Illawarra Shoalhaven Local Health District

Emergency Medicine Fellowship Program

Topic-Based Quiz: Qs and As

CARDIOVASCULAR

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

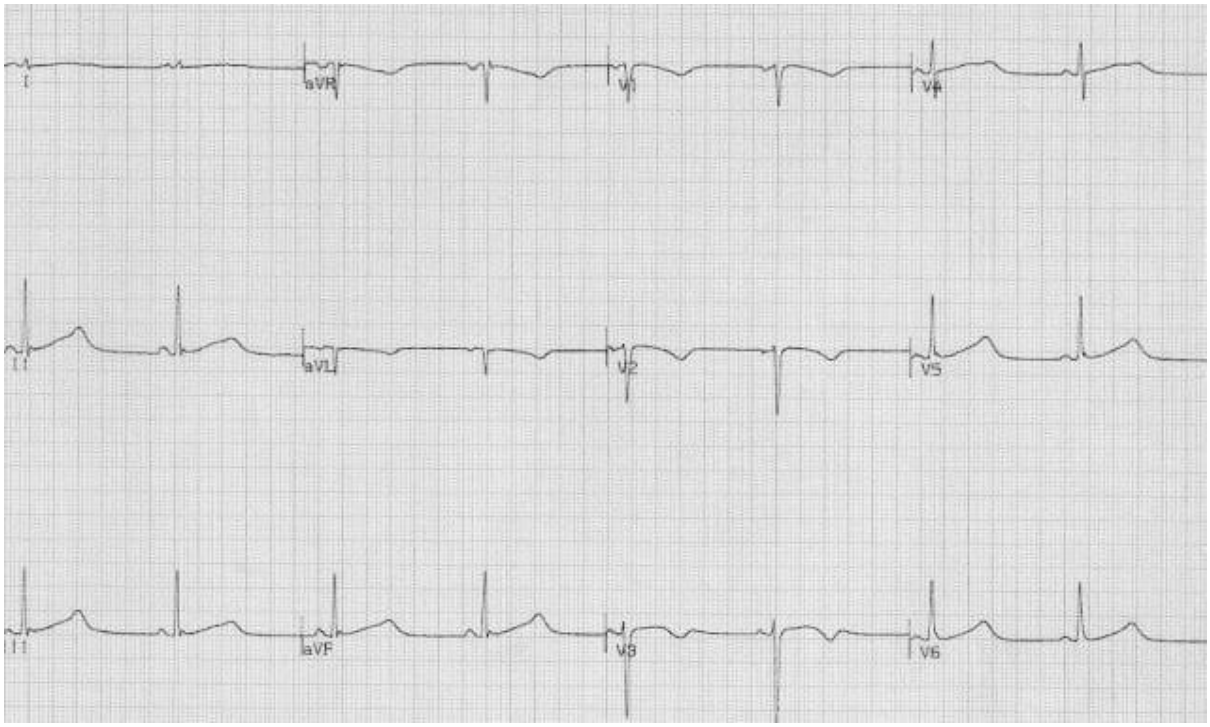
Good Luck!

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: Cardiovascular

Question 1

You are asked to review the ECG of a 14 year old girl who has been brought by her mother who has concerns regarding her body weight. She has a history of Bulimia nervosa and anxiety.



Identify the most concerning ECG change present (1 mark)

_____

What is the major risk associated with the ECG changes? (1 mark)

_____

List 4 causes from 4 different aetiological categories in any patient that can produce this ECG abnormality (4 marks)

_____

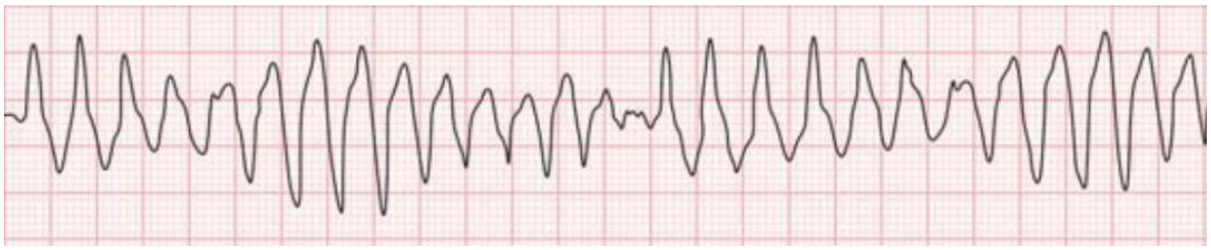
_____

_____

_____

Topic-Based SAQ Quiz: Cardiovascular

While awaiting a monitored bed in the paediatric the child becomes unresponsive and pulsesless. On attachment to the defibrillator a rhythm strip demonstrates as below;



