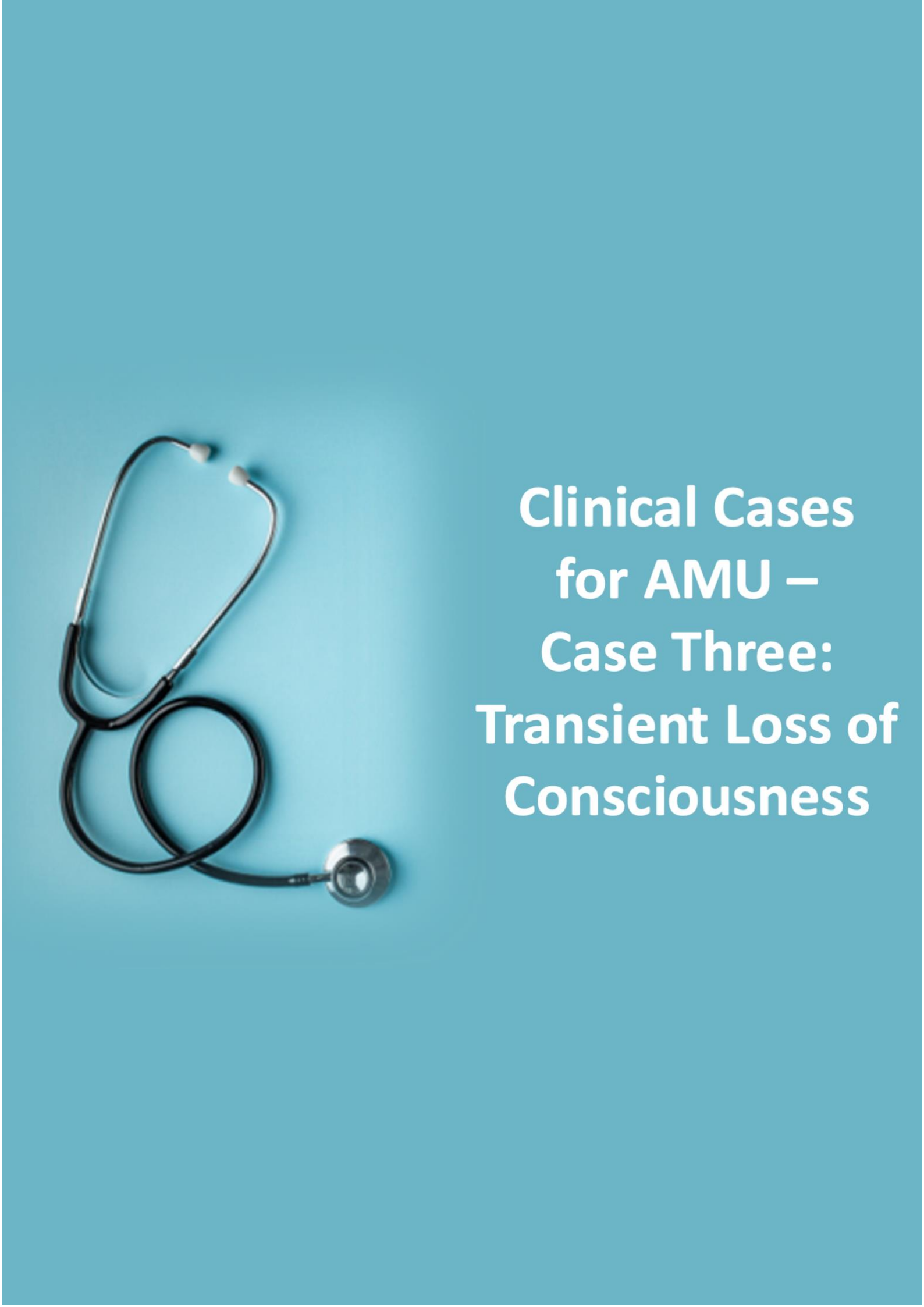


Clinical Cases for AMU – Case Three: Transient Loss of Consciousness

Introduction

These cases are designed to support your learning during your time in Acute and General Medicine. You can use them when you have free time on the ward. They can be done either alone, or in a small group. They use fictional scenarios to demonstrate learning points from common presentations to the Acute Medical Unit (AMU) and on the General Medical wards. As you work through the cases, you will find a mixture of case discussions, practical activities, and practice questions to assess your learning.

During the transient loss of consciousness (TLOC) material, you will work through three separate cases.

If there is a knowledge check or interpretation exercise, the answer can be found on the back of the same page that the question is on.

