

University Hospital, Geelong

Emergency Medicine

Trial Fellowship Exam

Short Answer Questions (SAQ)

Week 15

DIRECTIONS TO CANDIDATE

- 1. Answer each question in the space provided in this question paper.
- 2. Do not write your name on this question paper.
- 3. Enter your examination number in the space below.
- 4. Cross out any errors completely.
- 5. Do not begin the exam until instructed to do so.
- 6. Do not take examination paper or materials from this room.
- 7. The booklet binder may be removed during the exam.

QUESTION & ANSWER

BOOKLET

Question 1 (18 marks)

a. Complete the table to distinguish between the historical features of Guillain-Barré Syndrome and Multiple Sclerosis. (4 marks)

	Historical feature	Guillain-Barré Syndrome	Multiple sclerosis
1. (1 mark)			
2. (1 mark)			
3. (1 mark)			
4. (1 mark)			

Question 1 (continued)

b. Complete the table to distinguish between the examination features of Guillain-Barré Syndrome and Multiple Sclerosis. (4 marks)

	Examination feature	Guillain-Barré Syndrome	Multiple sclerosis
1. (1 mark)			
2. (1 mark)			
3. (1 mark)			
4. (1 mark)			

Question 1 (continued)

c. List the two (2) investigations of choice to assist with the diagnosis of Multiple Sclerosis. State two (2) diagnostic findings that are supportive of Multiple Sclerosis for each investigation. (6 marks)

2	
Investigation of choice 2:	

1.			

- 2. _____
- d. Assuming the diagnosis of Guillain-Barré Syndrome, which drug must not be given if intubation is required? State the reason why. (2 marks)

Drug:_____

Reason: ______

Supportive findings:

e. List the two (2) options for specific treatment of Guillain-Barré Syndrome. (2 marks)

1. _____

2. _____

Question 2 (11 marks)

A 35 year old man is brought into your emergency department after an isolated injury to the left ankle sustained in a motor cycle accident. His observations are:

BP	160/ 50	mmHg supine
HR	110	bpm
GCS	15	

Two (2) of his ankle X-rays are shown in the props booklet- page 1 & 2

a. State four (4) features shown on these xray that suggest a severe injury. (3 marks)

1.	
2.	
3.	
4.	

Question 2 (continued)

He is delivered by ambulance and has received only penthrane enroute. He does not have intravenous access on arrival. He is extremely distressed with pain. He last ate 2 hours ago. His weight is 70 kg.

b. List seven (7) analgesic options for this patient while he is in the emergency department. Include initial doses and routes where applicable. (7 marks)

1	
2.	
3.	
_	
4	
5	
6	
7	

Question 3 (12 marks)

A 65 year old female, non- English speaking, Italian lady presents with about 1 cup of haemoptysis.

You are unable to obtain any medical history. Her observations are:

BP	135/65	mmHg
HR	80	bpm
GCS	15	

a. List four (4) likely differential diagnoses for this presentation. (4 marks)

1.	 	
2.	 	
3.		
4.		

Question 3 (continued)

b. Other than a CXR, list three (3) key investigations that you would consider ordering in the emergency department for this patient. (3 marks)

1.	 	
2.	 	
3.		

A Chest X-ray shows unilateral changes.

She experiences a large volume haemoptysis (estimated blood loss 500 ml).

c. State five (5) key steps in the treatment of this patient over the next 30 minutes. (6 marks)

1.	 	
2.	 	
3.	 	
_		
4.	 	
5.		
2.		
6.	 	

Question 4 (17 marks)

A 64 year old man is being evaluated in your emergency department after an episode of chest pain which has now resolved. He has been given aspirin only en route to hospital. His observations are:

BP	140/85	mmHg
RR	20	bpm
O2 saturation	97%	room air

An ECG is taken- refer to the props booklet- page 3 (labelled ECG 1).

a. State four (4) abnormal findings shown in this ECG. (4 marks)

1.	
2.	
3.	
4.	
	b. List four (4) likely causes for these findings. (4 marks)

1.	
_	
2.	
3.	
4.	

Question 4 (continued)

The patient becomes suddenly unwell. He is lightheaded with no chest pain. His BP is 70/50 mmHg. He is given a 500ml fluid bolus with no improvement.

His ECG at this stage is shown in the props booklet- page 4 (labelled ECG 2).

c. State five (5) abnormal findings shown in this ECG. (5 marks)

1.	
2.	
3.	
4.	
5.	

Question 4 (continued)

d. List in order of escalation, your first two (2) choices of drug treatment for this patient. For each specify dose and route. (4 marks)

	Drug treatment (2 marks)	Dose and route (2 marks)
1 st line		
2 nd line		

Question 5 (14 marks)

Three (3) X-rays from three (3) <u>different</u> patients are shown in the props booklet- pages 5, 6 & 7.

- a. For X-ray 1, state where the foreign body lies. (1 mark) Props booklet- Page 5
- b. For X-ray 1, list two (2) options for the nature/composition of the foreign body. (2 marks) **Props booklet- Page 5**
- 1. _____
- 2. _____
 - c. For X-ray 1, list two (2) factors that would mandate urgent removal of the foreign body. (2 marks) **Props booklet- Page 5**
- 2. _____

1. _____

- d. For X-ray 2, state where the foreign body lies. (1 mark) Props booklet- Page 6
- e. For X-ray 2, what is the nature/composition of the foreign body? (1 mark) **Props booklet- Page 6**

Question 5 (continued)

f. For X-ray 2, state your disposition. Provide two (2) points of justification for this choice. (3 marks) **Props booklet- Page 6**

Disposition:_____

Justification:

1		

2. _____

g. For X-ray 3, state where the foreign body lies. (1 mark) Props booklet- Page 7

h. For X-ray 3, state your disposition. Provide two (2) points of justification for this choice. (3 marks) **Props booklet- Page 7**

Disposition:_____

Justification:

1.				

2. _____

Question 6 (12 marks)

A 45 year old man with type 1 diabetes mellitus is brought in by ambulance with an altered conscious state.

Initial investigations are taken- refer to the props booklet- page 8.