Outline your immediate management of this child now (4 marks)

Topic-Based SAQ Quiz: Cardiovascular

Question 2

A 28 year old male presents with 4 days of central sharp chest pain. He has no other medical history. Below are his vital signs;

Temp 37.6

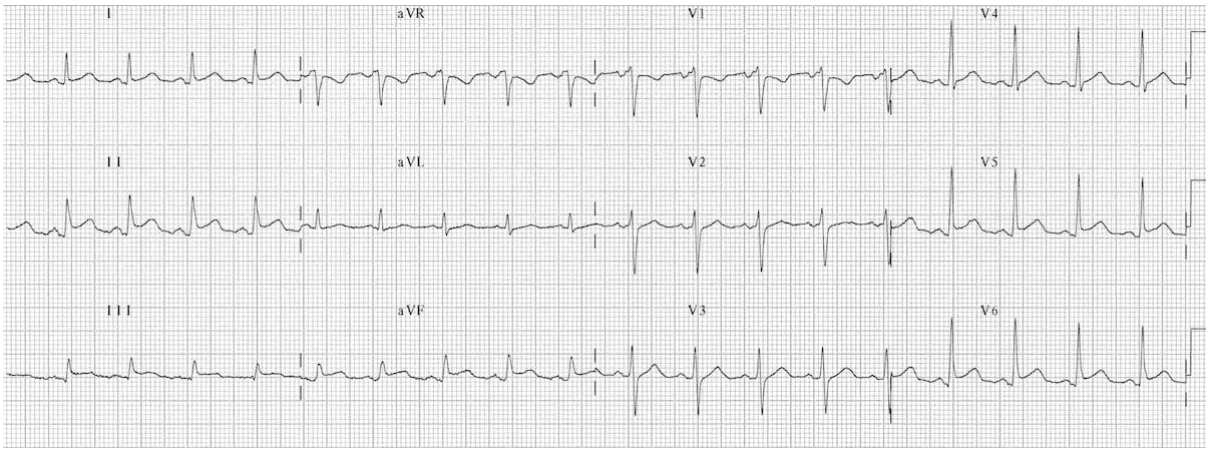
HR 104 RR 122/77

RR 16 Sats 99%ra

You suspect he has pericarditis

Apart from Pericarditis/Myocarditis list 4 Differentials for the causes of his chest pain (4 marks)

His ECG is below



Describe the features in the ECG consistent with Pericarditis (3marks)

List 3 further ED investigations you may perform in this patient (3 marks)

1

2

3

You have decided the patient is safe for discharge and have arranged appropriate follow up.

List 2 pharmacological agents with doses that can be used to treat Pericarditis.

1

2

Topic-Based SAQ Quiz: Cardiovascular

Question 3

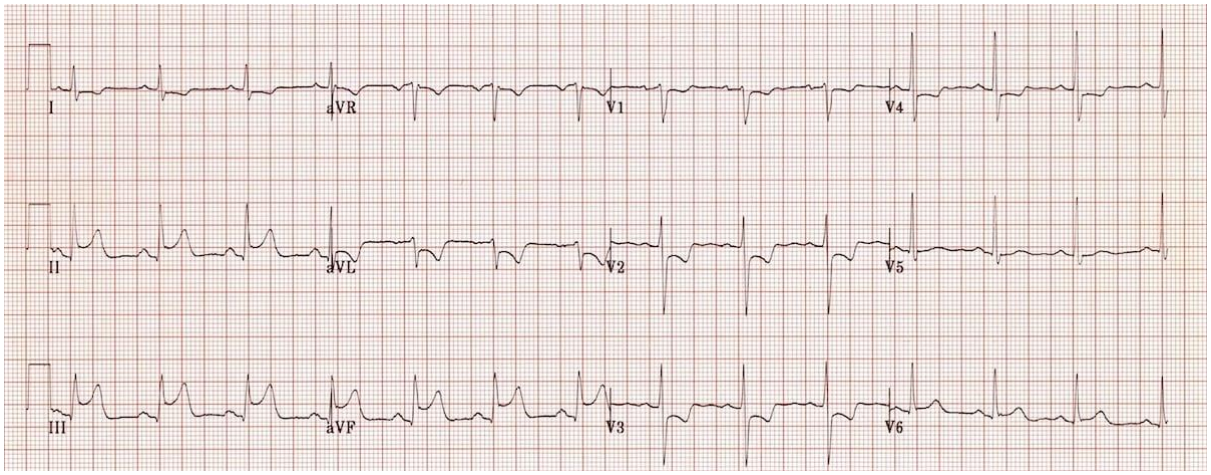
You are working in a tertiary centre ED receive a pre-arrival alert for an incoming 58 year old male who is meeting STEMI criteria. He has no other medical history and takes no medications. He has been given aspirin 300mg PO by the ambulance officers. The cath lab has been activated and will send for the patient once ready.