Case One

A 40-year-old male (Steven) is brought to hospital by his wife (Susan) after collapsing at the bus stop. He reports that they had been stood at the bus stop for about 30 minutes, when he collapsed to the ground. He had been feeling quite sweaty, hot, and stressed (due to the warm temperature and late bus) and developed increasing light-headedness over the 20 seconds immediately before the fall. He denies any other preceding or prodromal symptoms, specifically no palpitations, no chest pain, no visual disturbance nor sensory abnormalities.

He is not sure how long he was out for, but on coming back round he felt he recovered quickly and was not keen for his wife to bring him in. He had not been incontinent during the collapse and had not bitten his tongue. He feels tired and lethargic now, but otherwise well.

He has not 'blacked out' for many, many years, but reports that when he was a child he did faint several times.

He has a background of depression but does not take any regular medications. There is no personal nor family history of heart disease, early cardiac death, or other cardiac disease. He does not have any allergies.

He lives at home with his wife Susan and his three children. They are all well. He is independent for all ADLs. He enjoys 4 beers/day at the weekends but does not drink in the week. He is a lifelong non-smoker. He works in HR.

Collateral history

You recognise that a collateral history will be very useful, so you proceed to ask Susan for her eyewitness account and any further information she may have.

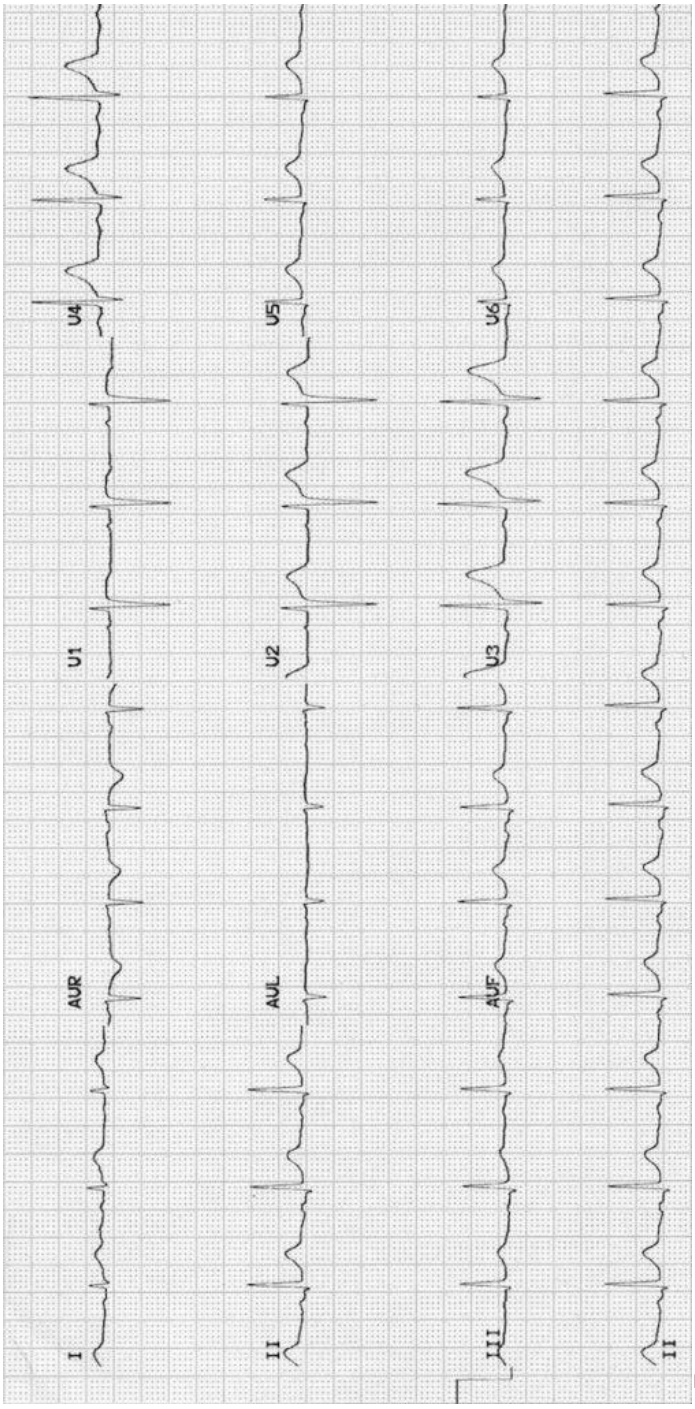
STEVEN STOCKHOLM

Section	Parameter	Entry 1	Entry 2	Score
NEWS Key 0 1 2 3	Date:	24/10		
	Time:	15:00		
A+B Respirations Breaths/min	≥25			3
	21-24			2
	18-20			
	15-17	•		
	12-14			
	9-11			1
	≤8			3
A+B SpO₂ Scale 1 Oxygen saturation (%) Use Scale 1 if target range is 94-98%	≥96			
	94-95	95		1
	92-93			2
	≤91			3
SpO₂ Scale 2* Oxygen saturation (%) Use Scale 2 if target range is 88-92% eg. in hypercapnic respiratory failure	≥97 on O_2			3
	95-96 on O_2			2
	93-94 on O_2			1
	≥93 on air			
ONLY use Scale 2 under the direction of a qualified clinician	88-92			
	86-87			1
Tick box if using SpO₂ Scale 2	84-85			2
Sign:	≤83			3
Air or Oxygen?	A = Air	AIR		
Oxygen is a drug and prescribed by target range	O² L/min or %			2
	Device			
C Blood Pressure mmHg Score uses systolic BP only	≥220			3
	201-219	SUPINE	ERECT	
	181-200			
	161-180			
	141-160	139	112	
If manual BP mark as M	121-140	↑	↑	
	111-120			
	101-110			1
	91-100			2
	81-90	↓	↓	
	71-80	84	86	3
	61-70			
	51-60			
	≤50			
C Pulse Beats/min Manual pulse	≥131			3
	121-130			2
	111-120			
	101-110			1
	91-100			
	81-90	• 89		
	71-80			
	61-70			
	51-60			
	41-50			1
	31-40			3
	≤30			
D Consciousness Score for new onset of confusion (no score if chronic)	Alert	A		
	New Confusion			3
	V			
	P			
	U			
E Temperature °C	≥39.1°			2
	38.1-39.0°			1
	37.1-38.0°	37.3		
	36.1-37.0°			
	35.1-36.0°			1
	≤35.0°			3
NEWS TOTAL				

Susan supports Steven's description of events and adds some further information. She reports that Steven was unconscious for probably 30 seconds, but "definitely less than a minute". Another gentleman at the bus stop had some basic life support training, so checked that Steven was still breathing and had a pulse and put him in the recovery position before calling an ambulance. Unfortunately, they were told that the ambulance could take 4hrs to come, so Susan decided to drive Steven to hospital herself.

