Question 1:

A 20yo male attends with a grossly swollen painful hand from a punching injury at 36 hours. There is broken skin over the 3rd MCP joint.

(a) What complications may arise from this injury? (20%)
(b) Outline your examination (20%)
(c) Given the appearance of the hand shown, what investigations would you request, assuming no comorbidities and that this is an isolated injury? (20%)
(d) What are the indications for admission? (20%)

Answers:

1a. Joint penetration
Septic arthritis
Metacarpal fracture
Extensor tendon laceration
Extensor tendon sheath infection
Extensor tendon rupture

Marking. 20% of the total for question 1 pass =4/6 =10% of total for question 1, add 5% for each additional correct item up to a total of 20%

1b. Anatomic assessment of skin wound (position, depth, and visible involvement of underlying structures.
Signs of infection: Local and spread (lymphangitis, nodes, and temperature)
Functional assessment: nerve, extensor tendon, joint, bone and vascular
Survey for other injuries

Marking. 20% of the total for question 1
Pass = 10% and must include Anatomical and Functional assessment. Add 5% each for Evidence of infection and for a Survey for other injuries up to a total of 20%

1c. Essential investigations are a plain x-ray and swab. Pass is 2/2=20% of total for question 1

Marking. 20% of the total for question 1
Pass/fail (zero points) and must include both of X-ray and swab. No additional points awarded or subtracted for other tests such as FBC, CRP, Blood culture

Question 2:

A 45yo male is brought to Launceston ED by ambulance from a property near Launceston Tasmania. He reports that he has been bitten on the hand in the field "by a tiger snake" 20 minutes earlier. A pressure bandage and splint were applied in the field. He experienced a brief syncope within a few minutes of the bite and now complains of mild discomfort in the hand, visual blurring and feeling light headed.

(a) Sequence your management steps (35%)
(b) What is the role for VDK in this man? (10%)
(c) What laboratory tests are appropriate to the management of this case? (30%)
(d) Complete the table for the clinical presentation of Tiger snake envenomation in humans? (30%)

Symptom/sign/lab result	**present/absent (cross out incorrect answer)**
Severe pain at the bite site	present/absent
Defibrinating coagulopathy	present/absent
Anti-coagulant coagulopathy	present/absent
Myolysis (clinically significant)	present/absent
Presynaptic paralysis	present/absent
Postsynaptic paralysis	present/absent

Answers

2 a. b.c Monitored bed and full monitoring.

1. **Leave bandage in place pending initial results and antivenom availability confirmed**

2. **IV access and send bloods** (coagulation profile, fibrinogen FBC, group and hold, CPK, EUC)

3. Brief targeted **history including allergies**

4. Order one vial of tiger snake **antivenom to be given immediately** (without waiting on results). If no Tiger snake specific then 1 vial of polyvalent.

5. Base line **observations** including motor function including lid lag and diplopia, and for external bleeding, and vitals (RR, oxygen sats, PR, BP, Level of consciousness), repeat Q 15 minutely initially.

6. **Remove pressure bandage after antivenom** infusion completed and continue close observation

7. VDK is not indicated as there are no brown snakes, black snakes, tiapans or death adders in the Tasmanian bush

8. tetanus prophylaxis

9. **ICU/HDU admission** when stabilized

Marking. 30% of the total for question 2
Pass/Fail (zero) only. Correct sequence, all bold steps. No additional points

2b. Role of VDK?

VDK is not indicated as there are no brown snakes, black snakes, tiapans or death adders in the Tasmanian bush

Marking. 10% of the total for question 2.
Pass/Fail (zero) only.

2c. Lab tests?

Coagulation profile, fibrinogen, FBC, group and hold, CPK, EUC

Marking. 30% of the total for question 2.
5% for each up to 30%

2d.

Symptom/sign/lab result	present/absent (cross out incorrect answer)
Severe pain at the bite site	absent
Defibrinating coagulopathy	present
Anti-coagulant coagulopathy	absent
Myolysis (clinically significant)	absent
Presynaptic paralysis	present
Postsynaptic paralysis	absent

NB. Tiger snake causes mild swelling by 3 hours and minimal to mild discomfort only

Marking. 30% of the total for question 2.
5% for each up to 30%

Pass = 60%

Question 3:

Immediately upon commencing Tiger snake antivenom therapy a 45 yo male develops severe dyspnoea, throat "tightness" and light headedness.

(a) Describe your immediate actions. (70%)
(b) Describe the hypersensitivity reaction involved. (30%)

Answer

3a. 1. Stop the antivenom infusion

2. Call for assistance and adrenaline 500mcg IM

3. Move to Resus area and fully monitored (these would be expected to be in place for a patient receiving antivenom, therefore no points lost or gained for doing this)

4. IV crystalloid bolus 500 -1,000mls

5. Oxygen by SFM or NRBM (high flow)

6. Assess response and consider IV adrenaline in 50 – 100mcgmcg boluses +/- infusion titrated to response

7. Other therapies include salbutamol nebs for bronchospasm and IV hydrocortisone 100mg q6h +/_ antihistamine

(correct answer incorporates the above. Must mention stopping the antivenom infusion)

3b. Type 1 hypersensitivity/ immediate hypersensitivity response.

Intense **IgE mediated** response

Antigen binds to and cross links **IgE on mast cells and basophils**

Mast cell and basophil degranulation with release of preformed inflammatory and **vasoactive mediators** including histamine

Bronchospasm, vasodilation and increased vascular permeability (Correct answer requires general gist and bold words or equivalent).