His observations are:

BP	90/70	mmHg
HR	120	bpm
Temperature	36.8	°C
Oxygen saturation	97%	on 8L by Hudson mask
GCS	12	E4, V3, M5

a. Provide three (3) calculations to help you to interpret these results. (3 marks)

Derived value 1:	 	 	
Derived value 2:	 	 	
	 	 · · · · · · · · · · · · · · · · · · ·	
Darivad value 2:			
Derived value 5.	 	 	

b. Provide a unifying explanation for this clinical picture based on these results. (3 marks)

Question 6 (continued)

c. Complete the following table demonstrating three (3) key specific treatment tasks in the first 2 hours of the emergency department stay. For each choice, state how you would achieve each of these tasks. (6 marks)

	Key treatment task (3 marks)	How will you achieve the task? (3 marks)
1		
2		
3		

Question 7 (12 marks)

A 65 year old man presents with a left hand injury.

A photograph of the man is taken- refer to the props booklet- page 9.

a. List three (3) factors that are evident from this image, that would suggest a poor prognosis for successful reimplantation. (3 marks)

1.		 	
2	 	 	
r			
3. <u> </u>		 	

b. List six (6) historical factors that would suggest a poor prognosis for successful reimplantation. (6 marks)

1.	
2.	
3.	
4.	
5.	
6.	

Question 7 (continued)

- c. How you would store the amputated parts, pending a decision for potential reimplantation? List two (2) points in your answer. (2 marks)
- 1. _____

2. _____

d. What is the most appropriate regional anaesthesia technique for this patient? (1 mark)

Question 8 (12 marks)

A 6 year old boy presents with a left supracondylar humeral fracture.

a. State two (2) types of pain scoring systems that you could apply to this child. (2) marks) 1. _____ 2. _____ b. List two (2) reasons why a pain score is used. (2 marks) 1. _____ 2. _____ c. List four (4) indications for general anaesthetic, manipulation and plaster for this patient. (4 marks) 1. _____ 2. _____ 3. _____ 4. _____

Question 8 (continued)

d. List four (4) pieces of advice that you would give to this boy's parent if the patient is able to be discharged from the emergency department. (4 marks)

1.	 	
2.	 	
3.		
4.		

Question 9 (12 marks)

A 46 year man is brought to your emergency department with suspected alcohol withdrawal.

a. List seven (7) of the 10 scale domains that form the Alcohol Withdrawal Assessment Scale. (7 marks)

1.	
2.	
3.	
4.	
5.	
6.	
7.	

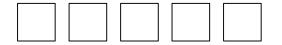
Question 9 (continued)

A 35 year old male is identified as having "very severe" alcohol withdrawal.

b. State five (5) key management steps for this patient over the next 1 hour. (5 marks)

1.	
2.	
3.	
4.	
5.	

ID NUMBER:



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Emergency Medicine

Trial Fellowship Exam

Short Answer Questions (SAQ)

Week 15

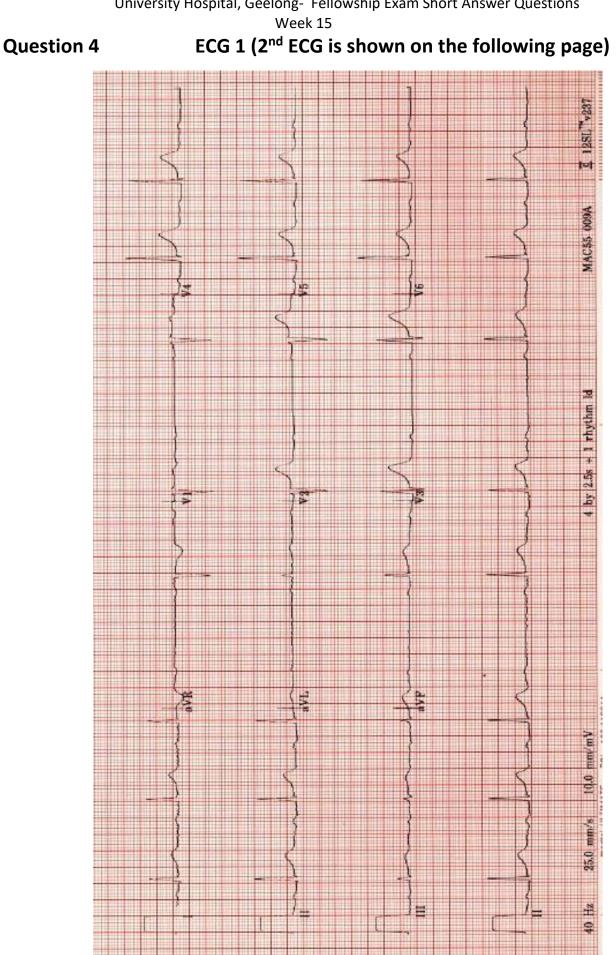
PROP BOOKLET

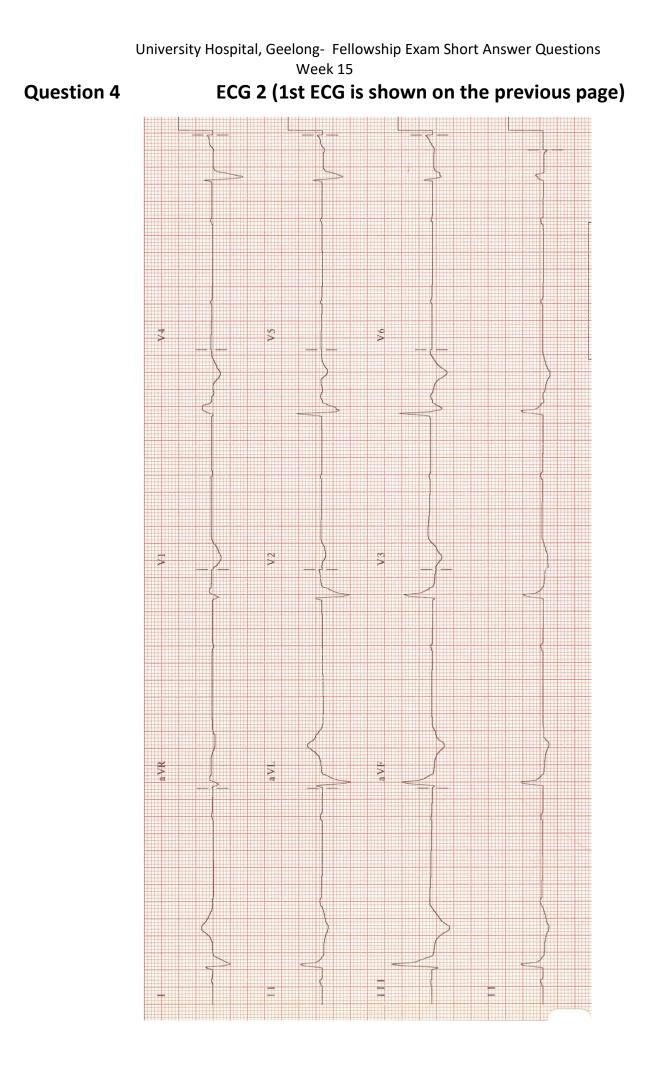
Question 2Xray 1(2nd xray is shown on the following page)