On examination Steven now looks well.
A comprehensive physical examination focussing on cardiovascular and neurological systems is entirely normal.

<u>Interpretation One</u>
Interpret the following ECG



Interpretation One – Answer

This ECG demonstrates normal sinus rhythm with a rate of 84bpm. P wave morphology and axis is normal. The PR interval is constant, and every P wave is followed by a QRS complex. QRS complex is normal width. There is no apparent QT prolongation.

Knowledge Check One

1. What is your initial impression?
2. How would you manage this patient?
3. What key points would you include when offering education and advice to this patient?

Activity One

There is a useful document, published by the Driver and Vehicle Licensing Agency, available at www.gov.uk entitled “Assessing fitness to drive: a guide for medical professionals”. This document is usually updated every 12 months. Access the most up to date version of the document and use it to inform your to answer the following questions:

1. Can Steven continue to drive his Volkswagen Corsa? Does he need to inform the DVLA?
2. How would your advice differ if Steven had a UK class 2 heavy good vehicle?

Knowledge Check One - Answer

1. The clinical diagnosis for this patient is vasovagal syncope, also known as the common faint. Vasovagal syncope is characterised by a typical prodrome usually associated with a triggering event or environmental condition. It can occur after a prolonged period of standing, and is more likely in the context of fasting, dehydration, hot environments, and/or stressful events (like missing the bus!). The prodrome described here of warmth, sweating and light-headedness is common. Nausea and blurred vision are also sometimes present.

2. Management is conservative. The foundation for treatment is patient education, advice and reassurance.

3. Patients should be counselled that vasovagal syncope is a benign condition caused by a drop in blood pressure and heart rate that is usually triggered by environmental or emotional stimuli. Patients should be advised to avoid standing for prolonged periods in hot places, to stay well hydrated and not skip meals. If they feel lightheaded, nauseous, or sweaty, they should lie down immediately with their legs elevated, or if not possible, sit down with their head between their legs.

Activity One – Answers

1. Steven has had a transient loss of consciousness due to a typical vasovagal syncope that occurred whilst standing. According to current guidance he can continue to drive and he does not need to inform the DVLA.

2. Steven would not be able to drive and he must inform the DVLA.

Case Two

A 78-year-old male called John is brought in by ambulance after collapsing whilst sitting on the bus. He describes feeling his "usual self" prior to the collapse and does not recall a prodrome. He can recall going to Lidl to purchase some bread, boarding the bus, and sitting down, but doesn't remember anything further until he woke with the bus driver and some members of the public around him. He reports one similar episode at home 1 week ago, where he blacked out and fell to the floor whilst watching television. His wife was present at the time.
He has recently been feeling more breathless with usual activity and has noticed increasing weakness and fatigue which he had attributed to "old age".