Question 4:

A 45yo male has become unresponsive a few seconds after receiving 500mcg of IM adrenaline for florid anaphylaxis (hypoxia, hypotension, welting, wheeze and tongue swelling) to snake bite antivenom.

(a) You elect to intubate using ketamine and suxamethonium (assuming that there are no contraindications). Complete the table by entering difficulties that you may anticipate and entering the immediate remedies that you'd institute for these.

Potential difficulty	**Remedy**
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

Answers

Q4

Potential difficulty	**Remedy**
1. Hypoxia from bronchospasm and airway obstruction from anaphylaxis	1. FiO2 100% preoxygenation, adrenaline, salbutamol, PPV (BVM)
2.Upper airway swelling from anaphylaxis obstructing a clear view to pass the ETT	2. Video-assisted intubation, suction, surgical airway, adrenaline infusion and neb if time permits
3. Able to intubate but hard to ventilate from bronchospasm from anaphylaxis	3. Adrenaline IV, High Pinsp, Long expiratory time (slow breath rate eg 8/min), Salbutamol MDI into the circuit, head elevated if BP permits
4. Laryngospasm from ketamine	4. Needle or surgical airway in dire

	circumstances, otherwise PPV with high Pinsp by BVM and suxamethonium 1.5 - 2mg/kg
5. Hypotension from anaphylaxis	5. IV crystalloid replacement, adrenaline

Correct answer First 4, Pass is ¾

Question 5:

A 45yo male has become unresponsive a few seconds after receiving 500mcg of IM adrenaline for florid anaphylaxis (hypoxia, hypotension, welting, wheeze and tongue swelling) to snake bite antivenom.

(a) Outline the ventilation strategy that you will employ in this case.

Answer

5a. FiO_2 100%. High Pinsp, Long expiratory time (slow breath rate eg 8/min), either volume cycled or pressure cycled or Bag ventilation until stabilized. Tolerate moderate hypercarbia.

Question 6:

A 47yo Caucasian male who has a prior hypoxic brain injury (secondary to anaphylaxis) complicated by seizures. He is brought to your department with an ongoing generalized seizure despite having had 15mg (0.2mg/kg) of midazolam en-route. His BGL is 12.0mmol/L. No trauma. No other comorbidities.

(a) Assuming that there are no drug allergies, in the table below sequence the next four medications that you would use to control this seizure

Medication	**Immediate potential complications**

(b) Record the immediate complications that you would anticipate with using these medications

Answer

6a & b

Medication	**Immediate potential complications**

Phenytoin 15-20mg/kg (max rate 50mg/min)	Ventricular arrhythmia
Levetiracetam 20-40mg/kg	Aggression (later on)
Sodium valproate 20mg/kg	Somnolence, headache and nausea (suggest dose at <33mg/min)
Thiopentone 3-4mg/kg or propofol 2-3mg/kg	Hypotension, respiratory depression, coma
Phenobarbitone 15-20mg/kg	Hypotension, respiratory depression, coma
Paraldehyde 5-10mls IM	Avoid IV because of APO, Pulmonary haemorrhage and shock

Question 7:

Whist restraining a 47yo male with a convulsive seizure a nurse was kneed in the cheek, including the orbit and nose. She experienced immediate epistaxis, facial pain and visual blurring. (photo)

(a) Assuming that this is an isolated facial injury without loss of consciousness, list six potential immediate ocular complications that you would exclude. (25%)
(b) What non-occular complications would you seek to exclude? (25%)
(c) Describe your management of a probable acutely fractured nose. (25%)
(d) What are the clinical signs of orbital compartment syndrome? What is the immediate management? (25%)

Answers

7a. Globe rupture, hyphaema, retinal tear and detachment, vitreous haemorrhage and detachment, choroidal tear/rupture, iris injury, traumatic iritis, lens detachment, corneal abrasion, commotion retinae, orbital fracture, orbital compartment syndrome, orbital content entrapment in the fractured orbital floor.

Examples of blunt injuries include orbital blowout fracture, orbital and lid contusions, iris injury, ruptured globe *(Figure 2)*, traumatic iritis, subconjunctival hemorrhage *(Figure 3)*, hyphema—blood in the anterior chamber—*(Figure 4)*, retinal hemorrhage, commotio retinae *(Figure 5)*, vitreous hemorrhage, choroidal rupture *(Figure 6)*, retinal tears, and retinal detachment.[3,7,8,12,15–18]

FIGURE 5.

Commotio retinae, seen as a whitish change in the retina after blunt trauma. This is believed to be caused by disorganization at the photoreceptor level.

View Large

7b. Inferior orbital nerve injury (sensory loss), nasal septal haematoma (fractured nose), depressed fractured maxilla), orbital floor fracture and entrapment of orbital fat (enophthalmos) and inferior rectus (diplopia). Pass = 4 complications

7c. Analgesia, control epistaxis, **exclude/drain septal haematoma**, **only image in the context of surveying for facial fractures**, exclude orbital injury and inferior orbital nerve injury, no evidence for antibiotics but argued for and given by many on risk of severe infection (divided debate), Pass must be reasonable and include exclude/drain septal haematoma, no imaging unless excluding facial fractures

Question 8:

You work in a metropolitan ED. In working through your algorithm for status epilepticus you elect to use propofol as a fourth line agent. You note that the patient has a short, thick neck, protuberant teeth and a hypertrophic tracheostomy scar.

