



FCA(SA) Part II

THE COLLEGES OF MEDICINE OF SOUTH AFRICA

Incorporated Association not for gain
Reg No 1955/000003/08

Final Examination for the Fellowship of the
College of Anaesthetists of South Africa

24 July 2018



Paper 2

(3 hours)

All questions are to be answered in the space provided.

CANDIDATE NUMBER.....

Questions 1 - 3

There are 7 books for this examination, please ensure that the 7 books are handed over to the invigilator for marking.



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Questions 4 - 6

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Question 4

A junior trainee reports to you just before the operating lists are about to start, that she thinks that the specialist allocated to supervise her is under the influence of alcohol or drugs.

- a) List the individuals, and their potential needs and rights you need to take into account when considering how you would approach this issue. (5)

- b) Briefly describe how you would approach this problem, balancing all the needs and the need to keep clinical services going? (5)

[10]

Question 5

Regarding the term "Clinical Governance"

a) Define, or explain briefly, your understanding of the term "clinical governance". (4)

b) Using your understanding, give at least two (2) examples of the different clinical governance roles and responsibilities that each of the following categories of staff have when providing care for a full-day operating list. (6)

i) Registered scrub/theatre nurse responsible for the list.

ii) Anaesthetic registrar responsible for anaesthesia care.

iii) Clinical head anaesthesiologist for the department who is not in theatre that day.

[10]

Question 6

A 24-year-old male patient is admitted with a blunt traumatic brain injury. He is assessed by medical staff to open his eyes to sternal pressure alone, withdraw his arm to painful stimulus and to verbalise without making sense.

- a) List the three elements assessed and scored (and indicate the range of scores possible for each element) in the Glasgow Coma scale.
What does the patient described above score on the Glasgow Coma Scale (GCS)? (4)

- b) What is the utility of the GCS? (2)

The Apgar score is another commonly used scoring system.

- c) What are the elements of the Apgar score? (2)

- d) Are the Apgar score and the GCS useful prognosticators of outcome? Explain your answer. (2)

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Questions 7 - 9

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Question 7

With open surgical repair of abdominal aorta aneurysm, the injury to the kidneys remains a major concern.

- a) List different methods of preconditioning. Define the time-window in preconditioning. (3)

- b) Explain the term post-conditioning. (2)

- c) Explain cold renal perfusion. (2)

- d) What are the 3 most valuable steps to improve renal outcome? (3)

[10]

Question 9

In the last few years there has been a paradigm shift to improve critical incident reporting in the hospital setting.

- a) What is your understanding of a critical incident and why should it be reported? (2)

- b) List 4 interventions that you, as a manager, will employ to ensure an effective critical incident reporting system? (4)

- c) In South Africa, what are the pitfalls/challenges to the success of an effective incident reporting system? (4)

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Questions 10 - 12

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Question 10

A 17-year-old girl collapses during a hockey match. She is transported to hospital where she is found to have a severe headache and neck stiffness accompanied by cranial nerve VII palsy. An urgent CT scan reveals a cerebral aneurysm with a subarachnoid haemorrhage (SAH). The neurosurgeons wish to proceed with coiling of the aneurysm as soon as possible.

- a) What systemic complications may occur following SAH that you wish to assess at your pre-operative visit? (6)

- b) What do you expect to see on transcranial doppler? (1)

- c) What is the role of calcium channel blockers in this patient? (3)

[10]

Question 12

A 32-year-old male is admitted to your intensive care unit. He has been the victim of a community assault. Clinical examination reveals evidence of extensive beatings with a sjambok (leather whip). His urine is dark brown in colour and his urine output is reduced.

a) What is the diagnosis? (1)

b) Describe the pathophysiology of this condition. (4)

c) Outline principles of management for this condition. (5)

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CANDIDATE NUMBER.....

Questions 13 - 15

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Question 13

Complete the following table, comparing the differences between Narrative Reviews and Systematic Reviews

Elements of review	Narrative Review	Systematic Review
Scope of clinical or research question		
Protocol		
Source of evidence and search strategy		
Evaluation of evidence		
Synthesis of evidence		

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Questions 16 - 17

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Question 17

Pectoral blocks (PEC) are an alternative to thoracic epidural or paravertebral blocks to provide analgesia and anaesthesia to the hemithorax.

- a) What are the indications for a PEC 1 block? (3)

- b) How does the Modified PEC's 2 block differ from the PEC's 1 block? (2)

- c) What are the indications for a Modified PEC's 2 block? (2)

- d) What are the advantages and disadvantages of continuous peripheral nerve blocks? (3)

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Questions 18 - 20

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Question 18

A baby at 48-weeks post-conceptual age requires a laparotomy for a suspected intestinal perforation due to Hirschsprung's disease.

- a) On pre-operative assessment, what potential issues may affect the risk of respiratory complications? (4)

- b) List the controversies regarding induction and intubation of this patient. (6)

[10]

Question 19

A three-year-old child with a moderately sized cardiac ventricular septal defect presents for a club foot repair.

- a) Explain the possible cardiovascular pathophysiology associated with this condition. (4)

- b) What are your haemodynamic goals when anaesthetising this child? (6)

[10]

Question 20

A patient presents four months after undergoing a thoracotomy for a lung tumour with severe, persistent pain occurring at the operative site.

- a) What is your likely diagnosis? (1)

- b) Briefly discuss the possible pathophysiology of this type of pain. (4)

- c) Briefly describe 5 pharmacological agents for the above condition that have been shown to be effective. (5)



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Paper 3

(3 hours)

All questions are to be answered in the space provided.

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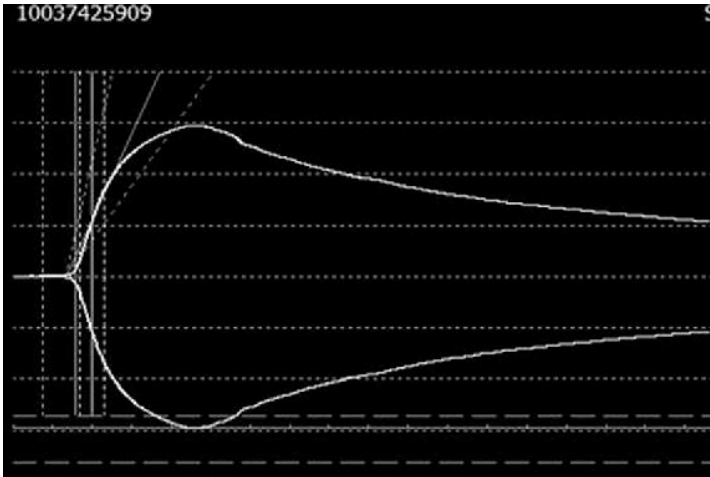
Questions 1 - 4

There are 6 books for this examination, please ensure that the 6 books are handed over to the invigilator for marking.

