

Illawarra Shoalhaven Local Health District Emergency Medicine Fellowship Program



Topic-Based Quiz: Qs and As

ENVIRONMENT

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

Question 1

A 32 year old woman is brought to the ED by ambulance after being found on a park bench in the middle of winter.

Observations are as follows:

T28.6

P 40 irregular

BP 76/45

SaO2 90%

Core T 28

List physiological effects of hypothermia from the following categories: (4 marks)

- Cardiovascular system
- Haematological
- Respiratory
- Renal

The patient's pulse rate decreases to 20bpm with no palpable femoral pulse. Outline your management: (2 marks)

List 4 rewarming methods including their rate of rewarming in °C/hr (4 marks)

Topic-Based SAQ Quiz: Environment

List 4 medical conditions might be cause low body temperature (2 marks)

Question 2

You are accompanying a Climbing team to the Everest Base camp on the Tibetan side of the mountain. The altitude is 5150m. A 30 year old man who has suffered Nausea, vomiting and headache over the past week has been breathless at rest over last couple of days and is only talking in short sentences. His vital signs are:

T: 37.2
HR: 110
O2sat 89%
RR 28
BP: 134/78

What is the most likely diagnosis? Outline 3 management interventions (4 marks)

What was the most likely explanation for his preceding symptoms? What would the most appropriate management have been? (3 marks)

High altitude cerebral oedema can also occur in this situation. Name 2 clinical features and 1 specific medication for this condition. (3 marks)

Question 3

You are informed of a near-drowning case that will be transported to your ED shortly. The patient is 4 years old.

Please address 4 aspects to your preparation for the arrival of this patient, give 2 examples for each (8 marks)

	i ii
	i ii
	i ii
	i ii

What scale is used to predict outcome following drowning? (1 mark)

List the 5 components of this scale (5 marks)

Topic-Based SAQ Quiz: Environment

How can this scale be used to estimate likelihood of good recovery? (2 marks)

Question 4

You are the emergency consultant in charge of a tertiary emergency department with all service capabilities. You receive a phone call from a GP from a nearby coastal town regarding a 23 year old healthy man is brought to the ED with left arm paraesthesia and unsteadiness after scuba diving with friends. He is alert and orientated with normal vital signs.

What is the most likely clinical diagnosis? (1 mark)

Explain the pathophysiology of this condition (2 marks)

List 4 diving-related questions you would ask on history (4 marks)

List 2 supportive treatment measures you would suggest during transfer of this patient? (2 marks)

What is the definitive management of this condition? (1 mark)

Topic-Based SAQ Quiz: Environment

Name 2 potentially fatal complications of scuba diving that relate to increasing depth (2 marks)

Question 5

A 19 year old apprentice electrician comes to the ED after an electrical injury.

List four factors that determine the degree of damage caused by an electrical injury (4 marks)

Outline 2 differences between the clinical effects of AC versus DC electrocution, namely at low voltage (2 marks)

Define high voltage (1 mark)

What is the voltage of domestic power in Australia? (1 mark)

List 2 investigations that should be performed in all patients with a high voltage electrocution (2 marks)

ANSWERS

Question 1

List physiological effects of hypothermia from the following categories: (4 marks)

- Cardiovascular system
- Haematological
- Respiratory
- Renal

Cardiovascular Bradycardia, widening QRS, increased PR and QT, J wave, AF High risk of VF < 28 Hypotension, decreased MAP, vasoconstriction
Haematological Increased bleeding time, PT, aPTT (labs normal as blood warmed for testing) Decreased platelet and WCC
Respiratory Decreased CO ₂ production L shift oxyhemoglobin dissociation curve Decreased PAO ₂ , and PACO ₂ Metabolic acidosis Pulmonary hypertension
Renal: Cold diuresis

The patient's pulse rate decreases to 20bpm with no palpable femoral pulse. Outline your management: (2 marks)

- 1 minutes attempting to feel carotid pulse before start CPR (unnecessary CPR may lead to VF)
- Continue rewarming the patient
 - o T < 28 :5 mins CPR alternating with 5 minutes no CPR
- Withhold adrenaline until T >30
- Withhold defibrillation

List 4 rewarming methods including their rate of rewarming in °C/hr (4 marks)

Non-invasive

- Shivering 1.5 C/h
- Warm O₂ with mask 1C/hr, ET 1.5 C/h
- Forced air blanket 1-2 C/hr

Invasive

- Warmed fluids: 0 C/hr avoid heat loss from cold fluid
- Thoracic lavage 3 c/h
- ECMO 7-10 C/hr