Question 2 Xray 2 (1st xray is shown on the previous page)

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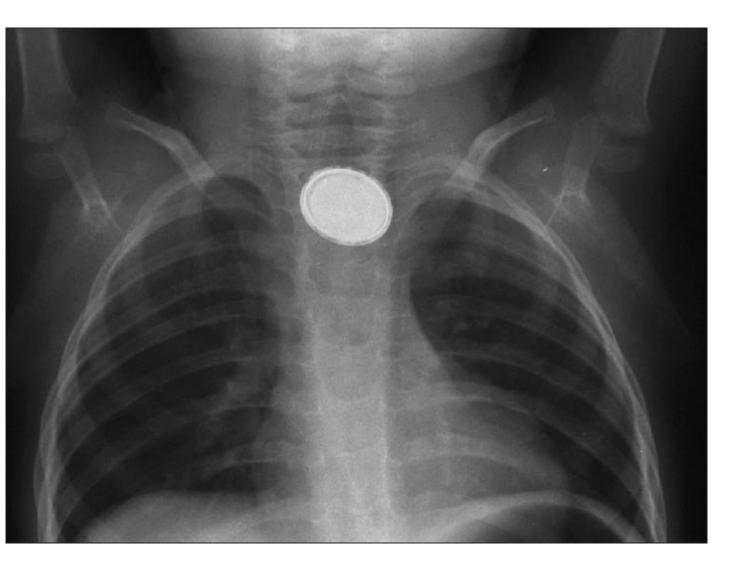




Question 5 Xray 1 (2nd Xray is shown on the following page)



Question 5 Xray 2 (1st Xray is shown on the previous page)



Question 5 Xray 3 (1st and 2nd Xray are shown on the previous pages)



Question 6

FIO ₂	0.50		
рН	7.05		7.35-7.45
pCO ₂	66	mmHg	35-45
pO_2	247	mmHg	80-95
Bicarbonate	18	mmol/L	22-28
Base excess	-14		-3 - +3
O ₂ saturation	99	%	>95
Na ⁺	131	mmol/L	134-146
K^+	5.0	mmol/L	3.4-5
Cl	92	mmol/L	98-106
Urea	15	mmol/L	3-8
Creatinine	227	micromol/L	45-90
Glucose	50.9	mmol/L	3.5-5.5

Question 7



Week 15

"List" = 1-3 words "State"= short statement/ phrase/ clause

UNIVERSITY HOSPITAL, GEELONG

clause FELLOWSHIP WRITTEN EXAMINATION

WEEK 15– TRIAL SHORT ANSWER QUESTIONS Suggested answers

PLEASE LET TOM KNOW OF ANY ERRORS/ OTHER OPTIONS FOR ANSWERS

Please do not simply change this document - it is not the master copy !

Question 1 (18 marks)

a. Complete the table to <u>distinguish</u> between the clinical features of Guillain-Barré Syndrome and Multiple Sclerosis. (4 marks)

History	Guillain-Barré Syndrome	Multiple sclerosis
Age at onset		Typical onset : 20-40 yr old
Onset	Insidious	Episodic, relapsing, remitting
	Post infection/ Sx/ Immunisation/ malignancy	
Distribution	Ascending motor paralysis	Random, eyes often 1 st
	Glove & stocking loss	
Limb pain	Passive movement/ calf pain common	Electric shock sensations in legs,
		worse with neck flexion
Visual disturbance	Opthalmoplegia rare	Optic neuritis
		Painful eye movements
		VA/ field defects
Cerebral Fx		Intellectual demise
		Seizures
Natural course	> 90% recovery	Stabilise & improve
		Progressive
Sex		Female : male 2:1

b. Complete the table to distinguish between the examination features of Guillain-Barré Syndrome and Multiple Sclerosis. (4 marks)

Examination	Guillain-Barré Syndrome	Multiple sclerosis
CN	50% facial n or bulbar	Common, esp eyes ION, RAPD
Cerebellar signs	Rare	May be present
Gait	weakness	Spastic
Tone	\checkmark	↑ , clonus
Reflexes	↓ / flaccid (LMN)	个 (UMN)
Autonomic	Common	Rare- sensory - Bladder dysfunction
Respiratory compromise	↓ FEV1	Rare
	Respiratory support may be required	

c. List the two (2) investigations of choice to assist with the diagnosis of Multiple Sclerosis. State two (2) diagnostic findings that are supportive of Multiple Sclerosis for each investigation. (6 marks)
 Investigation of choice 1: CSF examination

Supportive findings:

•

- (90%) < 10 cells/ml- T lymphocyte predominance
- Normal protein
 - **lggy** (个 in 80%)
 - Oligoclonal bands (85-90% of clinical MS)

Investigation of choice 2: MRI Brain Supportive findings:

- Subcortical and periventricular plaques (50%)
- Enhancement indicates activity/ resolves with remission
- d. Assuming the diagnosis of Guillain-Barré Syndrome, which drug must not be given if intubation is required? (2 marks)
 - Sux

- **Precipitation of life threatening hyperkalaemia (**absolutely contraindicated in patients with GBS. There have been a number of case reports of severe hyperkalaemia, life threatening arrhythmias, and cardiac arrest after its administration in GBS)
- e. List the two (2) options for treatment of Guillain-Barré Syndrome. (2 marks)
 - IV Immunoglobulin
 - Plasmaphoresis (usually not both together, it's an either/ or)

Guillain Barre Syndrome

- Commonest cause of rapid onset paralysis in previously healthy person.
- Both sexes. All ages
- Acute polyneuropathy 1-4 weeks post:
- 70% post viral URTI/ gastro
- Post operative
- Post immunisation
- Intercurrent malignancy

■ Pathology→ neuronitis with myelin destruction and ∴ Wallerian degeneration of neurones

Clinical features

<u>Sensory</u>

- Initial paraesthesia in hands and feet → minor glove and stocking loss (sensory neuropathy is usually minimal)
- Posterior column vibration/ proprioception > spinothalamic

