

**METABOLIC/ ENDOCRINE/ HAEMATOLOGY/ ONCOLOGY**

**Short Answer Questions**

**Book 1**

Examination Time: 60 Minutes

(no reading time)

Q1.

A 38 year old female school teacher presents by ambulance after a conscious collapse at work. She had been unwell at work that day.

HR 160 -190 AF, BP 190/110, T 39.5, RR 30. SpO2 92% on RA

She is confused, tremulous and anxious. GCS 14. BSL 11.6.

There is mild pitting oedema.

No medication history is available.

a. List 6 differential diagnoses? (6 marks)

The husband arrives and reports a recent history of a neck lump which is due to be investigated. Closer examination reveals a diffuse multinodular goitre.

b. What are 5 underlying conditions that can cause thyrotoxicosis? (5marks)

c. What are 5 immediate treatment priorities? (10 marks)

Q2. A 70 year old man presents via ambulance unwell after 3 days of abdominal pain, vomiting and diarrhoea. He has a past medical history of polymyalgia rheumatic and hypertension.

HR 110

BP 80/-

GCS 11 (E2,V4,M5)

T 34.5 with cool peripheries

BSL 2.9

a. What is the most important diagnosis?

b. What are three differential diagnoses to be considered?

c. What are 4 treatment priorities?

Q3.

A 70 year old man is brought in by ambulance with new onset confusion. He lives alone, and last been seen by his daughter 5 days earlier. Neither the patient nor his daughter know his past medical history or current medications. He weighs 60kg.

Initial observations with the ambulance were:

HR 110 BP 120/80 RR 28 SpO2 98% RA Temp 38.2

a. List 5 categories of differential diagnoses that should be considered in this patient, including an example of each. (5 marks)

Your intern has inserted a cannula and taken a venous blood gas which is included below:

pH 7.3

pCO2 36

pO2 76

HCO3 17

Hb 152

Na 160

K+ 3.9

Cl 122

Creatinine 140

Glucose 72

Fingerprick ketones 0.4

b. Interpret the blood gas, including relevant calculations and give a diagnosis (10 marks)

c. Outline your management plan for this patient (5 marks)

Q4.

A 5 year old boy is brought in by his father with fever, headache and rash. The headache started an hour ago and dad then noticed a petechial rash on his left upper limb. The father is concerned with these symptoms due to the recent media attention on a meningococcal outbreak.

a. What infective agents could cause fever and petechiae, other than Neisseria meningitidis? (3 marks)

b. What non-infective diagnoses could explain these symptoms ? (3 marks)

On further questioning, the boy has been well and the headache has now resolved after being given paracetamol. Examination is unremarkable apart from petechiae localised to the left upper arm. There is no mechanical reason evident for his petechiae.

c. List which investigations you would order explaining your reasoning for each. (3 marks)

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| --- | --- |
| INVESTIGATION | JUSTIFICATION |
|  |  |
|  |  |
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He is now lethargic with an altered conscious state, and has a spreading rash.

d. What medications, including doses, would you administer to this child? (3 marks)

The child’s investigations are positive for Neisseria Meningitides. Which contacts require chemoprophylaxis for Neisseria Meningitidies? (2 marks)

e.

Q5.

## A 67 year old male on warfarin for AF presents to ED. His INR is measured at greater than 9 by the lab monitoring his warfarin use. He has multiple bruises on his body and a mild headache, but is otherwise well.

a. List 5 co-ingested drugs that could be responsible for this over anticoagulation? (5 marks)

b. Name two other factors that may have led to this state. (2 marks)

c. Regarding warfarin reversal, list 4 treatment options and 1 pro and con for each. (8 marks)

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| TREATMENT | PRO | CON |
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Q6.

A 65 year old man is brought in by family with concerns that he has become progressively confused over the past 48hrs. He has a history of squamous cell lung cancer with metastatic disease to his right humeral head, left iliac crest and thoracic spine. He started to deteriorate a week ago with refusing to eat, occasional vomits, and being unable to open his bowels in this time.

T 36.0

P 52 SR

BP 130/80

RR22

Sats 96%

GCS 14 (E4M6V4), MMSE 12

a. List 5 common causes of delirium in this setting. (5 marks)

His ECG is shown on page 1 of the props booklet.



b. What is the major abnormality on the ECG and what is the most likely diagnosis for this patient? (2 marks)

His VBG shows an ionised Ca2+ of 2.9.

c. What are the two main factors that influence how ionised Ca2+ relates to corrected Ca2+? (2 marks)

d. How would you manage this patient? (6 marks)

Q7.

A 58yo woman on chemotherapy for breast cancer presents to your department feeling generally unwell.