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Question 1

You are providing anaesthesia for a 24-year-old male patient who sustained a gunshot wound to the abdomen 2 hours previously. He had no other injuries. His blood pressure is 80/40mm Hg, mean arterial pressure 53mm Hg. His core temperature is 34.5°C. The surgeon finds a liver laceration and multiple bowel injuries. He says that that the bleeding appears to be excessive. You perform a thromboelastogram (TEG) to assist with management.



R time: 12 minutes (4-8)
 K time: 7 minutes (0-4)
 Alpha angle: 32° (47-74)
 Maximum amplitude: 41mm (54-72)
 LY30: 24.7% (0-8)
 LY60: 39% (0-15)

a) Interpret these TEG findings. (4)

b) How would you use these TEG findings to guide your therapy in this patient? (4)

c) What other 2 laboratory tests of coagulation would be most useful in this scenario? (2)

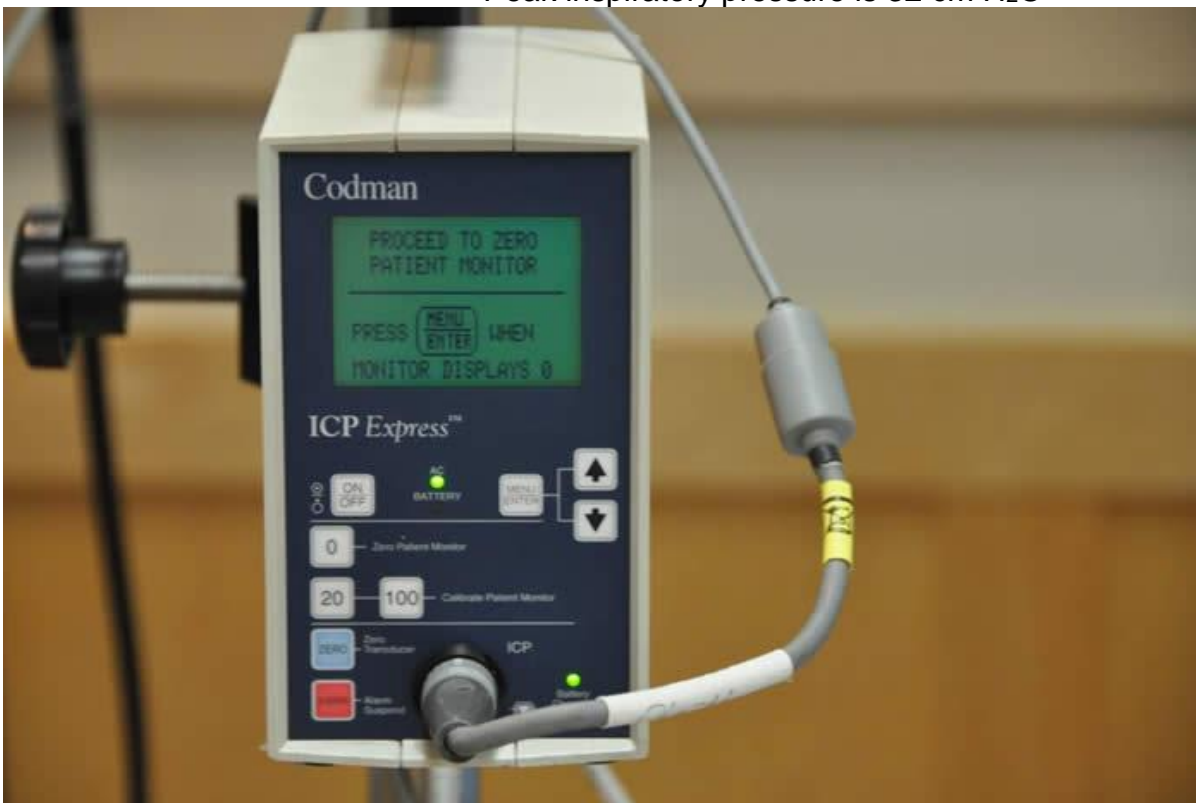
[10]

Question 2

A 23-year-old male patient sustained a traumatic brain injury after being assaulted with a blunt object. His Glasgow Coma Score (GCS) was 7/15 on admission. He underwent an evacuation of an extradural haematoma and an intraventricular pressure monitor was placed. His weight is 68kg and he has no other injuries.

Intracranial pressure (ICP): 25mm Hg
 Blood pressure: 100/54mm Hg; mean arterial pressure 69mm Hg
 Arterial blood gas: FiO_2 0,40
 pH: 7,36
 pO_2 : 120mm Hg /16 kPa
 pCO_2 : 46.5mm Hg / 6,2 kPa
 Standard bicarbonate: 22mmol/l
 Lactate: 0.9mmol/l

Ventilator settings: Volume control mode
 Tidal volume 550ml
 Respiratory rate 10 bpm
 PEEP 10 cm H₂O
 Inspiratory time 1.7 seconds
 Peak inspiratory pressure is 32 cm H₂O



a) What ICP would you target in this patient? (1)

PTO/Page 5 Question 2b)...

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- b) How do you calculate cerebral perfusion pressure? (1)

- c) What is the cerebral perfusion pressure in this patient? (1)

- d) What cerebral perfusion pressure would you target in this patient? (1)

- e) How would you optimise ventilation in this patient? Explain your answer. (6)

[10]

Question 3

You are asked to provide anaesthesia for a Caesarean Section. The patient is a 22-year-old primigravida with pregnancy induced hypertension. She is not in labour and there is no evidence of foetal distress. Blood results are as follows

Full blood count:

WCC $6.2 \times 10^9/l$

Hb 7.2 g/dl

Platelets $45 \times 10^9/l$

Liver function tests:

ALT 139 U/l

AST 240 U/l

LDH 887 U/l

- a) What is the diagnosis? (1)

- b) What other blood results would you like to see to better assess this patient? (3)

- c) What anaesthetic technique would you use and why? (2)

d) What blood products would you use in this patient, motivate for each type of product? (4)

[10]

Question 4

You are asked to provide labour analgesia to a 19-year-old female in active labour. She is para 0 gravida 1 with a singleton pregnancy at term. She has recently been diagnosed with a cardiac condition and is on furosemide, potassium and carvedilol. She has a blood pressure of 110/60 mm Hg, a regular pulse of 100 bpm and has no evidence of cardiac failure. She had a transthoracic echocardiogram performed today. She is in a high care area.