Past Medical History:
STEMI – managed with primary percutaneous coronary intervention
NSTEMI - managed medically
Heart failure with reduced ejection fraction.
Cataracts
R total hip replacement
BPH
Idiopathic pulmonary fibrosis

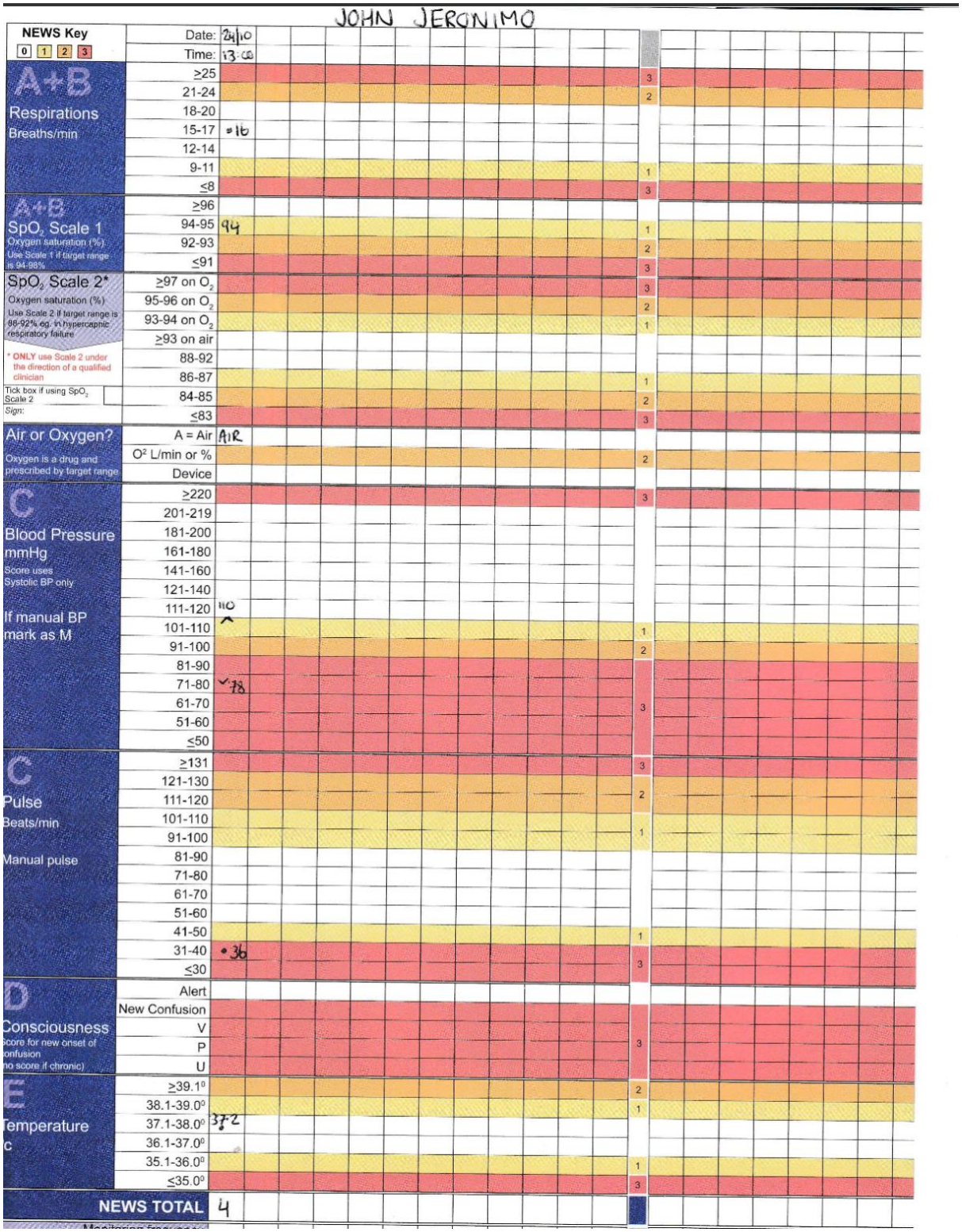
Medications:
NKDA
Lisinopril 2.5mg OD
Bisoprolol 1.25mg OD
Clopidogrel 75mg OD
Aspirin 75mg OD
Finasteride 5mg OD

No family history of note

Social History:
Lives with wife in bungalow
Independent all ADLs
Mobilises with a stick
Non smoker
No alcohol

You inspect the Scottish Ambulance Service (SAS) documentation and note the witness account. They describe the period of loss of consciousness as being 1-2 minutes in duration. They do not report any abnormal movements that may suggest a seizure. The bystander reports complete recovery within approximately 5-10 minutes.