(a) What is your approach to this situation? (30%)
(b) Describe 4-10 steps in performing an emergency surgical airway. (50%)
(c) What are 5 potential complications of this procedure? (20%)

Answer

8a.
1. To only attempt intubation if there is a compelling indication to immediate intubation. He doesn't have this at present.
2. Summon assistance, preferably anaesthesia for Videoassisted/fibre-optic or gaseous induction in OT
3. Otherwise to prepare for a difficult intubation including preping the neck and preparing staff and equipment for a surgical airway (includes informing NOK of this possibility as well)
4. Plan A. Propofol and sux RSI using video-assisted eg glidescope baton
5. Plan B. Intubating LMA
6. Plan C. Surgical airway (given that there must be a compelling reason for intubation eg loss of airway or impending loss of airway.

Pass/Fail only = Point #1, #2, #3 and escalation plan all required to pass

8b.
1. Informed consent if applicable
2. Prepare staff and equipment prior to RSI attempt
3. **Position patient with neck extended**
3. Prep neck with betadine and mark site

4. LA sc infiltration Lignocaine and adrenaline, puncture and aspirate trachea to confirm position

5. (If right handed) Standing on patient's left holding the trachea firmly with my left (non-dominant) hand and stretching the skin over the cricoid membrane, cut width 15mm minimum, transverse into the trachea in a single motion, or vertical through the skin and **transverse though the cricothyroid membrane.**

6. **Dilate** with my little finger of the right hand, or a haemostat and pass the ETT (preferably a tracheostomy tube) (some pass a bougie first this)

7. **Confirm position** with Bag ventilation

8. Secure the tube.

Pass = bold = 25% of total add 5% up to a total of 50% for additional points

8c. potential complications:

1. Unable to access airway/failed insertion of tracheostomy tube/malposition (hypoxia and death)
2. Haemorrhage
3. Laryngeal/vocal cord injury
4. Tracheal injury
5. Oesophageal injury
6. Mediastinal emphysema
7. Subcutaneous emphysema
8. Tracheal stenosis

Pass or Fail only = list 5 (zero marks for less, no extra marks for more)

Question 9:

A 70yo female attends with acute, non-traumatic painless right unioccular blindness.

(a) List 5 potential aetiologies for this presentation (50%)
(b) What are the clinical features that would suggest Giant Cell Arteritis? (30%)
(c) What is the treatment for Giant Cell Arteritis? (10%)
(d) What are the complications of delayed treatment of Giant Cell Arteritis? (10%)

Answers (9)

9a. Complications: Includes, central retinal artery thrombosis, Ischaemic Central Retinal vein Thrombosis, Optic neuritis (MS, autoimmune, HSV), Retinal detachment,

vitreous haemorrhage, ischaemic optic neuropathy, Giant Cell/temporal arteritis, Drugs (phosphodiesterase-5 inhibitors such as Viagra), migraine

Marking (a) : 10% each up to 50%

9b. Clinical features:

Rare under 50yo, peaks in 8th decade, median age of onset 75.

3.7 female: 1male.

Increased risk (x6) in smokers

Usually has prodromal symptoms days to weeks: headaches (72%), polymyalgia (neck, shoulder girdle, pelvis, malaise, weight loss, jaw and oropharyngeal claudication, limb claudication.

Visual : amorous fujax, diplopia, blurring,

Clinically inflamed temporal artery

Carotid tenderness (15%)

Fundoscopic changes of retinal ischaemia delayed 36hrs

Occasional diplopia and, ptosis and miosis

Marking (b) 30% of total score for this question: Pass (15%) but must include **both** ophthalmic and non-ophthalmic features, including headache, oropharyngeal claudication. Add 5% for each additional feature up to 30% total

9(c). Tx:

Prednisolone initiate at 1mg per Kg (or equivalent dose methylprednisolone) prior to histological confirmation by Temporal artery biopsy.

Marking (c) 10% of total score for this question. Pass/Fail only: **Early high dose steroid**

9d. Complications

(i) Ophthalmic complications

- Visual loss (retinal/optic infarction)

(ii) Non-ophthalmic complications:

- Cerebral ischaemia,
- mesenteric ischaemia,
- limb ischaemia,
- aortic rupture,
- renal infarction,
- death.

Marking (d) 10% of total score for this question:
Pass (5%) must include visual loss, and two others, add 3% for another and another 2% for a 5th

Overall pass = Total >60%

Question 10:

A 55yo male farm hand attends with palpitations for 8 hours and is found to be in AF. He has no history of rheumatic fever, IHD, hypertension, valvular heart disease, previous cerebral ischaemia, peripheral vascular disease or diabetes. He is normotensive and has no ECG evidence of ischaemia. This is his first episode. Apart from the AF his echo is normal.

(a) Calculate his CHADS2 score
(b) What is the purpose of this score
(c) What is the purpose of the HASBLED score
(d) In the table below List 4 pharmacologic management options for this patient and list two clinically important pros (excluding hypersensitivity reactions) for each

Medication	Pros	Cons
1.	1(i).	1(i)
	1(ii)	1(ii)
2.	2(i)	2(i)
	2(i)	2(ii)
3.	3(i)	3(i)
	3(ii)	3(ii)
4.	4(i)	4(i)
	4(ii)	4(ii)

Answers 10

(a) CHADS2 score: one point each for a history of CHF, Hypertension, Age >75, Diabetes, previous stroke/TIA (maximum CHADS2 score = 6/6)
(b) The $CHADS_2$ score is one of several risk stratification schema that can help determine the 1 year risk of an ischemic stroke in a non-anticoagulated patient with non-valvular AF.
(c) HASBLED Score: Estimates risk of major bleeding for patients on anticoagulation for atrial fibrillation.
(d)