List 4 medical conditions might be cause low body temperature (2 marks)

Topic-Based SAQ Quiz: Environment

Hypoglycaemia
Sepsis
Addison's disease
Hypothyroidism

Question 2

What is the most likely diagnosis? Outline 3 management interventions (4 marks)

High altitude pulmonary oedema

- Oxygen
- Nifedipine 30 mg BD po
- Descend

What was the most likely explanation for his preceding symptoms? What would the most appropriate management have been? (3 marks)

Acute mountain sickness

- Acetazolamide 250 mg PO BD
- Descend
- O₂

High altitude cerebral oedema can also occur in this situation. Name 2 clinical features and 1 specific medication for this condition. (3 marks)

Clinical Features

- Ataxia (early finding)
- Altered mental status

Dexamethasone 8 mg BD PO

Question 3

You are informed of a near-drowning case that will be transported to your ED shortly. The patient is 4 years old.

Please address 4 aspects to your preparation for the arrival of this patient, give 2 examples for each (8 marks)

- Space
- Staff
- Stuff: Equipment/Drugs
- Rest of the department

PLUS 2 reasonable examples for each category

What scale is used to predict outcome following drowning? (1 mark)

Orlowski scale

Topic-Based SAQ Quiz: Environment

List the 5 components of this scale (5 marks)

Bad prognostic features

- Age <3
- Submersion >5min
- No resuscitation in first 10min
- Coma on arrival to the ED
- Metabolic acidosis, pH<7.1 on arrival

How can this scale be used to estimate likelihood of good recovery? (2 marks)

<3 present = 90% chance of good recovery

>3 present = 5% chance of good recovery

Question 4

What is the most likely clinical diagnosis? (1 mark)

- Cerebral arterial gas embolism (CAGE)

Explain the pathophysiology of this condition (2 marks)

AGE results from sudden over-inflation of the lungs resulting in alveolar rupture and passage of air into the arterial circulation (via pulmonary vein). It generally occurs after a rapid, uncontrolled ascent with breath holding after breathing gas under pressure. Divers usually ascend in the upright position so develop cerebral arterial gas embolism (CAGE). Onset is sudden and symptoms will begin within five minutes of surfacing from the dive.

List 4 diving-related questions you would ask on history (4 marks)

1. Maximum depth of the dive
2. Duration of the dive
3. Diving equipment and gas mixture used
4. Diving site and weather conditions
5. Any difficulty whilst diving notably a RAPID ASCENT
6. Use of a dive computer and warnings issued by the computer during the dive (if the diver has a dive computer and is referred to the Hyperbaric Facility, send the computer with them)
7. Episodes of returning to the surface during the dive (referred to as bounce diving)
8. Decompression stops, time and depth
9. Other dives within the last 24 hour period
10. Surface interval between dives if multiple dives within a 24 hour period
11. Type of symptoms and latency after diving
12. Exercise, alcohol or air travel pre or post dive
13. Past history of DCI
14. Past medical history and medications

Topic-Based SAQ Quiz: Environment

List 2 supportive treatment measures you would suggest during transfer of this patient? (2 marks)

15L/min via Non-rebreather mask
Head down positioning

What is the definitive management of this condition? (1 mark)

Hyperbaric therapy for recompression

Name 2 potentially fatal complications of scuba diving that relate to increasing depth (2 marks)

Nitrogen narcosis
Oxygen toxicity

Question 5

List four factors that determine the degree of damage caused by an electrical injury (4 marks)

- (i) amount of electricity that flow (current) – flow of electrons (dependent on $V=IR$)
- (ii) current path & density – through which tissues
- (iii) type of current (AC or DC) – AC @ 50 Hz is most dangerous as myocardium most sensitive here and muscle spasm prevents victim letting go.
- (iv) duration – the shorter duration the higher the current flow must be before damage is done

Outline 2 differences between the clinical effects of AC versus DC electrocution, namely at low voltage (2 marks)

AC causes tetany and patient typically grabs onto wire / at low-voltage -> VF (high voltage asystole)
DC typically throws patient off wire / at low voltage -> asystole

Define high voltage (1 mark)

High voltage > 1000 volts

What is the voltage of domestic power in Australia? (1 mark)

240V (230V in NZ)

List 2 investigations that should be performed in all patients with a high voltage electrocution (2 marks)

ECG (and then typically cardiac monitoring for 12hrs at minimum)
CK
Further Ix based on clinical findings, may include CT brain, Xrays, UEC etc