tumour or trauma, exogenous steroid therapy

Question 5

What are the main causes of AKI? Include 2 examples of each (3 marks)

- Prerenal: hypovolaemia, renal artery stenosis, heart failure, sepsis
- Renal: renal vein thrombosis, vasculitis, drugs (NSAIDs, ACEI, ARBs)
- Post renal: retroperitoneal neoplasm, renal calculus, urinary retention

  Any 2 correct from each group

Complete the table regarding the RIFLE Classification of Acute Renal Failure? (10 marks)

Stage	Serum creatinine (SCr) concentration	Urine output
RISK	Increase of 1.5 times the baseline	<0.5 mL/kg/h for 6 h
INJURY	Increase of 2.0 times the baseline	<0.5 mL/kg/h for 12 h
FAILURE	Increase of 3.0 times the baseline or SCr is 355 µmol/L or more when there has been an acute rise of greater than 44 µmol/L for 24 h or anuria for 12 h	<0.3 mL/kg/h
LOSS	Persistent acute renal failure; complete loss of kidney function for longer than 4 weeks	
END-STAGE RENAL DISEASE	End-stage renal disease for longer than 3 months	

Outline 3 investigations you would perform in the ED for this patient. Justify each (3 marks)

- CT Abdo (abdominal mass, hydronephrosis)
  - Better than US as known mass
- VBG (metabolic acidosis, hyperkalaemia)
- ECG (hyperkalaemia)
- Urinalysis (infection / haematuria / proteinuria)
- Others may be reasonable

Topic-Based SAQ Quiz: Medicine 2

List 5 indications for Continuous Renal Replacement Therapy (5 marks)

- K>6.5 or rapidly rising
- Na <100 or >160
- Pulmonary oedema unresponsive to diuretics
- Severe uncompensated metabolic acidosis with pH<7.1
- Uraemic Syndrome
- Overdose with dialysable toxin
- Urea >35
- Cre >400