Echocardiography findings: (Normal range in brackets)

Dilated left ventricle LVEDD 3.4 cm/m² (2.4-3.0)

Fractional shortening 15%

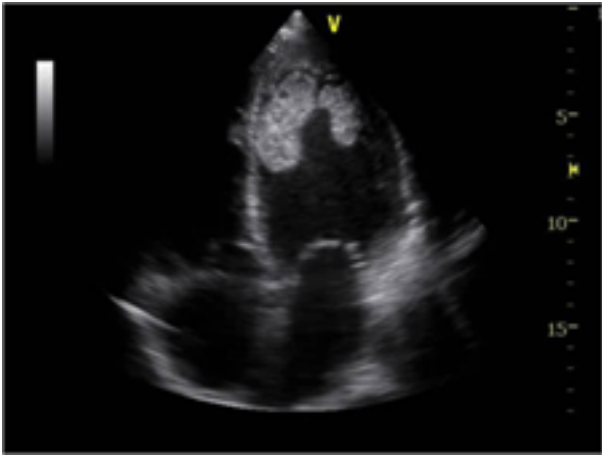
LV ejection fraction 28% (>55%)

Moderate mitral regurgitation

TAPSE 1.3cm (1.5-2)

Mild tricuspid regurgitation

Mass in left ventricle



- a) Explain the echocardiographic findings. (5)

- b) What is the likely diagnosis? (1)

c) What is the most likely nature of the mass in the left ventricle? (1)

d) What treatment will the mass require? (1)

e) What mode of labour analgesia will you offer? What monitors will you use? (2)

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Questions 5 - 8

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Question 5

A 2-year-old boy presents for a tonsillectomy at a day clinic. He has no significant medical or surgical history and is otherwise well. Examination reveals a murmur. An ECG is done to investigate further.



- a) What features present in the above ECG are **normal** for this 2-year-old but would be considered **abnormal in an adult** ECG? (4)

- b) What features on clinical examination of the cardiovascular system suggest that a murmur in a child is pathological? (6)

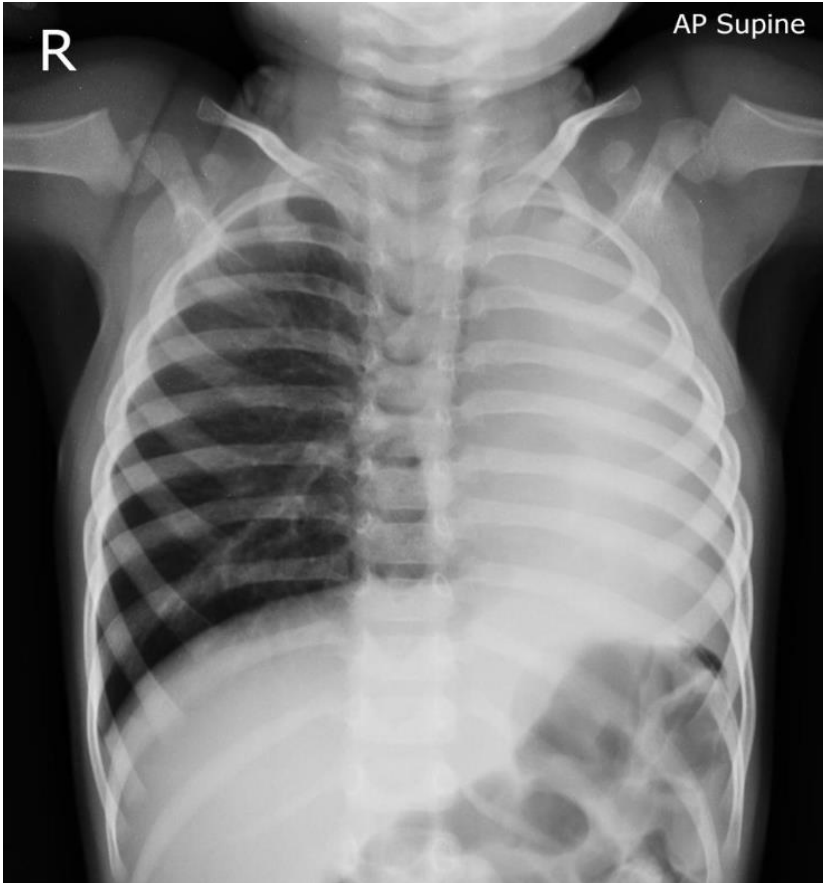
[10]

Candidate number: _____

Question 6

A 3-year-old child, who was previously well, is admitted with a sudden onset of cough and dyspnoea whilst playing. The child is afebrile, tachypnoeic and tachycardic and has left sided wheezes. He is placed on 40% facemask oxygen and IV fluids are commenced.

This is his chest x-ray:



- a) List 3 abnormalities on the above chest x-ray taken upon admission. (3)

b) What is the most likely diagnosis and cause in this child? Justify your answer. (3)

c) What are the concerns regarding an intravenous induction in this child? (2)

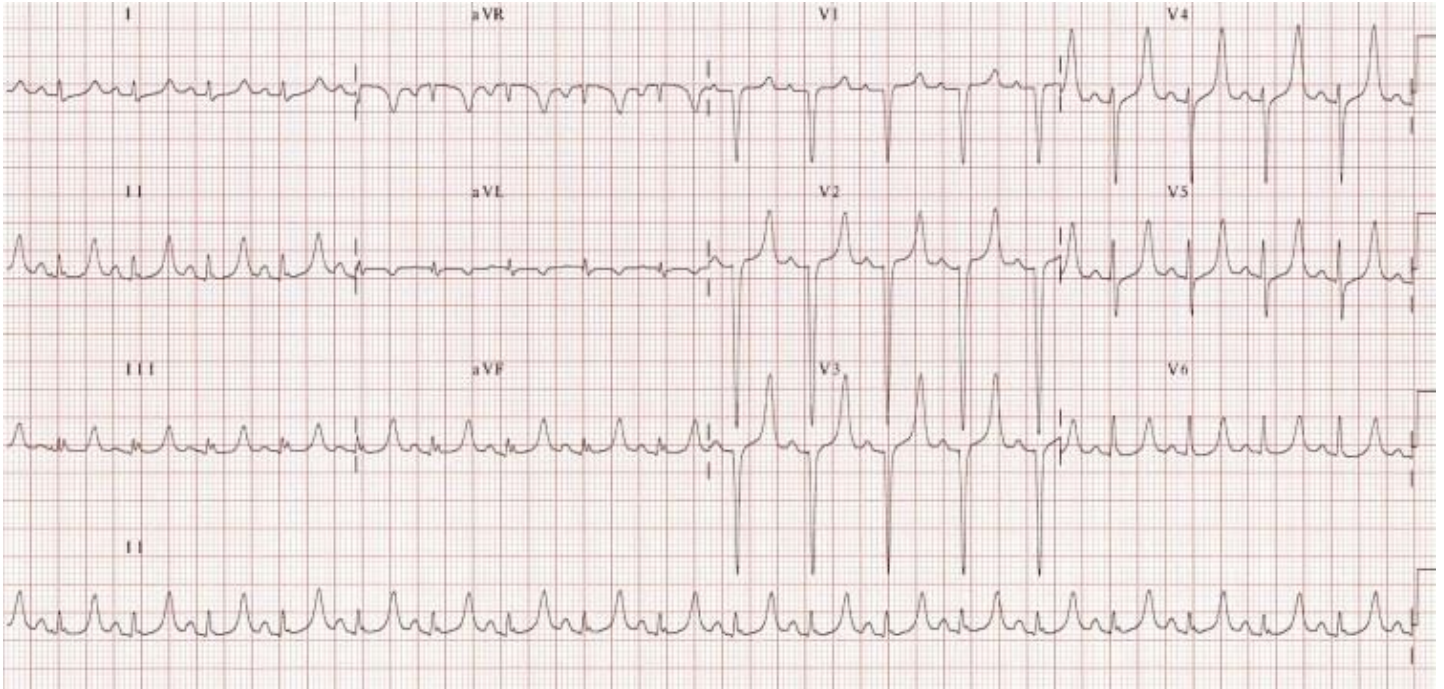
d) What is the main advantage and disadvantage of an inhalational induction in this child? (2)