<u>Motor</u>

- Progressive ascending motor weakness affecting > 1 limb → distal mm weakness without atrophy (25% prox >distal)
- Areflexia/ marked hyporeflexia
- Limb pain on passive movement/ calf pain
- CN in ~ 50% \rightarrow usually facial nn or bulbar (all except I, II, VIII, extra ocular mm rarely involved)
 - Miller Fischer variant has predominant CN involvement

Other

- No fever/ neck stiffness, normal mental state
- Autonomic dysfunction
 - Bad prognostic indicator
 - Very sensitive to cardiac drugs \rightarrow may arrest on intubation
 - Ileus, retention, assoc. SIADH

Investigations

Dx

- CSF protein \uparrow in 90% > 0.4g/l
- CSF count normal
- FET \rightarrow monitor progress

Тх

- ABG
- RFT
- Exclude other causes

Management

- CVS, Resp support
- SUXAMETHONIUM ASSOCIATED WITH SUDDEN DEATH
- Nutrition \rightarrow enteral, parenteral
- Plasmaphoresis
 - Superior to supportive alone
 - Best if commenced < 7 days after onset
 - 1 speed of recovery
 - No change to ultimate mortality
- Immunoglobulin Rx
 - Probably as useful as plamaphoresis

Prognosis

- Good → most full recovery
- Worse prognosis if : autonomic involvement

- deficit not \downarrow in 3/52

- 2% mortality \rightarrow resp. failure
- 10% major residual deficit

DDx of acute ascending motor paralysis

- Rhabdomyolysis
- Tick/snake bite
- Diphtheria/ polio/ botulism
- PAN

DDX autonomic neuropathy

- DM
- ETOH
- Amyloid

Multiple sclerosis

- Commonest chronic neurological condition
- Onset 30- 40's, 60% F
- 20% asymptomatic through life
- Higher incidence in Tas, lower as go north in Aus
- Pathology → Extensive white matter plaques, loss of oligodendrocytes, axonal sparing

Conduction disturbed by fever, stress, electrolyte imbalance (loss of suppressor T cells b4 attacks)

Clinical features

- Episodic attacks of focal neurological deficit → sensory, motor or sphincter
- Predilection for spinal cord, brain, optic nerves
- Over 2- 14/ 7 then remission
- ~½ present as single sign or symptom
- Common \rightarrow limb weakness, optic neuritis (pain wit eye movements, \downarrow VA), sensory symptoms, diplopia

1. <u>Spinal cord</u> \rightarrow commonest manifestation

- limb weakness in 40%, UMN signs (spastic gait, ↑ tone, clonus, ↑ reflexes), post column loss
- painful spasms
- bladder dysfunction, constipation
- Lhermittes sign → painful electric shocks down legs ↑ by neck flexion
- Optic neuritis → 40% at some stage, presenting symptom in 20%
 Significant pain with eye movement is present in nearly every case of demyelinating optic neuropathy
 - VA over days, central scotoma, usually unilateral
 - disturbed colour perception early sign
 - visual field defects
 - pain on eye movement
 - Ex: 50% papillitis on fundoscopy, relative afferent pupilliary defect
 - 40% go onto MS
 - 1/3 completely recover, partially, not at all
 - Uhthoff's phenomenon $\rightarrow \downarrow$ vision dt exercise, hot meal/ bath
- 3. <u>Brainstem</u> \rightarrow common
 - Diplopia, III, IV, VI CN lesions
 - Internuclear opthalmoplegia almost Dx of MS or SLE
 - Abno of MLF \rightarrow ipsilateral adduction inability, contralateral lat. gaze nystagmus
 - Bell's palsy
 - Vestibular neuronitis → vertigo, vomiting, nystagmus
 - Cerebellar signs
- 4. <u>**Cerebral**</u> \rightarrow Intellectual demise
 - Depression
 - Seizures ~ 5%
 - Rare \rightarrow dysphasia, hemiparesis, homonymous hemianopia

Diagnosis

עחח

- Involvement of different parts of nervous system, 2 separate occasions, lasting > 24/24 or slow progression over 6/12
- Requires 2 anatomically separate lesions
- Delayed visual/ auditory/ somatosensory evoked potentials
- LP \rightarrow 90% < 10 cells/ml, mainly T lymphocytes, \uparrow lgG, protein normal
- MRI → detects demyelinated areas, subcortical and periventricular plaques visualised in 50% Enhancement indicates activity of disease

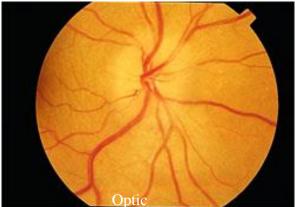
DDX		
Eye		HIV
	Retinal a/v occlusion	Posterior fossa SOL
	Optic nerve glioma	SLE
	Methanol ingestion	Sarcoid
SC dis	sease	
	Cx spondylosis	
	Subacute degeneration	
	Hereditary ataxias	
	SC compression	

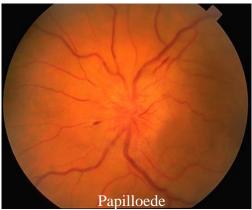
Cerbral

Mx

- Acute \rightarrow high dose methyl pred, ACTH 80U, PNL
- Prevent relapses → Azathioprine, cylophosphamide, interferon, plasmaphoresis
- Symptomatic \rightarrow baclofen for spasms, carbamazepine for pain, urinary catheter, bowel training

Optic neuritis





- Mono-ocular vision changes, especially in a young female should prompt you to thinking about this condition.
- Optic neuritis (decreased visual acuity, relative afferent pupillary afferent defect) can easily be mistaken for papilledema (visual acuity and pupillary reflexes are normal)
- Making the diagnosis can be difficult in that the majority of patients may actually have a normal fundoscopic exam but give a classic history for "retrobulbar neuritis" (vision changes and pain especially with eye movement).
- The clinical presentation of demyelinating optic neuropathy varies.
- Patients frequently present to the ED with an acute loss of vision.
- The natural history of MS-related vision loss is rapidly progressive acuity loss for a period of 10 days, which then

stabilises and improves.