You perform a physical examination. His observations can be found in the enclosed observation chart



John is sitting up in bed with cardiac monitoring in situ when you go to assess him. You note the monitor alarm going off for a bradycardia of 39bpm. He looks comfortable at the moment, there is no overt dyspnoea at rest, and he does not look to be in pain.

His observations can be seen on the attached chart.

On examination, he is a little cool in his fingers. His central capillary refill time is normal centrally. His JVP is elevated. Heart sounds demonstrate an ejection systolic murmur with radiation to the carotids, and he is noticeably bradycardic on auscultation. He has pitting oedema to his mid shins. On auscultation of his chest, he has fine crackles at the bases bilaterally. He has a GCS of 15/15, with no focal neurological deficit. There is no sign of head injury. His abdomen is soft and non-tender, and bowel sounds are present.

Knowledge Check Two

List the high-risk features of this patient's history of collapse.

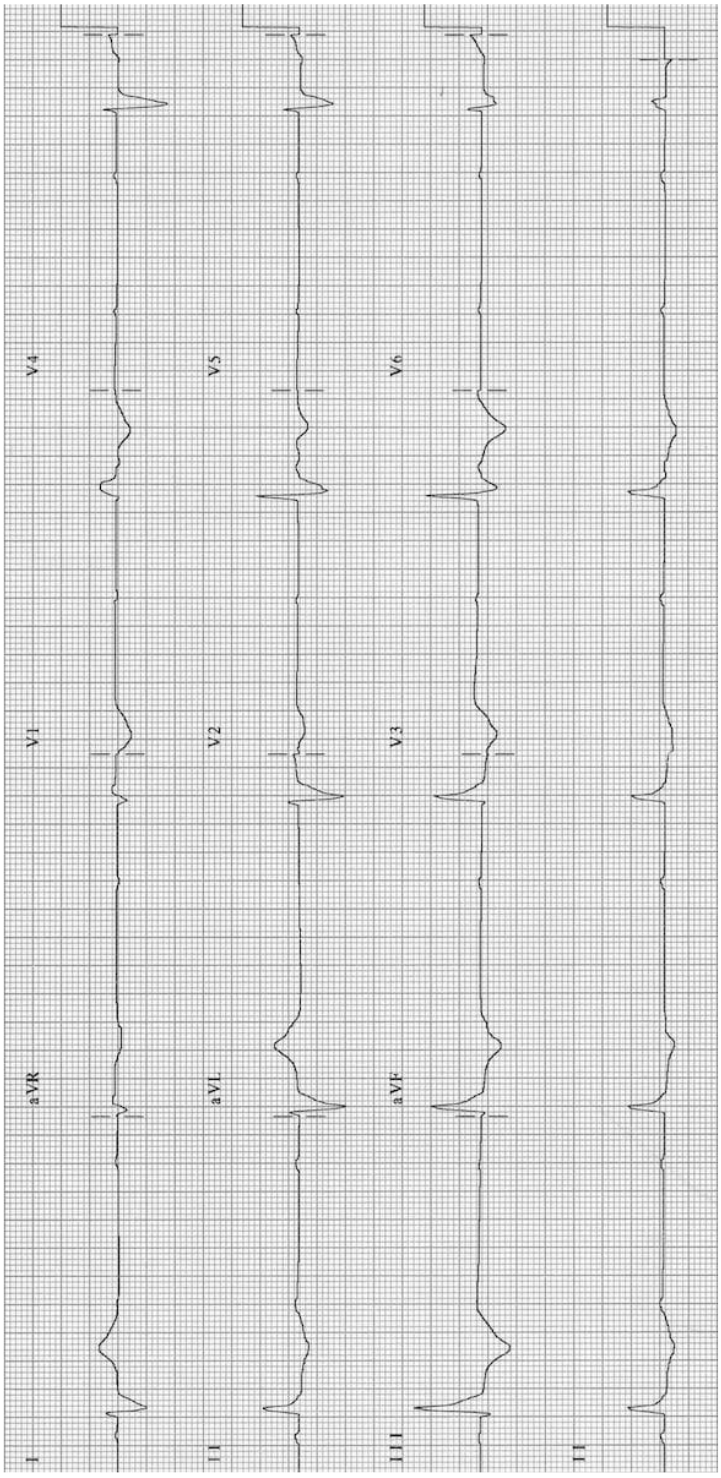
Knowledge Check Two – Answer

High risk features include:

- Lack of typical prodrome
- Lack of environmental trigger
- Syncope in the sitting position/lying down
- Increasing frequency of collapse/ recurrent syncope – 1 last week at home, and 1 precipitating hospital presentation.
- Recent increase in breathlessness
- Bisoprolol or other medications that affect cardiac conduction
- Old age
- Cardiac disease – coronary artery disease and heart failure.
- Undiagnosed systolic murmur

Interpretation Two

You request an ECG. Interpret John's ECG



Interpretation Two – Answer

The ECG shows complete heart block. The atrial rate is approx. 60bpm and the ventricular rate is approx. 30bpm. None of the atrial impulses are conducted to the ventricles. There is a slow ventricular escape rhythm. There is no evidence of myocardial ischaemia

Knowledge Check Three

1. What are the causes of complete heart block?
2. Which of John's medications would you consider withholding in this situation?
3. What further investigations would you consider requesting?
4. What management would you recommend?

Knowledge Check Three - Answer

1. Causes of complete heart block include:
   - Fibrosis and calcification of the conduction system
   - Coronary artery disease – both ACS and stable chronic coronary artery disease
   - AV-nodal blocking drugs, including beta blockers, calcium channel blockers, digoxin
   - Anti-arrhythmic agents
   - Cardiac intervention or injury
   - Severe electrolyte disturbances

2. You should withhold John's bisoprolol due to the bradycardia with complete heart block and his lisinopril due to the risk of associated hypotension.

3. Investigations are guided by the history and examination findings. Reversible causes should be considered and excluded. You would consider ordering:
   - Set of bloods
     - FBC
     - U&Es
     - Magnesium
     - Calcium
     - VBG
     - Serum troponin
     - D-dimer – if PE considered a possible differential
     - Serum digitalis level – if relevant. Digitalis toxicity is a reversible cause of AV block, however toxicity does not necessarily correlate with serum levels
   - Bedside glucose level
   - Transthoracic echocardiogram
     - Echocardiography should be performed due to the presence of a cardiac murmur and to quantify ventricular function.

4. Complete heart block is a serious condition; these patients are at high risk of ventricular standstill and sudden cardiac death. Urgent admission is required for cardiac monitoring and review. He will require insertion of a permanent pacemaker. If he developed shock, chest pain, loss of consciousness of frank pulmonary oedema, he would need emergency treatment with an infusion of a medicine to increase his heart rate. Locally this is normally isoprenaline. Temporary transvenous pacing may also be required. He cannot be safely discharged home.

Knowledge Check Four

For a patient presenting with a TLOC, what criteria must be met for consideration of safe discharge home?

Activity Two

There is a useful document, published by the Driver and Vehicle Licensing Agency, available at www.gov.uk entitled “Assessing fitness to drive: a guide for medical professionals”. This document is usually updated every 12 months. Access the most up to date version of the document and use it to inform your to answer the below question.

John no longer drives, but he does still have a car and a driver’s licence. What advice should he be given prior to eventual discharge?

Knowledge Check Four - Answer

Patients presenting with a TLOC can sometimes be discharged home with direct and specific safety netting advice if the following criteria are met:

- Absence of clinical risk factors
    - Normal ECG
    - No cardiovascular risk factors
    - Normotensive on presentation
    - No symptoms of new heart failure/decompensated heart failure
- Reassuring witness account
- Normal vital signs and monitoring in the department
- Medications reviewed, no concern of drug related cause
- Safe home environment

If you are unsure of the above then a short admission for cardiac monitoring would be recommended.

Activity Two

John must not drive, and he must still inform the DVLA, as he still holds a drivers licence. Driving may be allowed to resume after 4 weeks if the cause has been identified and treated. If no cause has been identified, the licence will be refused or revoked for 6 months.

Case Three

A 20-year-old medical student called Bradley is brought to hospital by ambulance after 'collapsing' in the early hours of Sunday. He had attended an all-night university party, the previous night and had consumed copious alcohol. At about 05.00 Brad was sat on Arthur's seat, watching the sun come up. "All of a sudden he looked blank and became unresponsive". He collapsed to the floor. His friends report that "his whole body then seemed to tense and stiffen up", after which he "started making random jerking movements of his limbs". He had not reported any unusual sensations prior to the episode, but his friends acknowledge this may be unreliable as he was intoxicated at the time. The whole episode lasted perhaps 2-3 minutes. Upon coming round afterwards he was drowsy and confused and was bleeding from his mouth. His friends put him in the recovery position so that he didn't choke on the blood nor vomit. There was no residual limb weakness and speech returned to normal.

Bradley is now complaining of a generalised headache, aching in all 4 limbs and being tired.