Her vital signs are:

HR 105

BP 110/65

RR 28

Sats 92% 6L oxygen

T 38.6

Her ABG is shown below.

FiO2 0.4

pH 7.28

pO2 68

pCO2 40

HCO3 18

BE -6

Na 141

K 4.6

Cl 106

a. Describe and interpret the results. (10 marks)

b. List further investigations you would consider. (4 marks)

Q8.

A 26yo man presents with dyspnoea and weakness. His parents mention that he has a history of kidney problems and that he has not been compliant with his medication.

His arterial blood gas on arrival is shown below.

FiO2 0.21

pH 7.08

pO2 110

pCO2 19

HCO3 7

BE -16

O2Sats 100%

Na 136

K 1.8

Cl 124

Urea 4.7

Creat 42

a. Describe and interpret the results. (10 marks)

A1.

a. What are 6 differential diagnoses?

Cerebral- encephalitis, meningitis

Endocrine- thyroid storm, phaeochromocytoma, dka

Environmental- Heat stroke

Toxicological- Sympathomimetic overdose, Anticholinergic syndrome, Serotonin syndrome, neuroleptic malignant syndrome

CVS- Myocardial ischaemia with congestive cardiac failure

Infective- sepsis

b. What underlying conditions?

Graves disease

Toxic multinodular goitre

Toxic adenoma

Thyroiditis

Drug induced (amiodarone)

c. What are the immediate treatment priorities

a

b

c

Lower heart rate with Propranolol 0.5mg IV q5min (max 10mg) OR Esmolol 250-500mcg/kg IV bolus then 50-100mcg/kg/min

Block further T3 T4 release with Polythiouracil 900-1200mg PO/NG stat then 200mg q4hrly

Then Lugol’s iodine 1hr later

Hydrocortisone 100mg IV q6hrly

d

Aggressive passive + active cooling

e

Seek and treat electrolyte abnormalities

A2.

a. Addisonian crisis

b.

Infective- Sepsis, distributive shock secondary to intra-abdominal sepsis

Endocrine- Myxoedema coma

CVS- Decompensated cardiac failure

c.

a

b

c

NS 10-20ml/kg IV stat up to 500ml boluses titrated to end point of peripheral perfusion; 2L

Hydrocortisone 25-100mg IV stat + q6hrly depending on age

d

Seek and treat hypoglycaemia

e

Seek and treat electrolyte abnormalities eg hyperkaelaemia

Seek and treat hypothermia with passive/active warming

A3.

a. List 5 categories of differential diagnoses that should be considered in this patient, including an example of each. (5 marks)

INFECTIVE- urinary, encephalitis

TRAUMA- head injury, sdh, edh, ich

TOXICOLOGICAL- alcohol withdrawal

ENDOCRINE- dka with sepsis, thyrotoxicosis

METABOLIC- hyponatraemic, hypoglycaemia

ENVIRONMENTAL- heat stroke

b.

METABOLIC ACIDOSIS

AG= 160-122-17=21 ie HAGMA

OG= SeOsm- Na x 2- Glu – Urea – 1.25 x etoh

DG= 21-12/24-17= 9/7= 1.3 ie isolated HAGMA

Expected paC02 for HAGMA= (1.5xHC03) +8 = 32 ie measured is lower than expected therefore additional RESP ACIDOSIS

Corrected Na= Na + (Glu-5)/3 = 182 ie PROFOUND HYPERNATRAEMIC

Corrected K= 4.5

U:C ratio= ? but Creat 140 so likely pre-renal failure

Water deficit- 0.6 x 60 x (1- 140/182)= 8.2L

Profound HYPERGLYCAEMIA, minimal ketonaemia

LIKELY DIAGNOSIS HYPEROSMOTIC HYPERGLYCAEMIC SYNDROME

c.

a

b

c Manage shock with NS 0.9% 20ml/kg IV (2L) initially then ongoing boluses titrated to effect of cerebral perfusion, peripheral perfusion, sbp, UO

Ongoing fluid maintenance with Saline 0.45% over 48hrs aiming for drop in Na of <10/24hrs

Add dextrose if glucose <15

Add KCL if <4

Commence insulin infusion Actrapid 0.05units/kg/hr aiming for slow Glucose lowering of <3/hr

Target is SeOsmolality <315, K4-5, normonatraemia, normoglycaemia

Supportive care ie IDC, thromboprophylaxis

Seek and treat precipitants

Disposition

A4.

a. What infective agents could cause fever and petechiae, other than Neisseria meningitidis? (3 marks)

Viral infections eg Enterovirus, Influenza

Bacteria- Strep pneumonia, Haemophilus influenza

b. What non-infective diagnoses could explain these symptoms ? (3 marks)