Medication	Pros	Cons

1. Metoprolol	relatively up-titratable, rate control only,	long duration of effect hypotension, negative inotrope, CHF, asthma
2. Sotalol	Chemical cardioversion, rate control, IV and PO	Hypotension, negative inotrope, CHF, asthma Prolongs the QT interval
3. Amiodarone	Chemical cardioversion, rate control, IV and PO	Hypotension, Slows conduction, C/I in prolonged QT, long term side effects include thyroid dysfunction and altered TFTs, liver injury, corneal deposits, skin discolouration
4. Digoxin	May be used for rate control when β-blockers C/I eg poor LV function Positive inotrope	Narrow therapeutic range, long T1/2 (several hours to achieve loading) Ineffective in moderate-high adrenergic states
5. Esmolol	Highly titratable, rapid on/off-set Chemical cardioversion	Experienced staff required to correctly titrate, hypotension, negative inotrope, CHF, asthma
6. Flecanide	Oral, single dose chemical cardioversion	C/I if LV dysfunction, or IHD, induces polymorphic VT May induce Atrial flutter at conversion
7. Verapamil/diltiazem	IV/PO, rate control only Alternative to β-blockers in asthmatics, safe in AF with WPW (with normal LV function)	C/I in CHF, hypotension, heart block
8. Procainamide	Safe in AF with WPW IV loading	limited availability, hypotension, lupus antibodies,

Question 11:

A 30yo IV drug user is BIBA with acute stridor. En-route he has been given adrenaline 500mcg IM, ventolin and oxygen. He has an IV in place.

He is alert, diaphoretic, and pale, febrile T-38.5C, PR 100SR, BP 120/80, RR 20, Sats 96% R/A. He has impaired mouth opening and abdominal rigidity. He reports feeling unwell and complains of difficulty swallowing and back pain and over the past three days.

(a) What is your DDx for this presentation? (40%)
(b) What is the pathophysiology of tetanus (20%)
(c) What are the priorities in the management of this man with generalized tetanus? (40%)

Answers 11

(a) DDx for this presentation?

Dystonic drug reaction, tetanus, hypocalcemia, seizures, strychnine toxicity, infections of the head, neck and central nervous system, neuroleptic malignant syndrome, serotonin syndrome. *(**Not** malignant hyperthermia in this context)*

Marking 11(a). 40% of the total score for this question
8% per Differential (max 40%)

(b) Pathophysiology of tetanus

Clostridium tetani, **toxin**, **axonal transport** proximally to the presynaptic GABA-nergic terminal , blocks synaptobrevin, inhibits vesicle binding and release of **inhibitory neurotransmitters** (eg GABA, not acetylcholine)

Results in muscular spasm and autonomic instability

Marking 11(b). 20% of total for this question.
Critical in bold. Pass/fail only (zero or 20%)

(c) Mx priorities

1.Secure the airway (RSI),
2.tetanus toxoid and
3. Immunoglobulin,
4.metronidazole,
5.prevent spasm (diazepam, $MgSO_4$, vecuronium),
6.anticipate autonomic instability (extremely labile BP and heart rate).

Marking 11(c). 40% of the total for this question.
Fails if candidate doesn't intubate (zero)
6% per item up to 40%

(NB. Although C. tetani is penicillin sensitive, penicillin is avoided because of its anti-GABA effects)

Overall Pass = 60%

Question 12:

A 24yo female is BIBA with fever, mutism and increased muscle tone.

(a) List 5 drug induced syndromes that have hyperthermia as a presenting sign. (10%)
(b) What are the cardinal features of the history and clinical examination that define this as Neuroleptic Malignant Syndrome as distinct from Hyperserotonism? (40%)
(c) What are the indications for intubation in this woman with NMS? (25%)
(d) How would you manage her hyperthermia? (25%)

Answers 12

(a) List 5 drug induced syndromes that have hyperthermia as a presenting sign. (10%)

NMS, Hyperserotonism (SS), Malignant Hyperthermia, Sympathomimetic syndrome, Anticholinergic syndrome

Marking. 10% of total for this question
2% for each answer

(b) What are the cardinal features of the history and clinical examination that define this as Neuroleptic Malignant Syndrome and not Hyperserotonism? (40%)

NMS: Must have exposure to a **Neuroleptic medication**: older anti-psychotics, newer anti-psychotics, other agents that increase dopamine (prochlorperazine, metoclopramide, droperidol, promethazine)
mutism
Bradykinesia/akinesia, lead pipe **rigidity**, **dystonia/ catotonia**
Serotonin Syndrome: exposure to an escalated dose or combination of **drugs that increase serotonin** eg lithium, tricyclics, SSRIs, SNRIs, valproate, tramadol, pethidine, dextromethorphan, fentanyl , ondansetron, amphetamines, LSD,
Motor and neurological, agitation and **clonus**, hyperexcitability, **increased tone most marked in the lower limbs**

Marking. 40% of the total for this question
Must have all that are in bold to pass (25%)
5% for each other clinical feature up to 40%

(c) What are the indications for intubation in this woman with NMS? (25%)

Coma/impending coma, impaired airway reflexes, impaired ventilation, temperature control aided by deep sedation (benzodiazapines) and by pharmacological paralysis

Marking. 25% of total for question 12
Pass/fail (zero) only. Must have all of these.