Past Medical History:
Usually fit and well

Medications:
No regular medications

Social History:
Occasional recreational drug use – cannabis mostly

- Denies drug ingestion the preceding night and denies drug dependence

Drinks alcohol to excess on nights out

Family History:
Father – epilepsy (not sure which type)
You proceed to examine Bradley. It is now 4hrs after the event. His observations can be seen on the enclosed chart. Bradley is sitting up in the hospital trolley. There is dried blood around his mouth, but no other obvious signs of injury from the end of the bed. He is warm and well perfused. His heart sounds are normal with no additional sounds. His chest is clear. He is alert and orientated with a GCS of 15/15. There is no evidence of head injury. His abdomen is soft and non-tender and bowel sounds are present. He has a graze on his left elbow and a small bruise on his right knee, with associated tenderness.

<u>Knowledge Check Five</u>

1. When assessing patients presenting with a transient loss of consciousness, it is important to differentiate those with seizures, from those with syncope. Which factors in the history would point you towards a diagnosis of seizure?
2. Clinically, what type of seizure is this?
3. How can you differentiate between "convulsive syncope" and a generalised tonic-clonic seizure?
4. What investigations would you consider ordering in the first instance and why?

BRADLEY ROOSTER

NEWS Key 0 1 2 3			Score
	Date:	24/10	
	Time:	06:30	
A+B Respirations Breaths/min	≥25		3
	21-24		2
	18-20		
	15-17	• 17	
	12-14		
	9-11		1
	≤8		3
A+B SpO_2 Scale 1 Oxygen saturation (%) Use Scale 1 if target range is 94-98%	≥96		
	94-95	95	1
	92-93		2
	≤91		3
SpO_2 Scale 2* Oxygen saturation (%) Use Scale 2 if target range is 88-92% eg. in hypercapnic respiratory failure	≥97 on O_2		3
	95-96 on O_2		2
	93-94 on O_2		1
	≥93 on air		
* ONLY use Scale 2 under the direction of a qualified clinician	88-92		
	86-87		1
Tick box if using SpO_2 Scale 2	84-85		2
Sign:	≤83		3
Air or Oxygen?	A = Air	AIR	
Oxygen is a drug and prescribed by target range	O^2 L/min or %		2
	Device		
C Blood Pressure mmHg Score uses Systolic BP only	≥220		3
	201-219		
	181-200		
	161-180		
	141-160		
	121-140	118	
If manual BP mark as M	111-120	↑	
	101-110		1
	91-100		2
	81-90		3
	71-80	↓	3
	61-70	81	3
	51-60		3
	≤50		3
C Pulse Beats/min	≥131		3
	121-130		2
	111-120		2
	101-110		1
Manual pulse	91-100	•	1
	81-90		
	71-80		
	61-70		
	51-60		
	41-50		1
	31-40		3
	≤30		3
D Consciousness Score for new onset of confusion (no score if chronic)	Alert		
	New Confusion		3
	V		3
	P		3
	U		3
E Temperature °c	≥39.1°		2
	38.1-39.0°		1
	37.1-38.0°		
	36.1-37.0°	• 36.7	
	35.1-36.0°		1
	≤35.0°		3
NEWS TOTAL		2	

Knowledge Check Five – Answer

1. Factors that suggest seizure include:
   - Tonic-clonic movements
   - Onset of tonic-clonic movements coincides with loss of consciousness
   - Longer duration
   - Post-ictal confusion, longer time to recovery
   - Tongue biting, especially lateral

2. A generalised tonic-clonic seizure. This type of seizure classically involves loss of consciousness and a phasic tonic stiffening of the limbs (either symmetrically or asymmetrically), followed by repetitive clonic jerking. The vast majority of these types of seizure are self-limiting without intervention.

3. A detailed history is critical and more important than any test. Vasovagal syncope can sometimes be associated with brief convulsive activity (<15 seconds) in the limbs shortly after loss of consciousness. Typical syncope is often triggered by environmental/ emotional factors and preceded by a brief prodrome of light-headedness and perhaps tunnelling vision. The loss of consciousness is classically very brief, with rapid recovery. Seizure is more likely if tonic-clonic movements start at the same time as consciousness is lost and they are more prolonged. They may occur on one side or both sides. Recovery to baseline is classically protracted and there is likely to be residual confusion and drowsiness on regaining consciousness.