[10]

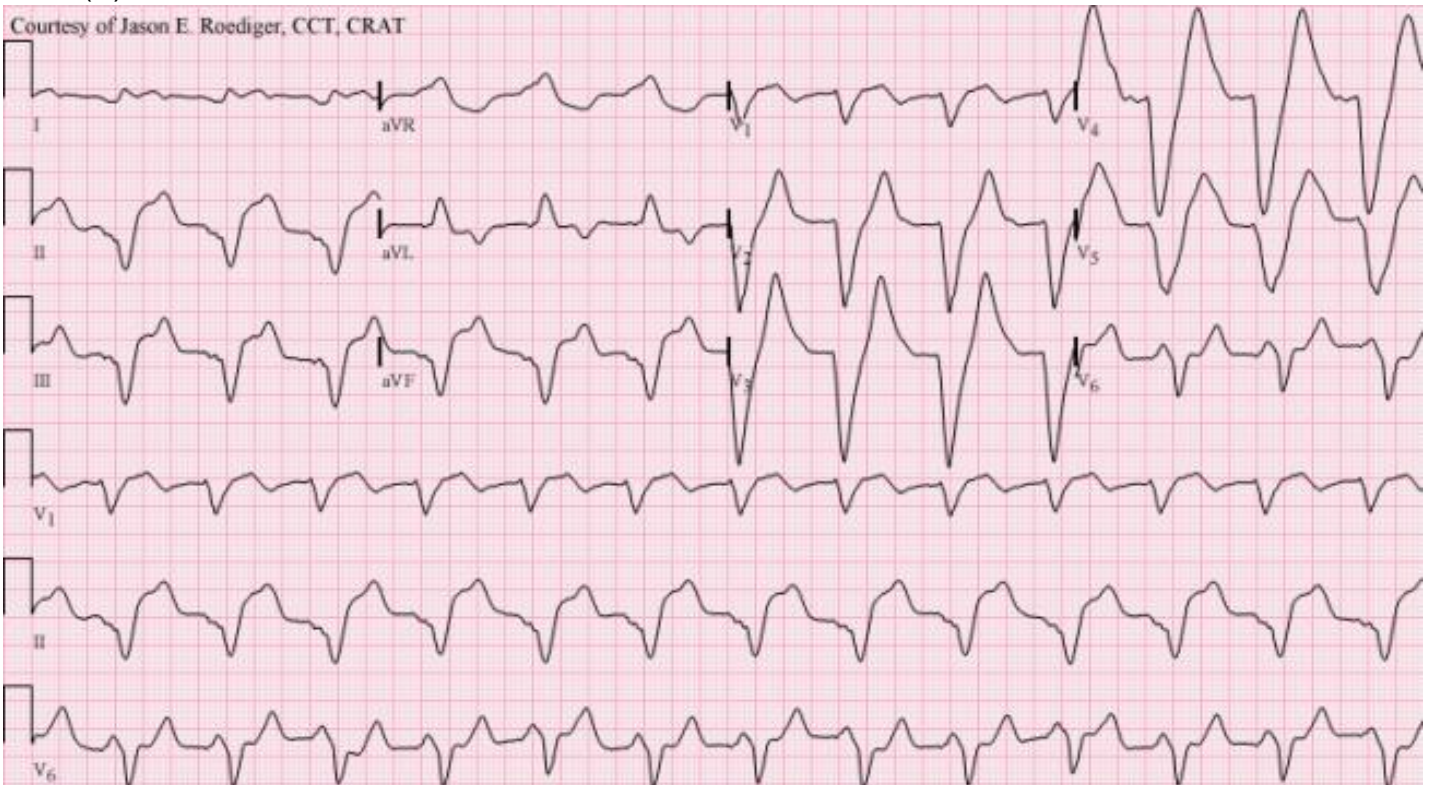
Question 7

A 75-year-old female has a history of insulin-requiring diabetes mellitus. She developed a septic foot that progressed to severe sepsis and acidosis which required ICU admission. Her serial ECG tracings are presented below. ECG (A) taken on admission.

ECG (A) (On admission)



ECG (B) 1 hour later



a) What are the most concerning features in the above ECG's (A) and (B)? (4)

b) What is the most likely cause? (2)

c) What is the immediate management of this condition? (4)

[10]

Question 8

A 43-year-old female patient being investigated for extra-pulmonary tuberculosis presents with hypotension and weakness. These are her special investigations

Electrolytes:

Na^+ = 128mmol/L

K^+ = 6mmol/L

Renal Function:

Urea = 18

Creatinine = 164

Arterial Blood Gas (FiO₂ = 0.4):

pH = 7.25; PaCO₂ = 35mmHg (4.6 kPa); PaO₂ = 110mmHg (14.6 kPa); HCO₃⁻ = 18; BE = -6

- a) What syndrome is the most likely cause of the above clinical and biochemical picture? (2)

- b) Explain the pathophysiology of the abnormalities found in the above investigations. (6)

- c) What drug is used to treat the above condition/ syndrome? (1)

d) What anaesthetic agent may result in the above condition? (1)