(d) How would you manage her hyperthermia? (25%)

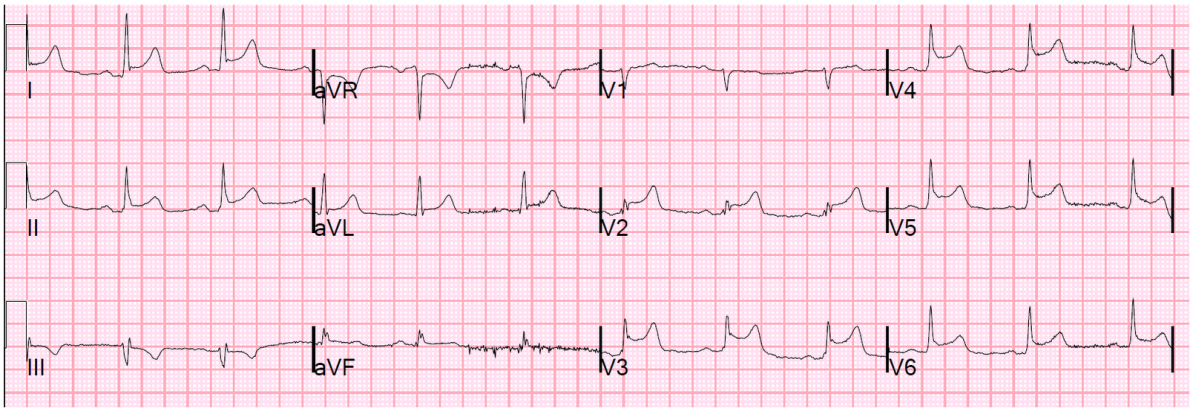
Environmental: strip, fan, warm water mist, cold packs to groin and axillae, hands in cold circulating water
Pharmacological: deep sedation with benzodiazapines, paralysis if Temp >39.5C (intubation and PPV),
Bromocriptine (2.5mg Q8h via NGT)

Marking. 25% of total for question 12
Pass/fail (zero). Requires all of environmental measures, benzodiazapines, paralysis and mention of bromocriptine.

Overall pass = 60%

Question 13:

A 55yo male is BIBA with severe CP of 45 minutes duration. He has had oxygen, 600mcg of GTN, 300mg of oral aspirin followed by 250mls of NS for hypotension. ECG attached (assume standard calibration and paper speed)



(a) What is the diagnosis from this ECG? (15%)
(b) What are the most likely causes for acute hypotension in this setting? (30%)
(c) What are the principal interventions for cardiogenic shock in AMI? (20%)
(d) List 8 absolute contraindications to giving fibrinolytic therapy. (35%)

Answers 13

(a) What is the diagnosis from this ECG? (15%)

Extensive STEMI: **anterior and lateral**, in the territory of the LMCA (LAD)

Marking (a) 15% of total for question 13.
Pass/fail (zero or 15%). Must include STEMI and the territory and comment that it is large/extensive

(b) What are the most likely causes for acute hypotension in this setting? (30%)

Cardiogenic shock from large ischaemic muscle mass LV, tamponade from aortic dissection or free wall rupture, rupture of a papillary muscle, medications (GTN and narcotics), drug interaction with a phosphodiesterase inhibitor eg viagra.

Marking (b). 30% of total score for question 13.
Fail (zero) if did not mention cardiogenic shock/large ischaemic muscle mass.
5% each cause listed up to 30%

(c) What are the principal interventions for cardiogenic shock in AMI? (20%)

Aspirin 300mg
Heparin/enoxaparin
Clopidogrel 300-600mg
Support his BP with IV NS or Hartmanns (+/- vasopressors and inotropes, IABP debated)
Oxygen, given that he is shocked

Urgent revascularization. PCI preferred.

- Primary PCI if available (balloon deployment within 90 minutes of arrival for cardiogenic shock). Otherwise fibrinolysis if not C/I. (Time to Primary PCI balloon inflation is longer if > 3hours from symptom onset)
- Fibrinolysis if not C/I when there will be a delay to PCI , ie if (Door to balloon time) minus (door to needle time) > hour
- Secondary PCI, after primary fibrinolysis when Primary PCI will be delayed

Marking (c). 30% of the total score for question 13.
Pass (15%): Supportive and specific therapies and concept that PCI is preferred but at times fibrinolysis is indicated.
Additional marks for specific time requirements.
Additional marks for clopidogrel and heparin, up to 30%

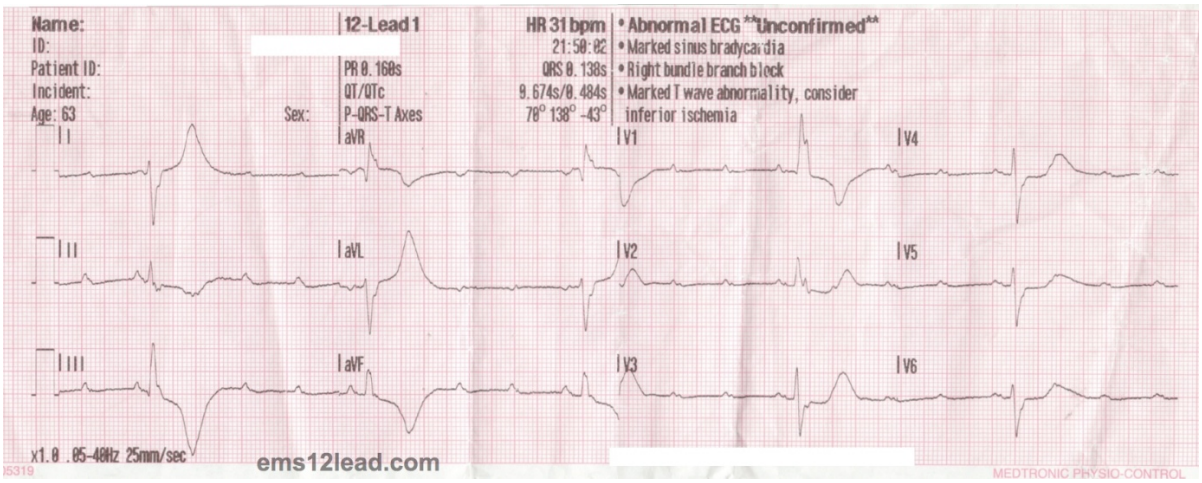
(d) List 6 absolute contraindications to giving fibrinolytic therapy. (35%)