- Additional ocular signs include eye pain, tenderness of the globe, dyschromatopsia, decreased brightness sense, decreased colour perception, a relative afferent pupillary defect, assorted visual field defects (altitudinal and central/cecocentral), phosphenes upon eye movement and optic disc swelling with or without vitreous cells. Often, the optic nerve is normal in appearance and the dysfunction is considered retrobulbar.
- Demyelinating optic neuropathy can damage the fibers in both the visual and pupillary pathways. This
 damage interrupts nerve impulses within the pathways, producing decreased vision as well as an
 afferent pupillary defect.
- Systemic signs and symptoms may include headache, nausea, Uhtoff's sign (decreased vision with or without limb weakness following exposure to increased temperatures i.e., a bath or exercise), Romberg's sign (patient falls when they close their eyes), Pulfrich's stereo phenomenon (beer barrel appearance to the environment) and fever.
- As recorded in the three-year follow-up of patients Rx with intravenous methylprednisolone followed by oral corticosteroid regimens reduced the two-year rate of development of clinical MS, particularly in patients with signal abnormalities consistent with demyelination on MRI of the brain at the time of study entry. Serious side effects of glucocorticoid therapy are infrequent. Therefore, outpatient administration of highdose intravenous glucocorticoids may be recommended.

Clinical Pearls

- A number of other types of demyelinating disorders have been associated with ON.
 - They are: acute transverse myelitis Guillain-Barré syndrome Devic's neuromyelitis optical Charcot-Marie-Tooth syndrome multifocal demyelinating neuropathy acute disseminated encephalomyelitis.
- Diseases such as syphilis, toxoplasmosis, histoplasmosis, tuberculosis, hepatitis, rubella, human immunodeficiency virus (HIV), Lyme borreliosis, familial Mediterranean fever, Epstein-Barr virus, herpes zoster ophthalmicus, paranasal sinus disorder, sarcoidosis, systemic lupus erythematosus, Bechet's

disease, and diabetes may cause optic neuropathy and should be considered before prematurely diagnosing demyelinating optic neuropathy.

- In cases of optic neuropathy presumably secondary to demyelinating disease, MRI can assist in systemic diagnosis by identifying both old and acute demyelinating plaques within periventricular white matter.
- Significant pain with eye movement is present in nearly every case of demyelinating optic neuropathy.
- As the visual dysfunction is due to autoimmune destruction of myelin and not direct inflammation of the optic nerve tissue, this disease entity is best termed demyelinating optic neuropathy.

Question 2 (11 marks)

A 35 year old man is brought into your emergency department after an isolated injury to the left ankle sustained in a motor cycle accident. His obs are: BP 160/50 mmHg supine HR 110/min GCS 15



- a. State (4) features shown on this xray that suggest a severe injury. (4 marks)
 - Complete # through the neck of talus
 - Severe comminution of talus
 - Separation of the major fragments > 1 cm
 - Marked anterior displacement of distal fragment

NB: not dislocation/ subluxation as ankle joint is intact

He is delivered by ambulance and has received only penthrane enroute. He does not have intravenous access on arrival. He is extremely distressed with pain. He last ate 2 hours ago. His weight is 70 kg.

- b. List seven (7) analgesic options for this patient while he is in the emergency department. Include doses and routes where applicable. Include initial doses and route where appropriate. (7 marks)
 - Initial options:
 - IM ketamine 3-5 mg/kg
 - IN fentanyl 1 mcg/kg
 - N20
 - IV morphine- 5-10mg
 - Sedation for reduction:
 - IV ketamine 1-1.5 mg/ kg
 - IV midazolam 3-5 mg
 - Reduction/ immobilisation
 - Elevation
 - Ankle block 10-20ml x 0.5% plain bupivacaine
 - PCA
 - Oral oxycodone/paracetamol

Question 3 (12 marks)

- A 65 year old female, non- English speaking, Italian lady presents with about 1 cup of haemoptysis. You are unable to obtain any medical history. Her observations are: BP 135/65 mmHg HR 80/min GCS 15
 - a. List four (4) likely differential diagnoses for this presentation. (4 marks)
 - TB
 - PE
 - Pneumonia severe with infarction
 - Lung Ca- primary/ secondary
 - Pulmonary abscess
 - Coagulopathy/ over anticoagulation
 - Thrombocytopaenia
 - Pulmonary contusion
 - Inhaled FB
 - b. Other than a CXR, list three (3) key investigations that you would consider ordering in the emergency department. (3 marks)

NB: list only- no qualification needed

- INR
- Sputum- AFB, MCS
- CT Chest
- CTPA
- ECG, FBE, UE, LFT, Quanteferon Gold, ECHO

A Chest Xray shows unilateral changes.

She experiences a large volume haemoptysis (estimated blood loss 500 ml).

c. List five (5) key steps in the treatment of this patient over the next 30 minutes. (6 marks)

NB: 500ml is massive/life threatening haemoptysis

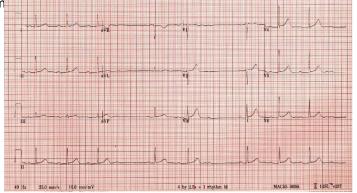
- Communication- Interpreter- obtain focussed Hx/ explain to pt
- Nurse with affected side down Preserve unaffected lung
- Ventilation support- Mainstem intubation or combitube/ dual lumen tube to non affected side only (anaesthetic assistance)
- Circulation- Volume replacement- blood- massive transfusion if indicated
- Reverse anticoagulation- FFP/ VitK/ Prothrombinex/ Tranaxemic acid
- Rx underlying conditions- Pneumonia IV abs/ PE- anticoagulation
- Isolation- If Tb expected

NB: Refer interventional XR- If bleeding persists will probably be after 30 min

Question 4 (17 marks)

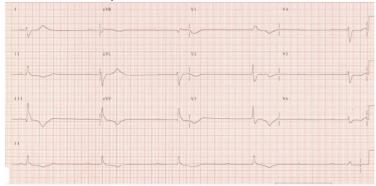
A 64 year old man is being evaluated in your emergency department after an episode of chest pain which has now resolved. He is given aspirin only en route to hospital.2010/1/6. His observations are:

BP 140/85 mmHg RR 20/m



- a. State four (4) abnormal findings shown in this ECG. (4 marks)
 - Bradycardia ~ 48 bpm
 - Mobitz type 1 (Wenchebach) 2nd degree HB
 - STE 1mm II, V2- V6
 - Biphasic TW III Vi
- b. List four (4) likely causes for these findings. (4 marks)
 - Ischaemia
 - Drugs- -ve chronotropes (BB, CCB, Digoxin)- therapeutic
 - Drugs- OD eg same as above
 - Cardiomyopathy
 - Myocarditis

The patient becomes suddenly unwell. He is lightheaded with no chest pain. His BP is 70/50 mmHg. He is given a 500ml fluid bolus with no improvement.