Observations are HR 76 RR 16 BP 118/67 Sats 99%ra

List 4 STEMI mimics and for each one their corresponding ECG changes (4 marks)

1
2
3
4

Below is the patient's ECG



Outline your management in ED while awaiting cath lab (4 marks)

1
2
3
4

While awaiting transfer to Cath the patient becomes hypotensive and bradycardic to a rate of 40bpm. An appropriate dose of atropine is trialled with no clinical effect. List 2 options to manage the patients hypotension along with appropriate doses or initial settings (2 marks)

1

2

Question 4

A 78-year-old gentleman presents with a 2 day history of feeling short of breath and lethargic. He has history of IHD and a Permanent pacemaker inserted for third degree heart block. His observations are below

HR 40 BP 109/77

RR 16 Sats 99% RA

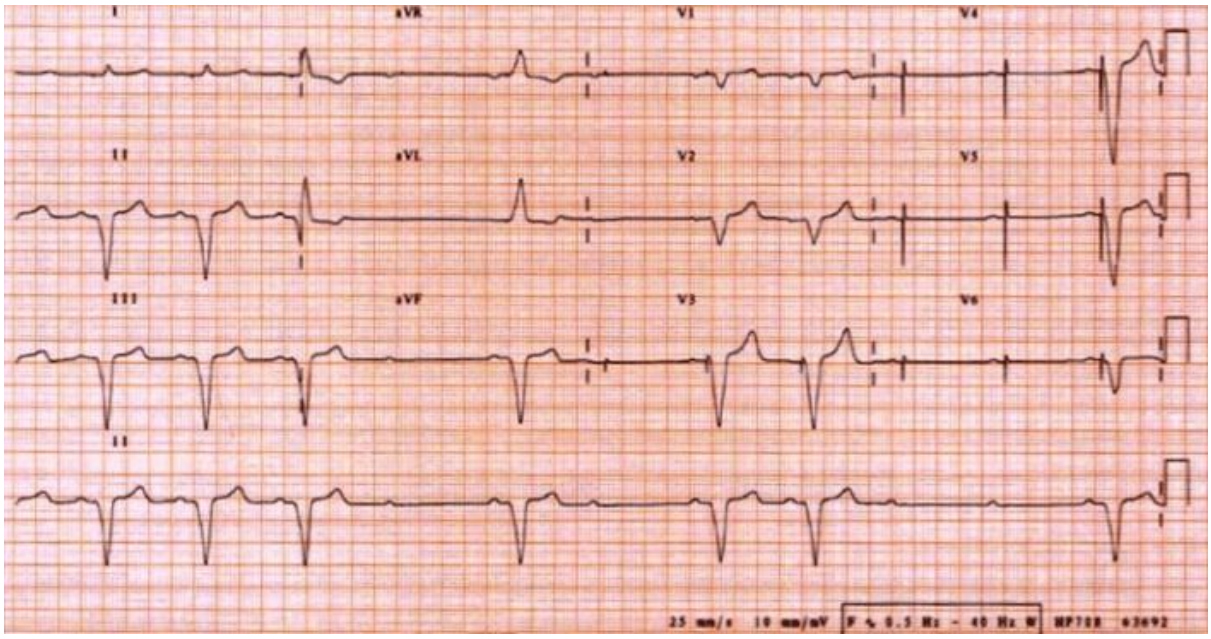
He has his PPM care with him which Identifies his Pacemaker as VAI

Which chamber(s) does this gentleman's pacemaker Sense? (1 mark)

Which chamber(s) does this pacemaker Pace? (1 mark)

What does the pacemaker action if it senses a native rhythm? (1 mark)

His ECG is below;



Topic-Based SAQ Quiz: Cardiovascular

Describe and Interpret the ECG (4 marks)

List 5 causes for the abnormality demonstrated on the above ECG (5 marks)

1
2
3
4
5

Question 5

A 78 year old female is brought in to your emergency department with palpitations. She has PPM in-situ for sick sinus syndrome, as well as a history of Atrial fibrillation and IHD.