Haemorrhagic CVA (ever), or unknown type of CVA ever
Ischaemic CVA within 6 months
CNS lesions (tumours, A/V malformations)
CNS (< 3 months), major surgery/trauma/head injury (< 3 months)
GIH < 1 month
Known coagulation disorder
Aortic dissection

Marking (d). 35% of total for question 13.
Pass (18%)= 4,
Additional 9% for each extra up to 35%

Question 14:

A 74yo, normally active and independent female presents with light headedness. PR 30bpm, BP 70/40. She is on no medications. She denies chest pain at any stage.



(a) What is the diagnosis from this ECG? (20%)
(b) What are your options for managing this condition acutely? (40%)
(c) Describe the steps in external pacing (40%)

Answers

(a) What is the diagnosis from this ECG? (20%)

CHB (variable PR interval, widened QRS with RBBB pattern (Purkinge origin)
Rate dependent (manifests with high atrial rate)

Marking. 30% of the total for question 14
Pass/fail (zero): CHB/3rd degree block

(b) What are your options for managing this condition acutely? Give pros and Cons (40%)

Reassurance

Pros – may work for rate dependent CHB such as this (avoids drugs)
Cons – recurrence with elevated catecholamines, eg hypotension!

Atropine 300mcg – 1mg

Pros - generally well tolerated, useful if high vagal tone
Cons - Doesn't always work
- blurred vision, dry mouth, confusion in the elderly
- May make rate dependent CHB worse by increasing the atrial rate

Glycopyrolate

Pros - Better tolerated than atropine (less confusion)
Cons - Doesn't always work
- Availability
- blurred vision, dry mouth
- May make rate dependent CHB worse by increasing the atrial rate

Adrenaline

Pros - β- effects May increase rate and contractility and
- α- effects May increase BP and organ perfusion including coronary artery
Cons - Doesn't always work
- May make rate dependent CHB worse by increasing the atrial rate
- Increased myocardial oxygen demand
-

Isoprenaline

Pros - β- effects May increase rate and contractility and less α- effects
Cons - Doesn't always work
- Tachycardia and increased myocardial oxygen demand

External pacing

Pros – Will usually get capture
-quick and available
Cons - Discomfort, requires sedation

Internal pacing

Pros – will usually get capture even when external pacing doesn't

Cons – requires equipment and expertise that may not be available

- Central access risks (bleeding, deterioration during procedure, infection)

Marking. 40% of the total for question 14
Pass = 30%. Requires Atropine, isoprenaline, external and internal pacing and 1 pro and 1 con for each
Additional 10% each for Reassurance and for Adrenaline with at least 1 pro and 1 con for each. Maximum 40%

(c) Describe the steps in external pacing (40%)

Inform patient if conscious
Pads positioned correctly
Select pacing option
Select synchronized if available
Nominate mAmps: may elect to start at 30 and build up, or at 60-120mAmps and wean down depending on urgency to establish capture
Nominate rate 60-80bpm
Start pacing and titrate analgesia (eg fentanyl IV)
Ensure capture (palpate pulse/art line)
Titrate mAmps, allow 50% above capture threshold

Marking. 30% of the total for question 14

Pass/fail (zero)

Sound description, that must include nominates mAmps and rate, ensures capture, provides analgesia

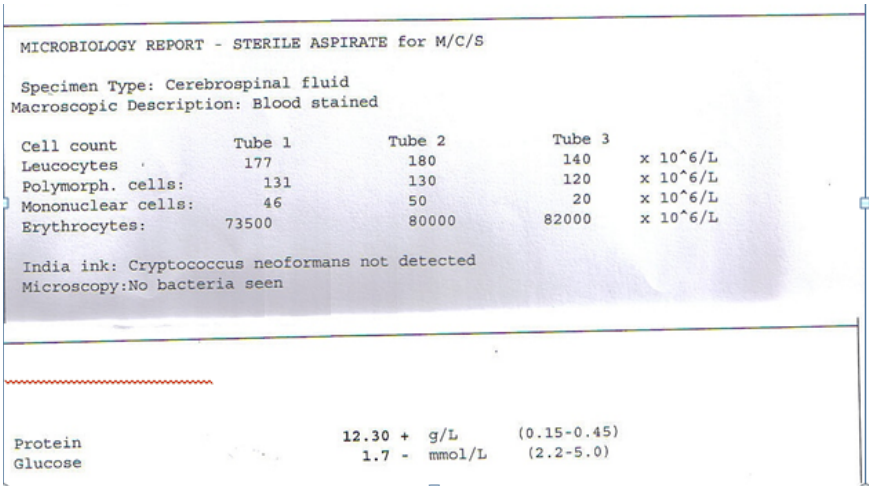
Overall pass 60%

Question 15:

A 22yo female attends with a sudden onset severe unilateral headache.