4. To screen and look for a provoking cause of the seizure, investigations include
   - Bloods
     - FBC - Elevated WBC can indicate an infection, of the CNS, or otherwise, which can lead to a provoked generalised tonic-clonic seizure. WBC count is also elevated following one third of cases of generalised seizures.
     - Urea and electrolytes (including magnesium and calcium) - Electrolyte imbalance, particularly hyponatraemia, hypernatraemia, or uraemia, can lead to a provoked generalised tonic-clonic seizure.
     - CRP - A significant rise in CRP may suggest infection as a cause. If CRP is elevated, urine culture and CXR should be considered.
     - Lactate - Generalized tonic-clonic seizures can lead to increased serum lactate. After syncope and psychogenic non-epileptic seizures, lactate levels are normal. Lactate can therefore help to distinguish between epileptic seizures and other differential diagnoses.
     - Glucose - Deranged blood glucose levels, whether too high or too low, can lead to seizures.
     - Toxicology screen - Though not routinely performed, a variety of illicit substances can cause a provoked GTCS.
   - Imaging
     - CT head - More readily available than an MRI in the emergency setting. This is used to look for evidence of an intracranial lesion, infarction, haemorrhage etc. that may have provoked the seizure

Knowledge Check Six

1. Investigations are grossly normal except for an elevation in lactate and mild elevation in white cell count. What management would you recommend?
2. What other safety and lifestyle advice may you offer Brad?

Activity Three

Pretend that a friend or medical student colleague is Brad's friend. Council them regarding what to do if Brad has a further seizure. Find what advice we would give on the back of this page.

Knowledge Check Six – Answer

1. The management of a generalised tonic-clonic seizure depends on whether the seizure was provoked or unprovoked. For a single provoked seizure, where the causative factor has been identified and addressed, there is no need to start anticonvulsant therapy. In this case, advice to avoid excess alcohol consumption is warranted, as alcohol can lower a patient's seizure threshold.
   Current NICE guidelines [NG217] recommend that adults with a first suspected seizure be referred to a specialist clinic to be seen within 2 weeks. Within NHS Lothian we are fortunate to have a First Fit Clinic to which patients should be referred at the time of discharge. Note that antiepileptic medications are not typically started following a single seizure event. At the First Fit Clinic, the neurologists may organise further investigations such as EEGs and MRIs and would consider initiation of antiepileptic medication. Given Bradley's family history of epilepsy, he is at higher risk of developing an epilepsy syndrome (e.g., a tendency to recurring, unprovoked seizures).

2. Brad should be informed that he is at a higher risk than the general population for having a further seizure. You should explain the intended investigations and follow up, diagnostic criteria for epilepsy (two unprovoked seizures) and an overview of management options. Brad should be advised to avoid sleep deprivation, (and if at all possible, avoid working night shifts), drugs, and alcohol, as they may all lower seizure threshold.
   In addition, he should be counselled against working at heights (including DIY!), with machinery, hot surfaces, open flames, or bodies of water, especially if alone.
   His flatmates should be instructed regarding basic first aid measures when attending a person having a seizure.

Activity Three

If you see someone having a seizure or fit, there are some simple things you can do to help.
It might be scary to witness, but do not panic.

- *Only move them if they're in danger, such as near a busy road or hot cooker*
- *Cushion their head if they're on the ground*
- *Loosen any tight clothing around their neck, such as a collar or tie, to aid breathing*
- *Turn them on to their side after their convulsions stop – read more about the recovery position*
- *Stay with them and talk to them calmly until they recover*
- *Note the time the seizure starts and finishes*

Do not put anything in their mouth, including your fingers. They should not have any food or drink until they have fully recovered. People with epilepsy do not always need an ambulance or to go to hospital every time they have a seizure.
Call 999 and ask for an ambulance if:

- *the seizure lasts more than 5 minutes, if you do not know how long their seizures usually last*
- *the person does not regain full consciousness, or has several seizures without regaining consciousness*
- *the person is seriously injured during the seizure*

Activity Four

There is a useful document, published by the Driver and Vehicle Licensing Agency, available at www.gov.uk entitled “Assessing fitness to drive: a guide for medical professionals”. This document is usually updated every 12 months. Access the most up to date version of the document and use it to inform your to answer the following question.
Brad has a motorbike, at his family home, which he uses during the holiday time. What advice should you give him?

Activity Four - Answer

Brad must not drive and must notify the DVLA. In most cases driving must cease for 6 months after the provoked seizure

Conclusion

Well done on completing this case. I hope that you have found it informative. If you have any questions, please contact …

Dr Sophie Horrocks, Sophie.horrocks@nhslothian.scot.nhs.uk

Dr Toby Merriman, Andrew.Merriman@nhs.scot

Thank you for completing this long case. As these cases are new intervention, we would really value your feedback.

We would be very grateful if you could complete the feedback form accessed from the QR code below.

References

Life in the Fast Lane (2021). *AV block: 3rd degree (complete heart block).* https://litfl.com/av-block-3rd-degree-complete-heart-block/

Life in the Fast Lane (2021). *Normal sinus rhythm. https://litfl.com/normal-sinus-rhythm-ecg-library/*