- c. State five (5) abnormal findings shown in this ECG. (5 marks)
 - Rate 25-30
 - CHB
 - Ventricular/ Idioventricular escape or QRS prolongation
 - RAD
 - TWI II, III, V1-V3

(For Q waves to be significant they need to be: > 40 msec & > 2 mm deep & > 25% depth of QRS)

d. List in order of escalation, your choice of drug treatment for this patient. Specify dose and route. (4 marks)

Drug treatment	Dose

W	eel	k	15
~ ~	CU	N .	тэ

1 st line	Isoprenaline or Adrenaline	Bolus 20-40 mcg IV Followed by infusion 0.5- 20 mcg/min
2 nd line	Atropine	300mcg-600mcg IV (rarely effective)

Question 5 (14 marks)

A series of three (3) Xrays from three (3) different patients are shown in the props booklet



- a. For Xray 1, state where the foreign body lies. (1 mark)
 - Lower oesophagus at the gastro-oesophagus junction.
- b. For Xray 1, list two (2) options for the nature/composition of the foreign body. (2 marks)
 - Coin
 - Round metal object
- c. List two (2) factors that would mandate urgent removal of the foreign body. (2 marks)
 - Excessive symptoms
 - Unable to swallow
 - Severe pain
 - Complications
 - Haematemesis
 - Features of perforation



- d. For Xray 2, where the foreign body lies. (1 mark)
 - Oesophagus- upper
- e. For Xray 2, what is the nature/composition of the foreign body? (1 mark)
 - Button battery
- f. For Xray 2, state your disposition. Provide two (2) points of justification for this choice. (2 marks)
 - Disposition: Theatre Admit Gastro/ ENT
 - Justification: Immediate removal required (MANDATORY) (< 2/24) Extensive surrounding tissue damage commences < 30 min Too large to allow wait and see if passage occurs spontaneously
- g. For Xray 3, where does the foreign body lie? (1 mark)

• Upper oesophagus



h. For Xray 3, state your disposition. Provide two (2) points of justification for this choice. (3 marks)

Disposition: Admit Gastro/ ENT

Justification: Too large to pass spontaneously Timing of removal depends on symptoms

Question 6 (12 marks)

A 45 year old man with type 1 diabetes mellitus is brought in by ambulance with an altered conscious state. His observations are: BP90/7 0mmHg HR120 bpm Temperature 36.8 °C Oxygen saturation 97% on 8L by Hudson mask GCS12E4, V3, M5

FIO_2	0.50		
pН	7.05		7.35-7.45
pCO ₂	66	mmHg	35-45
pO_2	247	mmHg	80-95
Bicarbonate	18	mmol/L	22-28
Base excess	-14		-3 - +3
O2 saturation	99	%	> 95
Na ⁺	131	mmol/L	134-146
K^+	5.0	mmol/L	3.4-5
Cl-			
CI	92	mmol/L	98-106
Urea	92 15	mmol/L mmol/L	98-106 3-8
Urea	15	mmol/L	3-8

- a. Provide three (3) calculations to help you to interpret these results. (3 marks)
 - 1. Corrected Na (Need to correct Na prior to AG calculation)

True Na =	measured Na+	+	glucose- 10/3
Or	measured Na+	+	glucose- 7/ 3.5
Or	measured Na+	+	glucose/4

- 2. Anion Gap = $21 \therefore \uparrow$
- 3. Delta gap Δ ratio: ~ 1.7 \therefore Pure HAGMA
- 4. Others:

•

- Expected CO₂
- A-a gradient 274-247 = 27 \therefore normal for age
- o Se Osmo
- b. Provide a unifying explanation for this clinical picture based on these results. (3 marks)
 - HAG Metabolic acidosis- Likely DKA
 - 1° respiratory acidosis- Likely hypoventilation
 - Renal impairment- slightly increased Ur:Cr likely partly prerenal from dehydration
- c. Complete the following table demonstrating three (3) key specific treatment tasks in the first 2 hours of the emergency department stay. State how you would achieve each of these tasks.

	Key treatment task	How will you achieve the task?
1	Establish U/O/ correct	Fluid
	hypovolaemia	1 L NS Stat
		~ 250 ml/hr for next 4/24
		Monitor U/O with FBC (avoid IDC)
		CVP monitoring
2	Correct hypoglycaemia	Fluids
		Insulin 0.1 U/kg/hr (max 15 U/hr)
		Follow local protocol
		3-5 U/hr
	K balance	Replace K as glucose falls and K falls
	Airway protection	Careful observation given altered conscious state

Treat precipitant Eg Seps	is

Delta ratio

This Delta Ratio is sometimes useful in the assessment of metabolic acidosis. As this concept is related to the anion gap (AG) and buffering, it will be discussed here before a discussion of metabolic acidosis. The Delta Ratio is defined as:

Delta ratio = (Increase in Anion Gap / Decrease in bicarbonate)

How is this useful?

In order to understand this, consider the following:

If one molecule of metabolic acid (HA) is added to the ECF and dissociates, the one H⁺ released will react with one molecule of HCO_3^- to produce CO_2 and H_2O . This is the process of buffering. The net effect will be an increase in unmeasured anions by the one acid anion A⁻ (ie anion gap increases by one) and a decrease in the bicarbonate by one.

Now, if all the acid dissociated in the ECF and all the buffering was by bicarbonate, then the increase in the AG should be equal to the decrease in bicarbonate so the ratio between these two changes (which we call the delta ratio) should be equal to one. The delta ratio quantifies the relationship between the changes in these two quantities.

Example

If the AG was say 26 mmols/l (an increase of 14 from the average value of 12), it might be expected that the HCO_3^- would fall by the same amount from its usual value (ie 24 minus 14 = 10mmols/l). If the actual HCO_3^- value was different from this it would be indirect evidence of the presence of certain other acid-base disorders (see Guidelines below).

Problem

A problem though: the above assumptions about all buffering occurring in the ECF and being totally by bicarbonate are not correct. Fifty to sixty percent of the buffering for a metabolic acidosis occurs intracellularly. This amount of H⁺ from the metabolic acid (HA) does not react with extracellular HCO_3^- so the extracellular $[HCO_3^-]$ will not fall as far as originally predicted. The acid anion (ie A⁻) however is charged and tends to stay extracellularly so the increase in the anion gap in the plasma will tend to be as much as predicted.

Overall, this significant intracellular buffering with extracellular retention of the unmeasured acid anion will cause the value of the delta ratio to be greater than one in a high AG metabolic acidosis.