(a) What features on history and examination support the diagnosis of Acute Sub-arachnoid Haemorrhage? (20%)
(b) What features support the diagnosis of hemicrania? (20%)
(c) What is the optimal timing for an LP to exclude the diagnosis of SAH? (10%)
(d) Describe your procedure/technique for lumbar puncture. (30%)

The LP result (after a negative CT for SAH) follow:



MICROBIOLOGY REPORT - STERILE ASPIRATE for M/C/S

Specimen Type: Cerebrospinal fluid
Macroscopic Description: Blood stained

Cell count	Tube 1	Tube 2	Tube 3	
Leucocytes	177	180	140	x 10^6/L
Polymorph. cells:	131	130	120	x 10^6/L
Mononuclear cells:	46	50	20	x 10^6/L
Erythrocytes:	73500	80000	82000	x 10^6/L

India ink: Cryptococcus neoformans not detected
Microscopy:No bacteria seen

Protein	12.30 +	g/L	(0.15-0.45)
Glucose	1.7 -	mmol/L	(2.2-5.0)

(e) What is the next step in the diagnostic work up given this result? (20%)

Answers

(a) What features on history and examination support the diagnosis of Acute Sub-arachnoid Haemorrhage? (20%)

Marking. 20% of the total for question 15

Past history of SAH

Pregnancy

Polycystic kidneys

Family history

Abrupt onset

Syncope at onset

New neurological deficit

Severe

Occipital/nuchal

Evidence of meningism (photophobia, neck stiffness)

Marking. 20% of the total for question 15

2% per feature up to 20%

(b) What features support the diagnosis of hemicrania? (20%)

Past history of hemicranias

Severe

Unilateral, Ophthalmic division of trigeminal nerve

Epiphoria and corneal injection

Highly responsive to Indomethacin

Multiple episodes per day

Marking. 20% of the total for question 15

4% per feature up to 20%

(c) What is the optimal timing for an LP to exclude the diagnosis of SAH? (10%)

After 11 hours from symptom onset to allow for development of xanthochromia

Marking. 10% of the total for question 15

(d) Describe your procedure/technique for lumbar puncture. (30%)

Essential items : **Consent, sterile technique, patient positioning, landmarks, at least 3 numbered tubes in sequence**, reinsert stylete prior to withdrawal of LP needle, time-out, local anaesthetic, manometry, tests requested.

Marking. 30% of the total for question 15

Pass = 15% which requires all of the bold.

Add 5% for each extra item as above, up to 30%

(e) What is the next step in the diagnostic work up given this result? (20%)

Refer to neurosurgery & CT angiography

Marking. 20% of the total for question 15

10% for each

Overall pass = 60%

Question 16:

A 28yo male has been BIBA.

Assaulted by a "business" partner in a carpark late at night.

Found unconscious, prone when people were alerted by yelling.

He has a stab wound to the right lateral chest and a blunt skull injury with bogginess.

GCS – 3, PR 140, BP 70/40, RR 36, Sats not accurate (poor peripheral perfusion), pupils equal 4mm, sluggish.

Pre-hospital Mx: intercostal needle right chest, 3 sided dressing right chest, IVC, NS 250mls, oxygen , collar.

(a) How do you manage his shock (25%)

(b) Describe your technique for ICC insertion for a stabbed chest (25%)
(c) Describe your approach to intubation in this situation (25%)
(d) Will you intubate before or after ICC insertion? Justify your decision. (25%)

Answers 16

(a) How do you manage his shock (25%)

- Minimize crystalloid in favour of blood as part of a
- Massive Transfusion Protocol (1:1:1 PC, FFP, platelets (if available), commencing with O positive.
- Target sBP of 90mmHg -100mmHg given his head injury
- Seeking adequate BP to allow safe RSI

Marking. 25% of the total for question 16

7% each for first 3 and 45 for last

(b) Describe your technique for ICC insertion for a stabbed chest (25%)

Expedite the procedure

Anticipate rapid deterioration from tension, exsanguination, stabbed heart and pericardial tamponade.

Avoid using the existing puncture site

Large diameter (32Fr)

Measure blood loss (massive haemothorax)

Bilateral if any doubt

Usual technique includes –

- 4^{th} ICS MAL
- Above the rib
- Blunt dissection

Marking. 25% of the total for question 16

5% each for any of the above except those under the usual technique

(c) Describe your approach to intubation in this situation (25%)

RSI with attention to fluid resuscitation prior to intubation if possible,

Maximizing preoxygenation (FiO2 100%, firmly applied BVM maximal flow rate)

Apnoeic oxygenation with NP on 15L/min

Minimize safe doses of sedatives (25% of estimated usual dose) and use those least likely to induce hypotension (fentanyl or ketamine (preferred))

Usual dose of suxamethonium (1.5mg/kg)

Essential elements :

Anticipate prolonged circulation time

Most experienced operator

Stylette and video device if immediately available eg C-MAC or Glidescope baton

Capnography for immediate confirmation of placement

Minimise volume and pressure to attain TV of 6 mls/kg

Adjust FiO2 downwards as patien's condition permits, maintain O2 sats at 100% given his head injury

Head at 30 degrees when BP permits

Marking. 25% of the total for question 16

5% each for any of the above

(d) Will you intubate before or after ICC insertion? Justify your decision. (25%)

Before:

He's unconscious so patient discomfort less of an issue

Haemothorax or tension may be adding to the hypotension

He has an airway at present

Intubation with PPV will probably push his BP lower so resuscitate first and this includes ICC

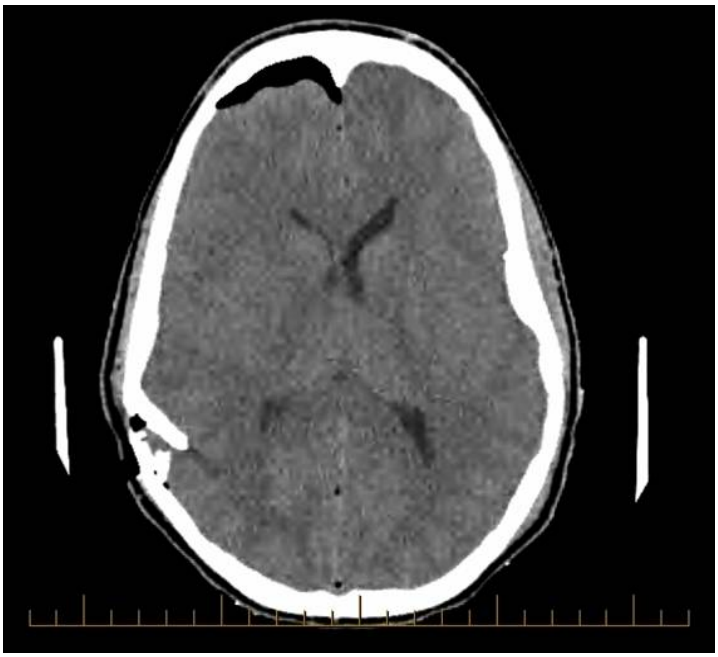
Marking. 25% of the total for question 16

Overall pass = 60%

Question 17:

You have intubated a patient with a severe head injury from an assault.

His CT is attached.



(a) List the abnormalities on this CT (50%)
(b) Would you provide seizure prophylaxis? (20%)
(c) Outline your management and define your physiological targets in the initial resuscitation for this presentation. (30%)

Answers

(a) List the abnormalities on this CT (50%)
Penetrating head injury right parietotemporal
Depressed skull fracture at the site of the penetrating injury
Air within the cranium
Effacement of the right lateral ventricle
Overlying scalp laceration/defect

Marking. 25% of the total for question 17

(b) Would you provide seizure prophylaxis? (20%)

Yes. Penetrating head injury. Depressed skull fracture.

Marking. 25% of the total for question 17

Pass/fail (zero)

(c) Outline your management and define your physiological targets in the initial resuscitation for this presentation. (30%)

Normalize CO2, PaO2, BP, BSL, temperature
Nurse at 30degrees head up
C-spine precautions
and clearance by CT
Tetanus prophylaxis
IV antibiotics eg Cefazolin and gentamicin
Analgesia and sedation (eg midazolam and morphine or morphine and propofol)
Anticonvulsant eg levetiracetam, valproate, phenytoin

Marking. 25% of the total for question 17

Pass = 15% (must include bolded 5% per item) plus 2% for each additional

Overall pass = 60%

Question 18:

A three year old child is brought in by her mother in with the presenting complaint of vomiting.

Her initial observations are: Temp 37C, PR 120, normal colour, RR 18, Oxygen saturation 99% R/A, GCS 15, pupils 3mm, briskly reactive.

After 10 minutes in the waiting room the triage notes that she has a staggering gait. You are called to review her in the CIN room.

She is pale and drowsy with generally reduced tone, PR 88, RR 10, pupils 2mm and slightly sluggish.

(a) Outline 5 essential steps in her resuscitation (20%)
(b) Apart from ingestions list 4 potential aetiologies for her presentation (20%)
(c) List 5 potential toxicological aetiologies for this presentation (20%)
(d) You learn that her mother had given methadone to settle her behaviour. What is your response? (20%)

Answers

(a) Outline 6 essential steps in her resuscitation (20%)

Resus area

Call for assistance

Immediate stabilization/resuscitation

Oxygen,

open and maintain airway (jaw thrust) and **support ventilation** (PPV by BVM prn)

Monitoring

IV access, check **BGL** and collect bloods (FBC, EUC, LFT, B/C, ethanol) and crystalloid bolus NS **20mls/kg**, assess response and repeat prn

Marking. 25% of the total for question 18

Pass/fail (zero), Need 6 of bold to pass (20%). 2% for each additional up to 25%

(b) Apart from ingestions list 4 potential aetiologies for her presentation (20%)

Metabolic – hypo/hyperglycaemia
Hypo/hypernatraemia
Hypoxaemia
Sepsis – CNS/systemic
Trauma—head
Organ failure – uraemia, hepatic
Dehydration
Brain tumour

Marking. 25% of the total for question 18

(c) List 5 potential toxicological aetiologies for this presentation (20%)

Clonidine

Narcotics

Antipsychotics and antihistamines

Tricyclics

Alcohols

Hypotensive agents, eg beta-blockers, verapamil, diltiazem

Hypoglycaemic agents

Marking. 25% of the total for question 18

5% each item

(d) You learn that her mother had given methadone to settle her behaviour. What is your response? (20%)

Protect the child (admit)
Protect other children in her care (DOCS notification, urgently by phone)
Prevent repeat episodes (DOCS notification)
Review the child for other evidence of injury (and record evidence of neglect that you see)
Paeds involvement

Marking. 25% of the total for question 18

Pass/fail Pass needs to include all the above (25%)

Overall pass = 60%