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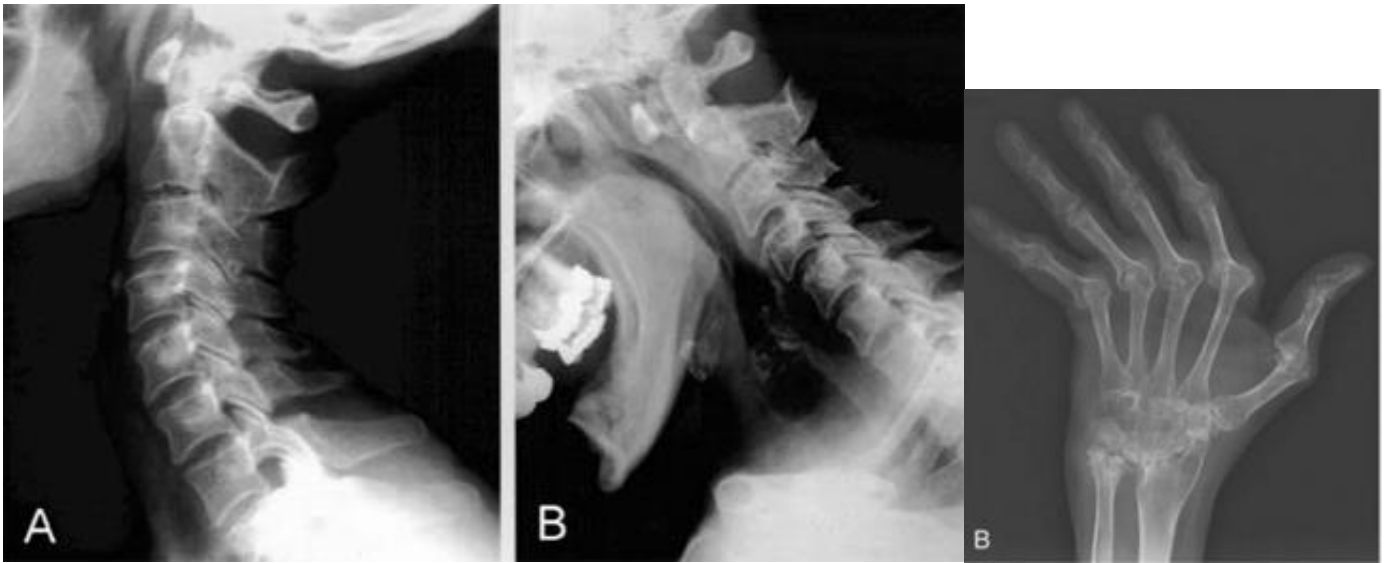
Questions 9 - 11

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Question 9

The following x-rays are from a 50-year-old female presenting for laparotomy for a perforated peptic ulcer.



a) What is the chronic condition likely to cause the abnormalities seen on the x-rays? (1)

b) What is alarming in images A and B? (3)

c) What in your clinical examination of this neck would make you concerned? (1)

- d) What are your preferred options for airway management in this patient? List the advantages and disadvantages of each. (5)

[10]

Question 10

- a) What block is depicted in this CT scan? (1)

- b) In which particular anatomical or disease process of the eye would this block be contraindicated? (2)

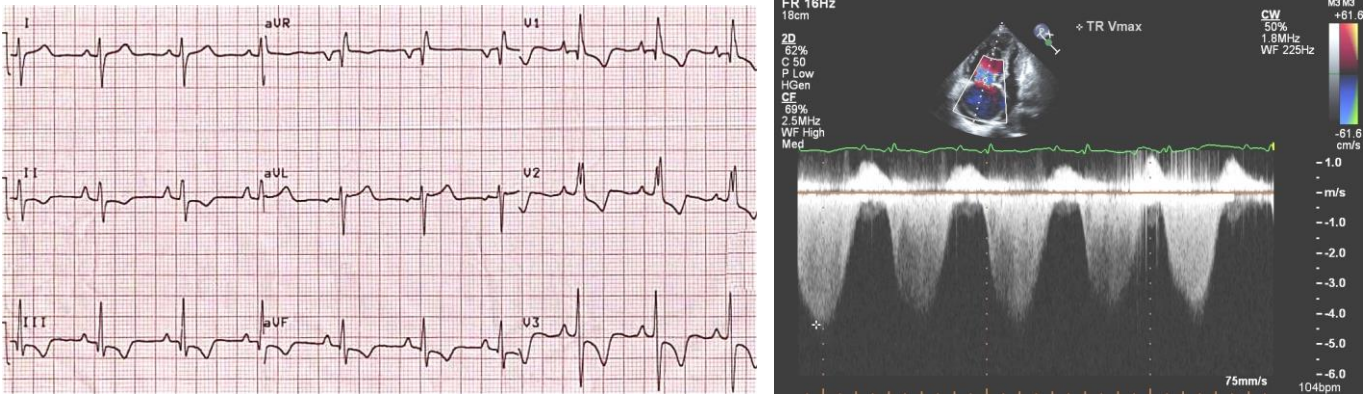
- c) In patients in whom this block is contra-indicated, what other blocks using local anaesthetic agents could be safely used? (4)

- d) What options can be used to shorten the onset of action of eye blocks? (3)

[10]

Question 11

The following is an ECG and Echocardiogram of a patient with long standing obstructive sleep apnoea syndrome.



Describe 5 abnormalities seen in the images. Give a short explanation of the pathophysiological basis for each. (10)

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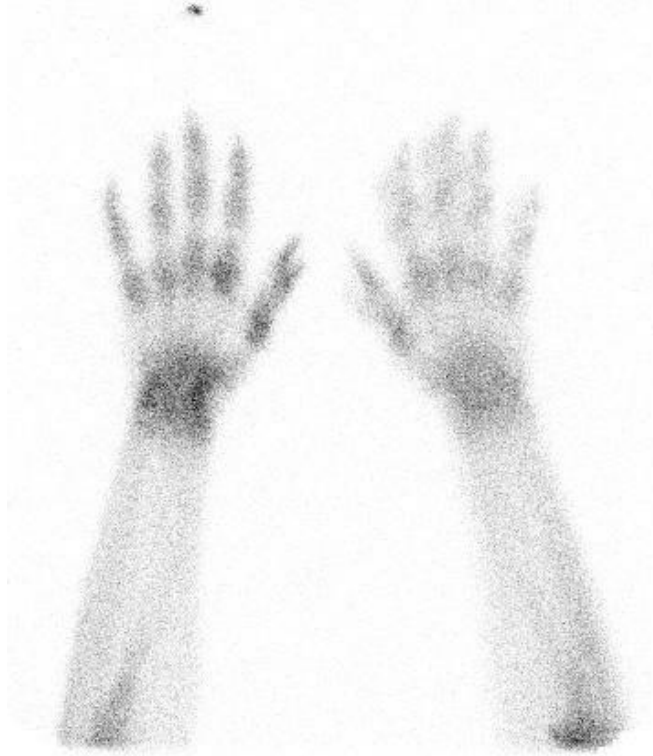
Questions 12 - 14

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Question 12

In a patient with type 1 Complex Regional Pain Syndrome (CRPS1)



- a) What radiological finding is present on this radionuclide bone image? (2)

- b) What x-ray finding will likely be present in chronic CRPS1 and what is the cause? (2)

- c) What nerve block can be done to treat this condition? (2)

d) What clinical findings will indicate a successful block? (4)

[10]

Question 13

2 Days after a traumatic brain injury, an intubated patient develops significant polyuria in ICU. These are his results

S-Sodium: 151mmol/L
S-Potassium: 4.2mmol/L
S-Osmolality: 330mmol/L
U-Osmolality: 30mmol/kg [50-1200]

a) What is the most likely pathology in this patient? (1)

b) What fluids would you prescribe for this patient? (2)