Her medications are as follows;

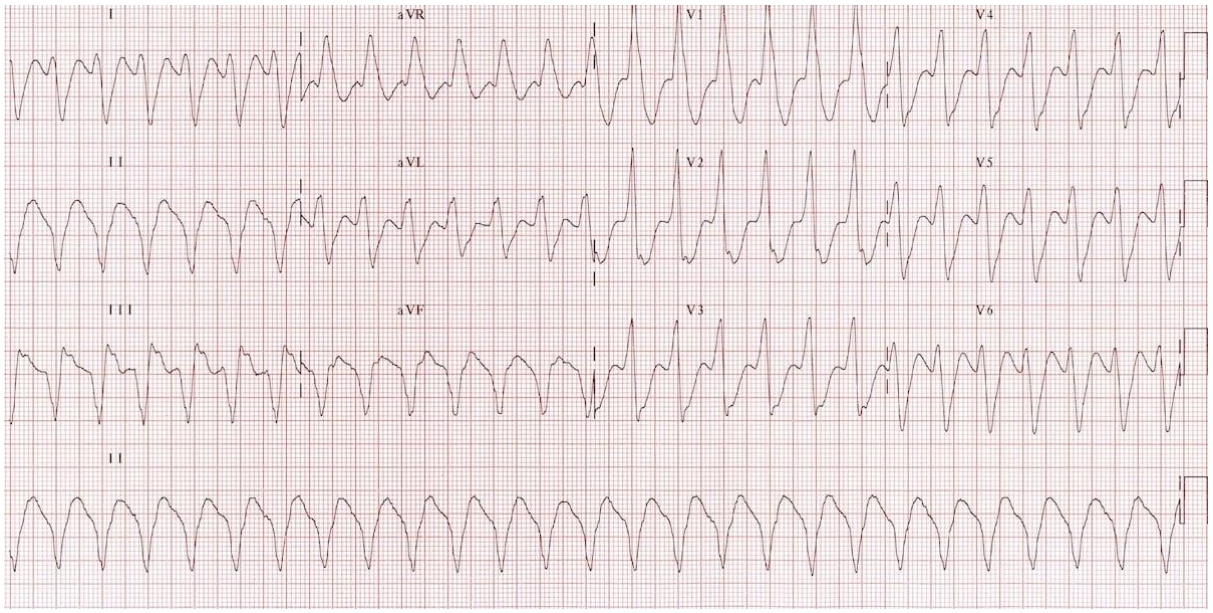
Apixaban 2.5mg BD

Ramipril 5mg OD

Atorvastatin 40mg MANE

Her current BP is 108/77, RR 16 and Sats are 99% on room air

Her ECG is below



What is the rhythm demonstrated on the ECG. (1 mark)

List 3 findings on the ECG to support your answer above (2 marks)

1

2

3

List 2 pharmacological agents and doses that you would consider to treat this patient. (2 marks)

1

2

List 2 non-pharmacological management options for treating this patient. (2 marks)

1

2

The patient has lost pulses and your team has started Advanced life support. Complete the following table regarding ARC recommendations for ALS.

Rate of chest compressions	100-120 per minute
Depth of chest compressions	
Defibrillation energy for 1st shock (Biphasic)	

Topic-Based SAQ Quiz: Cardiovascular

ANSWERS

Question 1

Describe the most concerning ECG change present (1 mark)

- Prolonged QTc

What is the major risk associated with these changes? (1 mark)

- Torsades de Pointes / Polymorphic VT

List 4 causes from 4 different aetiological categories in any patient that can produce this ECG abnormality (4 marks)

- Electrolytes – Hypokalaemia, hypomagnaseamia, hypocalcaemia
- Myocardial Ischaemia
- Medications – Ondansetron, Droperidol, Methadone, Hydroxychloroquine, Amiodarone, Antihistamines, Antipsychotics
- Environmental – Hypothermia, Electrical injuries
- Congenital – Long QT syndrome

While awaiting a monitored bed in the paediatric the child becomes unresponsive and pulsesless. Outline you management of this child. (4 marks)

1) Commence Chest Compressions at rate 30:2
2) Administer unsynchronised defibrillation / shock
3) Adrenaline every 3-5 mins
4) MgSO4 5mmol + 5mmol KCL bolus (Both required for the mark)

Question 2

Apart from Pericarditis/Myocarditis list 4 Differentials for the causes of his chest pain (4 marks)

ACS, Aortic Dissection, Pulmonary embolism, Pneumothorax, Pneumonia, Pleurisy, Costochondritis. Accept other reasonable differentials

Describe the features in the ECG consistent with Pericarditis (3marks)

- Sinus tachycardia
- Widespread concave STE and PR depression (I, II, III, aVF, V4-6).
- Reciprocal ST depression and PR elevation in V1 and aVR.