Caution: Inaccuracies can occur for several reasons, for example:

- Calculation requires measurement of 4 electrolytes, each with a measurement error
- Changes are assessed against 'standard' normal values for both anion gap and bicarbonate concentration. Sometimes these errors combine to produce quite an incorrect value for the ratio. As an example, patients with hypoalbuminaemia have a lower 'normal' value for anion gap so using the standard value of 12 to compare against must lead to an error. Do not overinterpret your result and look for supportive evidence especially if the diagnosis is unexpected. **Guidelines for Use of the Delta Ratio**

Some general guidelines for use of the delta ratio when assessing metabolic acid-base disorders in provided in the table below.

Overall Advice: **Be very wary of over-interpretation** - Always check for other evidence to support the diagnosis as an unexpected value without any other evidence should always be treated with great caution.

Delta Ratio	Assessment Guideline
< 0.4	Hyperchloraemic normal anion gap acidosis
0.4 - 0.8	Consider combined high AG & normal AG acidosis BUT note that the ratio is often <1 in acidosis associated with renal failure
1 to 2	Usual for uncomplicated high-AG acidosis Lactic acidosis: average value 1.6 DKA more likely to have a ratio closer to 1 due to urine ketone loss (esp if patient not dehydrated)
>2	 Suggests a pre-existing elevated HCO₃ level so consider: a concurrent metabolic alkalosis, or a pre-existing compensated respiratory acidosis

Warning: Be very wary of over-interpretation - Always check for other evidence to support the diagnosis as an unexpected value without any other evidence should always be treated with great caution.

A high ratio

A high delta ratio can occur in the situation where the patient had quite an elevated bicarbonate value at the onset of the metabolic acidosis. Such an elevated level could be due to a pre-existing metabolic alkalosis, or to compensation for a pre-existing respiratory acidosis (ie compensated chronic respiratory acidosis). With onset of a metabolic acidosis, using the 'standard' value of 24 mmol/l as the reference value for comparison when determining the 'decrease in bicarbonate' will result in an odd result.

A low ratio

A low ratio occurs with hyperchloraemic (or normal anion gap) acidosis. The reason here is that the acid involved is effectively hydrochloric acid (HCl) and the rise in plasma [chloride] is accounted for in the calculation of anion gap (ie chloride is a 'measured anion'). The result is that the 'rise in anion gap' (the numerator in the delta ration calculation) does not occur but the 'decrease in bicarbonate' (the denominator) does rise in numerical value. The net of of both these changes then is to cause a marked drop in delta ratio, commonly to < 0.4

Lactic acidosis

In **lactic acidosis**, the average value of the delta ratio in patients has been found to be is 1.6 due to intracellular buffering with extracellular retention of the anion. As a general rule, in uncomplicated lactic acidosis, the rise in the AG should always exceed the fall in bicarbonate level.

Diabetic ketoacidosis

The situation with a pure **diabetic ketoacidosis** is a special case as the urinary loss of ketones decreases the anion gap and this returns the delta ratio downwards towards one. A further complication is that these patients are often fluid resuscitated with 'normal saline' solution which results in a increase in plasma chloride and a decrease in anion gap and development of a 'hyperchloraemic normal anion gap acidosis' superimposed on the ketoacidosis. The result is a further drop in the delta ratio.

Question 7 (12 marks)

A 65 year old man presents with a left hand injury.



- a. List two (2) factors that arise from this image, that would suggest a poor prognosis for successful reimplantation. (2 marks)
 - Site through middle phalanyx or DIP
 - Tendon avulsion
 - Maceration of edges
 - (Pale tip or avulsed parts not stored appropriately at present- clutching straws)
- b. List six (6) historical factors that would suggest a poor prognosis for successful reimplantation. (6 marks)
 - Time of injury/ delay to repair Warm ischaemia > 6 bad and cold ischaemia time > 12 bad
 - Age
 - Smoking Hx
- Most important
- PVD
- Most importai
- Diabetes
- Steroid use
- Delay/ incorrect cooling of amputated parts
- Hypotension
- Proximal injury to arm/forearm
- c. How would you store the amputated parts pending a decision for potential reimplantation? List two (2) points in your answer. (2 marks)
 - Double sealed bag (or bottom shelf fridge)
 - Ice slurry
- d. What is the most appropriate regional anaesthesia technique for this patient? (1 mark)
 - Combined radial and median nn block
 - or US guided scalene block
 - or volar plate block

NB: Not ring block- may prang an artery

Amputations

Care of amputated parts

Xrav

Wash gross contamination with sterile N S \rightarrow wrap in sterile gauze lightly soaked in NS \rightarrow double plastic bag in ice/water

Or lower tray fridge

Aim to keep cool avoid freezing

Care of stump

- Remove any torniquet applied by MAS Direct pressure with sterile dressings - combine No vascular clamping Directed temporary tourniquet
 - only if uncontrollable bleeding en route to theatre

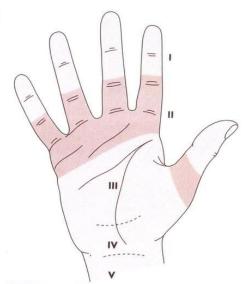
Time to reimplantation- ishaemia time

Warm 6-8 hrs Cool 12 hrs (up to 24 hrs)

Prognostic factors for favourable outcome

Amputated part factors

Clean cut vs crush/ shear/ degloving Duration of time between injury and surgery Minimal contamination/ infection Minimal water/ shrinkage effect at edges Site/ muscle content \rightarrow wrist better than forearm \rightarrow tendor tunnel. (V) Proximal to the carpal tunnel.



28.13 The zones of injury (I) Distal to the insertion of flexor digitorum superficialis. (II) Between the opening of the flexor sheath (the distal palmar crease) and the insertion of flexor superficialis. (III) Between the end of the carpal tunnel and the beginning of the flexor sheath. (IV) Within the carpal

muscle

 \rightarrow fingers do well if amputated distal to FDP or prox FDS

insertion (worst bet DIP & PIP)

 \rightarrow worst if two level injury

Patient factors

Age \rightarrow children do better Pre existing health (DM, PVD, steroids do worse) \rightarrow smokers poor success rate

Relative contraindications to implantation

Long duration between time of injury \rightarrow Sx (> 6/24 warm, > 12 cold ischemia time) Crush with extensive STI Peripheral vascular disease

Grossly contaminated/ infected wound

Devitalised tissue

Other life- threatening injuries which take precendence

Site of amputation in presence of significant neurological injury (eg BP disruption)

Don't forget

IV Abs Tetanus prophylaxis- toxoid +/- TIG Analgesia Splint Fast Management of other injuries- Secondary survey

Question 8 (12 marks)

A 6 year old boy presents with a left supracondylar humeral fracture.