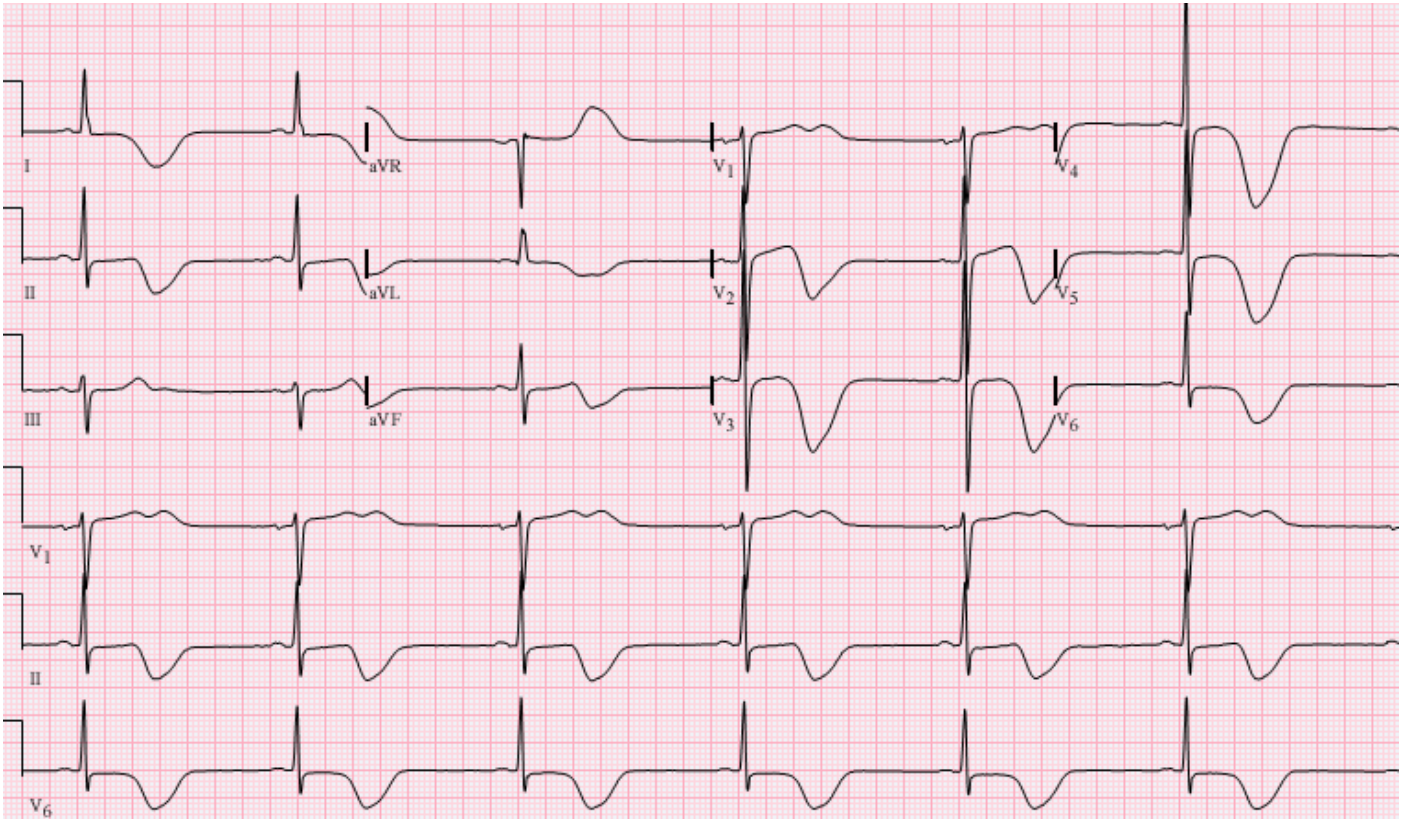
c) What is the definitive treatment? (2)

d) Give another 5 possible causes of polyuria in this patient. (5)

Candidate number: _____

Question 14

This ECG is of a 35-year-old, previously healthy patient, presenting with a sudden severe headache.



- a) Describe three prominent abnormalities on this ECG (3)

- b) What is the most likely cause for this clinical picture? (1)

c) Discuss the underlying mechanism of the ECG changes in the above-mentioned pathology. (2)

d) What other ECG changes are often found in these patients? (2)

e) What are other possible causes for the above ECG changes? (2)

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Questions 15 - 17

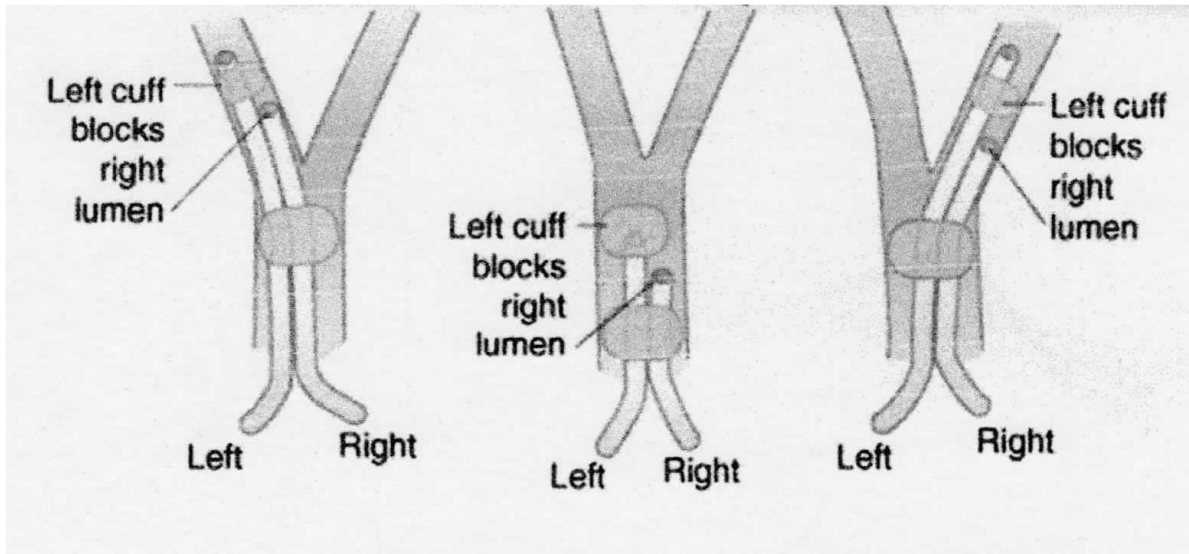
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Question 15

The picture below depicts placement of a double lumen tube. Analyse the pictures from the left side to the right side.