List 3 further ED investigations you may perform in this patient (3 marks)

- **Bedside echo – to look for a pericardial effusion**
- Troponin – to assess for myocarditis or ischaemia
- CRP/ESR – raised inflammatory markers with pericarditis
- CXR – assess for differentials (PTX, pneumonia)

Topic-Based SAQ Quiz: Cardiovascular

You have decided the patient is safe for discharge and have arranged appropriate follow up.

List 2 pharmacological agents with doses that can be used to treat Pericarditis

- Colchicine 500 microgram OD or BD
- Aspirin 750mg TDS or Ibuprofen 400-600mg tds

Question 3

List 4 STEMI mimics and for each one their corresponding ECG changes (4 marks)

LV aneurysm - Box STE anterior leads with Q waves

BER - High J Point and notched QRS, STE <25% of QRS

LVH - ant STE with voltage criteria LVH met

Pericarditis - diffuse STE and PR depression

Triple vessel disease - STE aVR and diffuse STD

Diffuse Subendocardial ischaemia - STE aVR and diffuse STD

Outline your management in ED while awaiting cath lab (4 marks)

1) Analgesia – Morphine or Fentanyl aliquots
2) Second antiplatelet – accept Clopidogrel or Ticagrelor
3) Load with Heparin – 4000 units IV UFH
4) Place defibrillator pads on and keep monitored – at risk of VT/VF
   NB If GTN given then Fail question – RV infarct suggested by ECG

While awaiting transfer to Cath the patient becomes hypotensive and bradycardic to a rate of 40bpm. An approrpiate dose of atropine is trialled with no clinical effect. List 2 options to manage the patients hypotension along with appropriate doses or initial settings (2 marks)

Isoprenaline 5micrograms/minute

Adrenaline 5micrograms/minute

Transcutaneous pacing – predict mA 50-90 to gain mechanical capture

Question 4

Which chamber(s) does this gentleman's pacemaker Sense? (1 mark)

Right Atrium

Which chamber(s) does this pacemaker Pace? (1 mark)

Right Ventricle

Topic-Based SAQ Quiz: Cardiovascular

What does the pacemaker action if it senses a native rhythm? (1 mark)

Inhibits

Describe and Interpret the ECG (4 marks)

Sinus Bradycardia – Native P waves

Intermittent broad QRS complexes following pacing spikes

Intermittent Pacing spikes followed by no QRS

Intermittent Ventricular failure to capture

List 5 reasons for the above ECG abnormalities (5 marks)

Exit block – scar tissue in myocardium

Lead displacement

Lead fracture

Myocardial ischaemia

Electrolyte abnormalities – Hyperkalaemia

Question 5

What is the rhythm demonstrated on the ECG

Monomorphic ventricular tachycardia

List 3 findings on the ECG to support your answer above

- Very broad complexes (~ 200 ms in V5-6).
- Northwest axis (-120 degrees).
- Brugada's sign – The distance from the onset of the QRS complex to the nadir of the S-wave is > 100ms.
- Joesphson's sign – Notching near the nadir of the S wave is seen in leads II, III, aVF.
- Some superimposed P waves in aVF.

List 2 pharmacological agents and doses that you would consider to treat this patient.

Amiodarone 5mg/kg

Procainamide 15mg/kg

Lignocaine 1.5mg/kg

Topic-Based SAQ Quiz: Cardiovascular

Complete the table below identifying 2 non-pharmacological management options for this patient. For each document your rationale for using it.

Synchronised DC cardioversion 100-200 J

Overdrive Pacing (at 10% above rate)

The patient has lost pulses and your team has started Advanced life support. Complete the following table regarding ARC recommendations for ALS

Rate of chest compressions	100-120 per minute
Depth of chest compressions	1/3 of the chest depth
Defibrillation energy for 1st shock (Biphasic)	200 J