Reactive- Henoch Schonlein purpura

Thrombocytopenia- Idiopathic thrombocytopenia

Malignant- Leukaemia

Mechanical

c. List which investigations you would order explaining your reasoning for each. (3 marks)

FBC + film- to exclude leukaemia, thrombocytopenia

CRP- to rule in infective cause

BC- to rule in and identify bacteraemia

d. What medications, including doses, would you administer this child? (3 marks)

<2 months Cefotaxime 50mg/kg (2g) IV q6h + Benpen 60mg/kg IV (2.4g) q6h + Aciclovir 20mg/kg IV q8h

>2mo Ceftriaxone 50mg/kg (2g) IV q12h + Aciclovir 15mg/kg IV q8h + Dexamethasone 0.15mg/kg (8mg) IV

e.

Index Case (if treated only with penicillin) and all intimate, household or daycare contacts who have been exposed to Index Case within 10 days of onset.

Any person who gave mouth-to-mouth resuscitation to the Index Case.

A5.

a.

Anything that potentiates warfarin

Allopurinol

Amiodarone

Azole antifungals

Cephalosporin antibiotics

Chloramphenicol

Cimetidine

Cotrimoxazole

Disulfiram

Isoniazid (INH)

Macrolide antibiotics

Metronidazole

Omeprazole

Penicillin antibiotics

Phenytoin

Quinolone antibiotics

Statins (particularly lovastatin and pravastatin)

Sulfonamides

Tamoxifen

b.

Accidental or intentional overdose

Alcohol ingestion

c.

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| TREATMENT | PRO | CON |
| Withhold warfarin | Less risk of becoming subtherapeutic | INR may remain high for several days or even continue to climb |
| Vitamin K 1-10mg PO/IV | Cheap; readily available | High risk of over shooting to subtherapeutic and then difficulty re-warfrinising. |
| FFP 15mls/kg IV | Cheap; rapid onset of action | Risk of transfusion reactions; risk of overload |
| PTX 50IU/kg IV | Rapid | Expensive; risk of over shooting to subtherapeutic |

A6.

a.

METABOLIC- Hypercalcaemia, hypernatraemia/dehydration

GIT- Constipation

MALIGNANT- Brain metastases

INFECTION- sepsis, encephalitis, meningitis

b.

Short QT

Hypercalcaemia

c.

pH- alkalosis = less ionized; acidosis = more ionized

Albumin- hyperalbuminaemia = less ionized; hypoalbuminaemia = more ionized

d.

a Support if aloc

b

c

NS IV resuscitation

Frusemide UO 100-150ml/hr aiming for diuresis of 100ml/hr

Consideration of Haemodialysis if renal failure or inadequate UO

Halt osteolysis- Bisphosphonates eg Pomidronate, Zolidronic acid

Consider Glucocorticoids in refractory hypercalcaemia

Seek and treat electrolyte abnormalities

Disposition- oncology/icu

A7.

A-a m= pA02-pa02 = (713 x 0.4 – 40/0.8) – 68 = 170 (RR = age/4 + 4) ie elevated there VQ MISMATCH 2 likely pneumonia, ards, pe

METABOLIC ACIDOSIS

AG = 17 ie HAGMA secondary to either lactate, ketones or mudpiles

Exp paC02 = 1.5 x 18 + 8 = 35

ADDITIONAL RESP ACIDOSIS secondary to HYPOVENTILATION

DG = approx 1 therefore HAGMA

Normonatraemia

Normokalaemia

Exp K for pH = 5.5

Euglycaemia

IMPRESSION HAGMA likely 2 lactate related sepsis/infection with additional respiratory acidosis 2 hypoventilation in the setting of possible pulmonary pathology such as ards/pneumonia/pe with VQ mismatch + hypoxaemia.

b.

B/S ecg, ketones, uhcg, wtu

B fbc, ue, lft, cmp, bc

XR CXR +/- CTPA

A8.

A-a m= 17 ie no VQ mismatch

METABOLIC ACIDOSIS

AG= 5 ie NAGMA 2 USEDCRAP ie ?RTA

DG= 7/17= 0.41 = likely also additional HAGMA 2 likely LACTATE in setting of organ failure related lactic acidosis

OG= ?

Expected paCO2= 18 ie measured = expected

Normonatraemia

Profound hypokalaemia; expected K for pH= 6.5 THEREFORE CRITICAL HYPOKALAEMIA

U:C= normal indicies

IMP

Profound metabolic acidosis with NAGMA 2 likely RTA and mild HAGMA with expected paCO2 for respiratory compensation. PROFOUND hypokalaemia.