- a) Fill in the table below where breath sounds will be audible in relation to each picture when a clamp is applied to verify placement. (9)

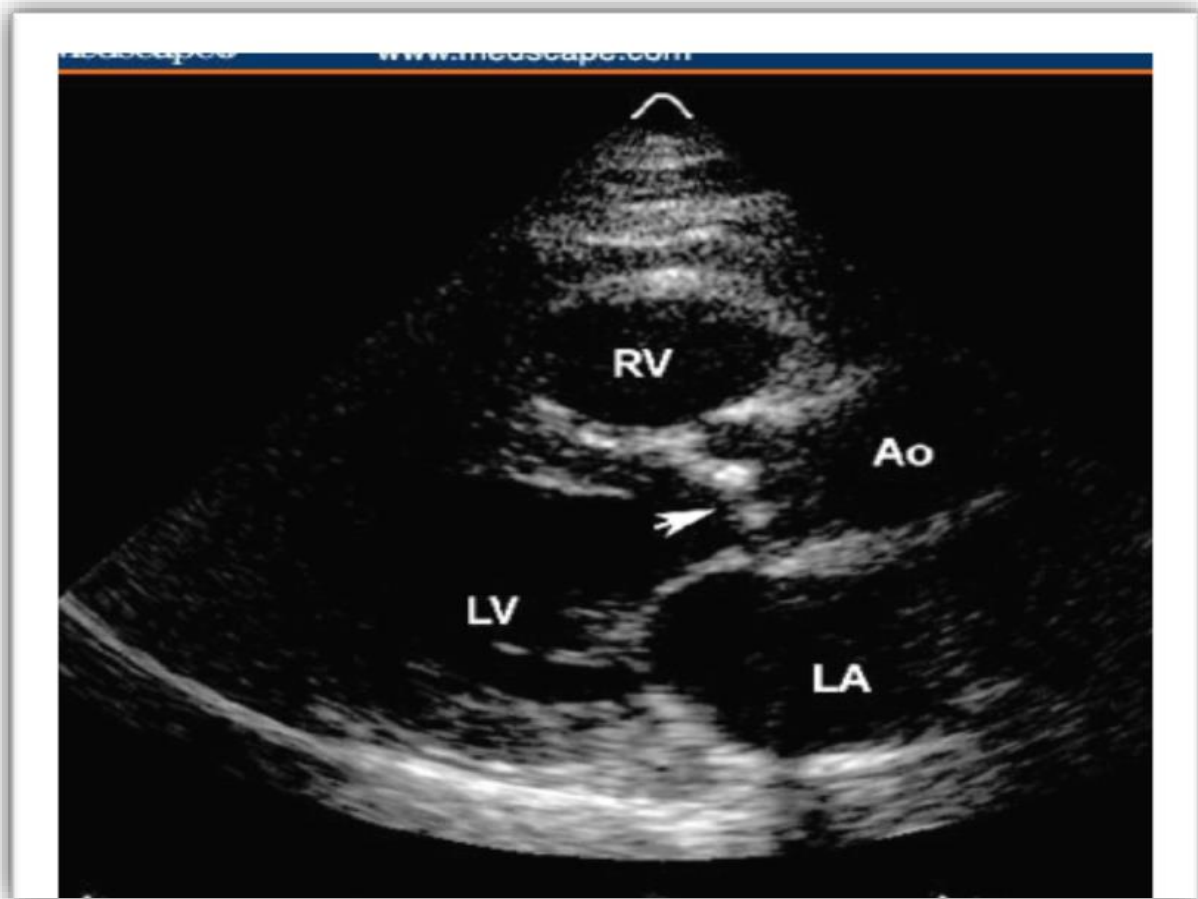


Procedure	Breath sounds audible on (Right/Left/Both sides/None or reduced)		
	Left side Picture	Middle Picture	Right side Picture
Clamp applied to right lumen with both cuffs inflated.			
Clamp on left lumen, with both cuffs inflated.			
Clamp on left lumen. With left cuff deflated.			

- b) Which picture depicts correct placement of a double lumen tube? (1)
- Left.
 - Middle.
 - Right.
 - None of the above.

Question 16

An 84-year-old man complains of syncope, chest pain and shortness of breath for two weeks. His vital data are pulse 140 beats per minute, irregular; BP 96/78 mmHg; BNP 2800pg/mL.



- a) What is the next investigation you will require in this patient? (1)

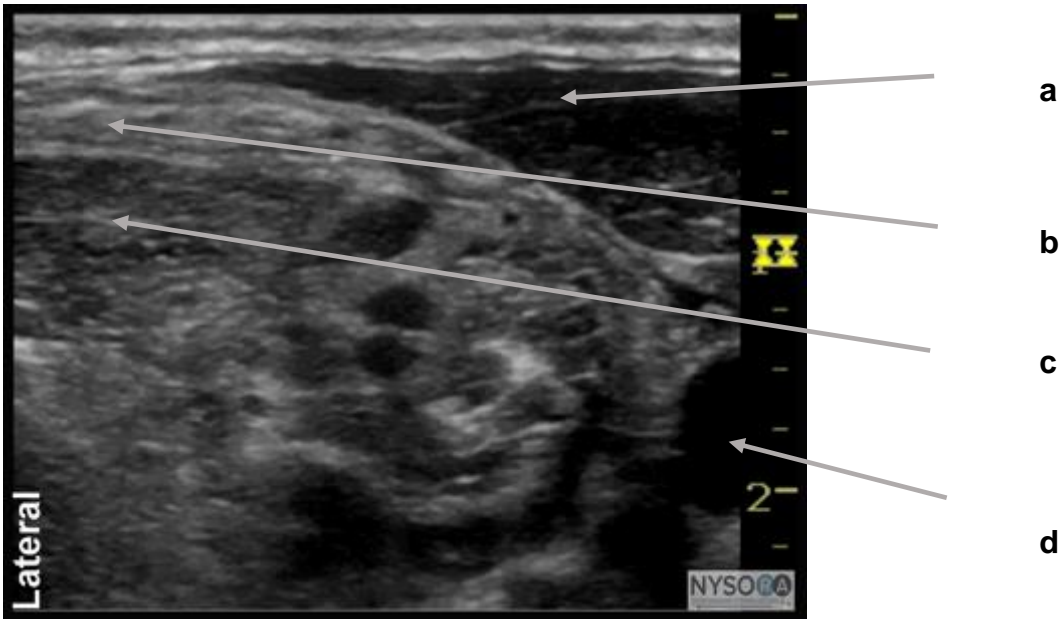
- b) What changes do you observe on this echocardiogram of this patient to explain some of the patient's symptoms? (2)

- c) List the haemodynamic goals you will pursue in the anaesthetic management of this patient. (7)

[10]