- a. List two (2) type of pain scoring systems that you could apply to this child. (2 marks)
 - Wong Baker Faces (3-18)
 - FLACC (2/12-18)
 - Visual analogue (6-18) NB: Numerical (8+ yrs)
- b. List two (2) reasons why a pain score is used. (2 marks)
 - Objective assessment of pain is poor
 - Allows assessment of efficacy of analgesia
- c. List four (4) indications for GAMP in this patient. (4 marks)
 - Distal neuro compromise
 - Distal vascular compromise
 - Skin compromise
 - Capitellum posterior to anterior humeral line (dorsal angulation > 10°)
 - < 50% bony contact
 - Medial/lateral angulation Esp if > 10°
 - Anterior displacement
- d. List four (4) pieces of advice that you would give to this boy's parent if the patient is able to be discharged from the emergency department. (4 marks)
 - Post sedation advice
 - Post POP advice
 - Indications to return for review
 - POP check plan
 - Analgesia advice
 - Follow up arrangements

Click on the image below to view the entire PDF (& print/save if necessary)

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PAEDIATRIC EMERGEN	CY MEDICINE	
The epidemiology	of pain in children t	reated by
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BILLORD, " Paul A JENNINGS"." an	d Karen SMITH ^{NA,A}	
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Emergency Medicine Australiaia (2016)	28,33-43	64-10.11191740-6723128
ORIGINAL RESEARCH		
Variables associate	d with parent satisf	faction with their
child's pain manag	ement	
and Simone Elise TAYLOR ⁴	TAYLOR, ^{2,8} Bennis L.U. ¹ Sophie Li-Y	
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Accessed 11 Chapter 2005		muly aimed to explore whether if provision of 'adoptate analgesia'

Question 9 (12 marks)

A 46 year man is brought to your emergency department with suspected alcohol withdrawal.

- a. List seven (7) of the 10 scale domains that form the Alcohol Withdrawal Assessment Scale (7 marks)
 - N&V
 - Tactile disturbance
 - Tremor
 - Paroxysmal sweating
 - Auditory disturbance
 - Visual disturbance
 - Anxiety
 - Agitation
 - Headache
 - Orientation and clouding of sensorium

A 35 year old male is identified as having "very severe" alcohol withdrawal.

- b. State five (5) key management steps for this patient over the next 1 hour. (5 marks)
 - Non stimulating environment
 - Provide adequate hydration
 - Rx Thiamine & multivitamins
 - Rx hypoglycaemia
 - IV diazepam 5mg repeat to 4x over 1st 30 min then 30 minutely as required

This resource is produced for the use of University Hospital, Geelong Emergency staff for preparation for the Emergency Medicine Fellowship written exam. All care has been taken to ensure accurate and up to date content. Please contact me with any suggestions, concerns or questions.

Dr Tom Reade (Staff Specialist, University Hospital, Geelong Emergency Department) Email: **tomre@barwonhealth.org.au**

November 2017

CIWA-Ar (ALCOHOL WITHDRAWAL SCALE)

Nausea & vomiting Ask "Do you feel sick to your stomach?" Have you vomited?" Observation. 0 no nausea and no vomiting 1 mild nausea with no vomiting 2 3 4 intermittent nausea with dry heaves 5 6 7 constant nausea, frequent dry heaves and vomiting Tremor Arms extended and fingers spread apart. Observation. 0 no tremor 1 not visible, but can be felt fingertip to fingertip 2 3 4 moderate, with patient's arms extended 5 6 7 Severe, even with arms not extended Paroxysmal sweats Observation.

0 no sweat visible 1 barely perceptible sweating, palms moist 2 3 4 beads of sweat obvious on forehead 5 6 7 drenching sweats

Anxiety Ask "Do you feel nervous?" Observation.

0 no anxiety, at ease 1 mildly anxious

2

3

4 moderately anxious, or guarded, so anxiety is inferred 5

6

7 equivalent to acute panic states as seen in severe delirium or acute schizophrenic reactions

Agitation Observation.

0 normal activity 1 somewhat more than normal activity 2 3 4 moderately fidgety and restless 5 6 7 paces back and forth during most of the interview, or constantly thrashes about

Tactile disturbances Ask "Have you any itching, pins and needles sensations, any burning, any numbness or do you feel bugs crawling on or under your skin?" Observation. 0 none

1 very mild itching, pins and needles, burning or numbness

2 mild itching, pins and needles, burning or numbness

3 moderate itching, pins and needles, burning or numbress 4 moderately severe hallucinations

- 5 severe hallucinations
- 6 extremely severe hallucinations
- 7 continuous hallucinations

Auditory disturbances Ask "Are you more aware of sounds around you? Are they harsh? Do they frighten you? Are you hearing anything that is disturbing you? Are you hearing things you know are not there?" Observation. 0 not present 1 very mild harshness or ability to frighten 2 mild harshness or ability to frighten 3 moderate harshness or ability to frighten 4 moderately severe hallucinations 5 severe hallucinations 6 extremely severe hallucinations 7 continuous hallucinations

Visual disturbances Ask "Does the light appear to be too bright? Is its colour different? Does it hurt your eyes? Are you seeing anything that is disturbing you? Are you seeing things you know are not there?" Observation. 0 not present 1 very mild sensitivity 2 mild sensitivity 3 moderate sensitivity 4 moderately severe hallucinations 5 severe hallucinations 6 extremely severe hallucinations 7 continuous hallucinations

Headache, fullness in head Ask "Does your head feel different? Does it feel like there is a band around your head?" Do not rate for dizziness or lightheadedness. Otherwise, rate severity. 0 not present

- 1 very mild
- 2 mild
- 3 moderate
- 4 moderately severe
- 5 severe
- 6 very severe
- 7 extremely severe

Orientation & clouding of sensorium Ask "What day is this?

Where are you? Who am I?" 0 orientated and can do serial additions 1 cannot do serial additions or is uncertain about the date 2 disorientated for date by no more than 2 calender days 3 disorientated for date by more than 2 calender days 4 disorientated for place and/or person

TOTAL CIWA-Ar SCORE

Date:

Time (24hr):

Rater's initials:

(Max possible score is 67)

/67