Question 17

With regards to regional anaesthesia for carotid endarterectomy



a) Identify the structures labelled in the picture above. (4)

b) List monitoring techniques for cerebral ischaemia during carotid endarterectomy in order of efficacy and give reasons for your weighting. (4)

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c) List 2 benefits of using ultrasound to do this block. (2)

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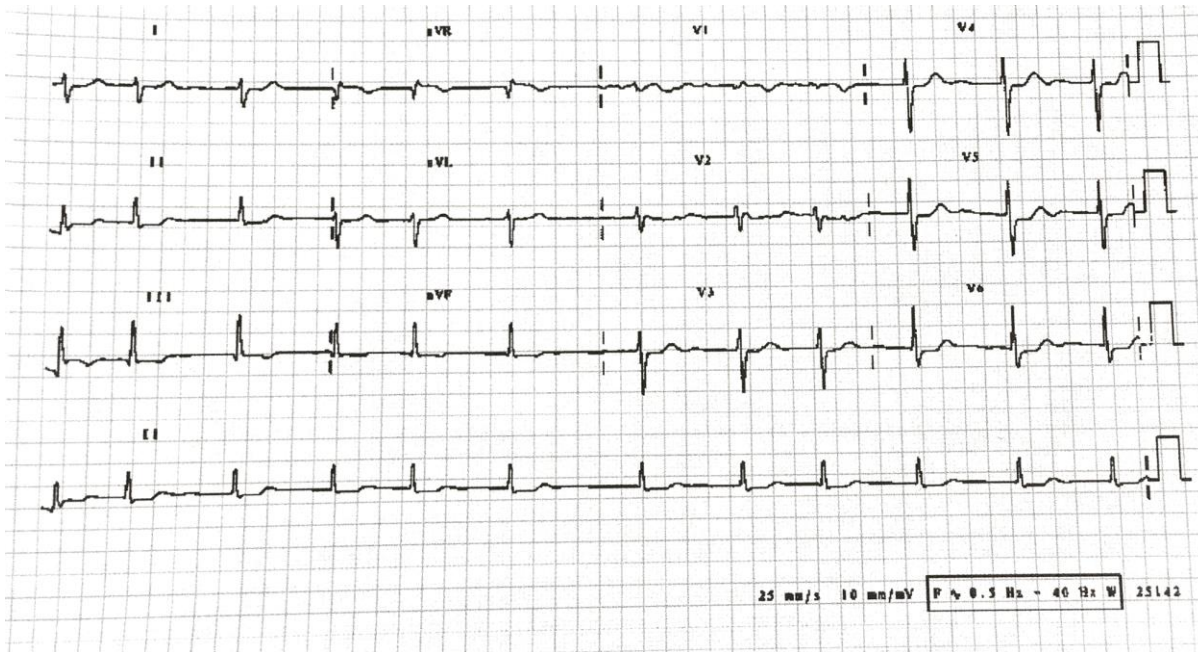
Questions 18 - 20

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Question 18

This is the ECG of a 68-year-old male patient who presents with an **open tibial fracture for wound debridement and internal fixation**. The patient has a heart condition for which he is on unknown chronic medications.



- a) What are the abnormalities (Diagnosis) on the ECG? (3)

- b) Name one useful investigation that you would ask for in order to decide on your anaesthetic technique. Justify your answer. (2)

Question 19

A 56-year-old male patient with type 2 Diabetes Mellitus presents for bronchoscopy for a suspected mass in the lung. On pre-operative evaluation he is confused.

His blood results are as follows

Sodium	122mmol/l
Chloride	94mmol/l
Potassium	4.8mmol/l
S- Osmolality	263mOsm/kg
U- Osmolality	250mOsm/kg
Urine sodium	40mmol/L

- a) What is the most likely clinical diagnosis and cause for this biochemical picture? (2)

- b) What other possible causes for the above biochemical picture should be EXCLUDED? (3)

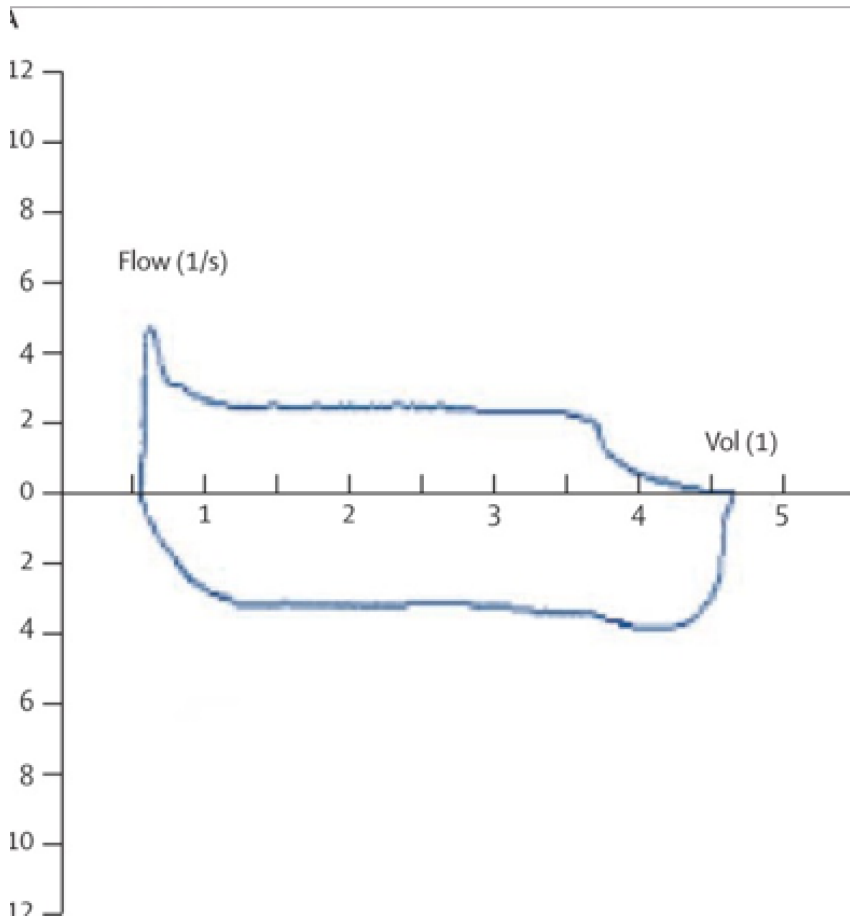
- c) How will you optimise this patient for the procedure? (3)

d) Name two potential risks which may occur as a result of optimising this patient. (2)

[10]

Question 20

Below is the flow volume loop of a 22-year-old patient. He is booked on your list for a mediastinoscopy. He complains of dyspnoea at rest which worsens on lying flat. On examination he is dyspnoeic, sitting upright, and has red eyes and a swollen face.



- a) What does the flow volume loop show? (1)

- b) Which radiological investigation would be useful in assessing the airway? Justify your answer. (2)
