Clinical Cases for AMU – Case Nine: Reduced Level 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.

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 History

Arthur is a 76-year-old man who has been referred to the Medical Assessment Unit by his GP due to confusion and odd behaviour which has been reported by his wife.

His past medical history includes hypertension, gout, Type 2 diabetes and a mechanical aortic valve.

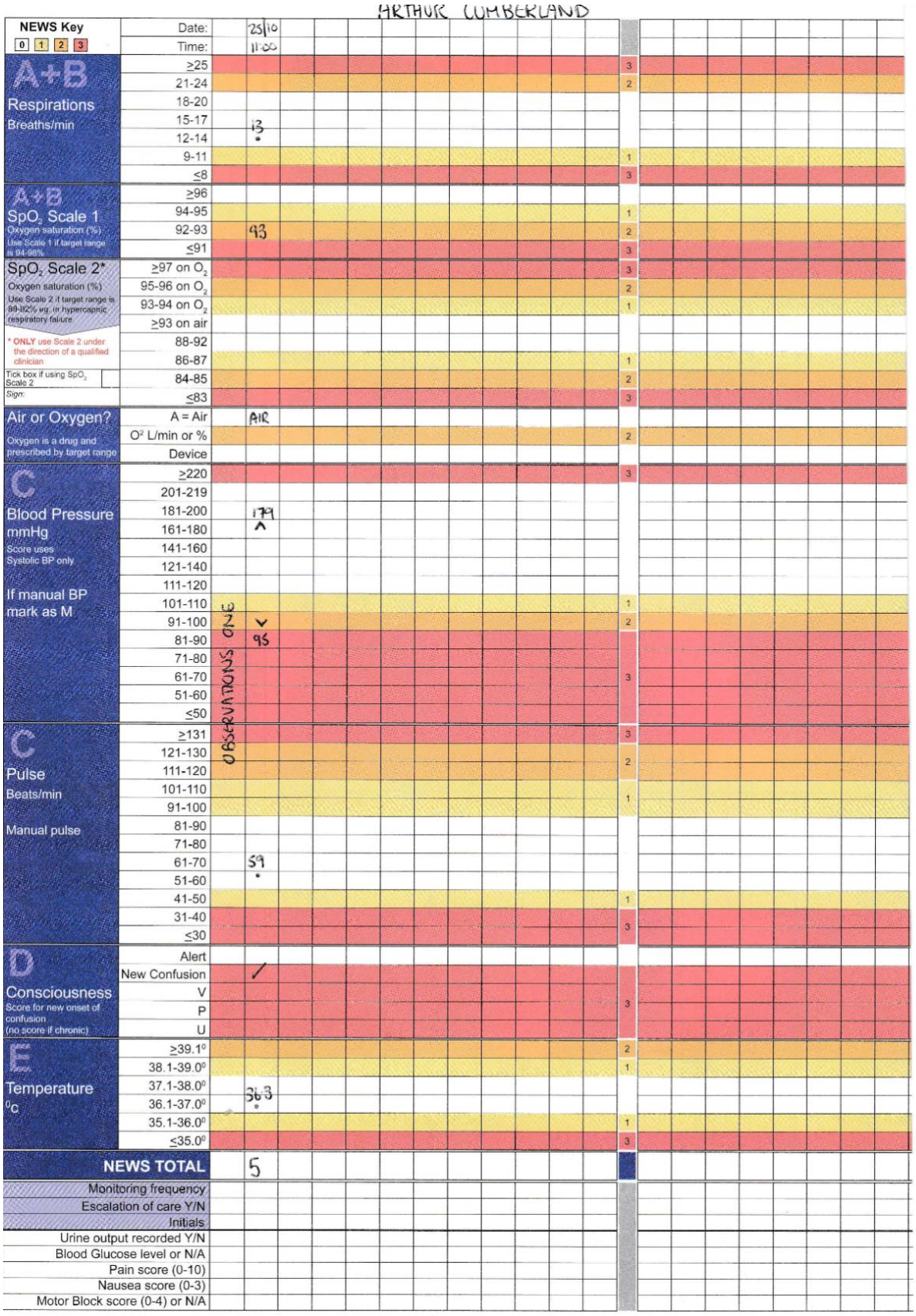
Arthur's medications are lisinopril, amlodipine, allopurinol, gliclazide and regular warfarin. He has no allergies.

His initial observations can be seen in the observation chart marked observations one. He is 80kg.

As you finish up with your last patient, the nurse looking after Arthur asks you to see him urgently as he is now unresponsive. The nurse tells you that Arthur has a GCS of 3.

<u>Knowledge Check One</u>

1. The differential diagnosis for an unresponsive patient is wide. List as many of the differentials as possible.
2. Of the differentials listed, what are the two most likely diagnoses based on the short clinical history above? Why?



Knowledge Check One - Answers

1. The differential diagnosis for an unresponsiveness is wide. Common considerations include:
    a. Intracranial haemorrhage
    b. Hypoglycaemia
    c. Drug toxicity (either recreational, with suicidal intent or iatrogenic)
    d. Seizure/post-ictal state
    e. Stroke
    f. Meningitis/Encephalitis
    g. Traumatic brain injury
    h. Encephalopathy (e.g., hepatic, uraeamic, hypertensive, Wernicke's)
    i. Electrolyte disturbance (e.g. hyponatraemia)
    j. Hypothermia
    k. Hypothyroidism
    l. Non-convulsive status epilepticus
    m. Hypoactive delirium

2. Based on the clinical history provided, the most likely diagnoses are:
    a. Intracranial haemorrhage – Arthur is on warfarin, and intracranial haemorrhage will always be a concern in patients with reduced GCS who are anticoagulated.
    b. Hypoglycaemia – Arthur is a Type 2 Diabetic who takes gliclazide. A side effect of gliclazide is hypoglycaemia, so this would be a concern in Arthur's case.

Activity One

An unresponsive patient with a GCS of 3 is a medical emergency and should be approached with an A to E assessment. Using a blank A to E assessment template enclosed with the pack, write the investigations and management that you would initiate at each stage of the assessment of Arthur. Compare this to the table on the next page.

The findings for Arthur's assessment and the immediate actions taken can be found on page 7.

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A	
B	
C	
D	
E	

Activity One – Answers

A	• Is the airway patent? Is there airflow in and out the mouth? Are there any signs of airway obstruction e.g., snoring, stridor, gurgling? • If there is any evidence of airway obstruction, get senior help immediately, perform airway manoeuvres such as a jaw thrust and consider insertion of an airway adjunct such as an oropharyngeal or nasopharyngeal airway. • If there is anything obstructing the airway, this should be removed (e.g remove vomit by suctioning). • Patients with airway compromise and a reduced GCS which cannot be rapidly reversed should be referred to critical care.
B	• Check saturations, respiratory rate, and perform a focussed respiratory examination • Apply 15l of oxygen via a non-rebreather mask • Perform an ABG • Arrange a portable CXR
C	• Check pulse and blood pressure • Perform a focussed examination, assessing for signs of systemic hypoperfusion (e.g. cool peripheries, prolonged capillary refill time, low volume pulse), assessing the JVP and auscultating the heart • Insert a cannula and take bloods including haematological, biochemical and coagulation tests. Arthur definitely needs an INR! • Perform and ECG • If evidence of hypoperfusion or hypotension, give a fluid challenge
D	• Check temperature • Measure capillary blood glucose. This is very important in reduced GCS • Assess patients' conscious level e.g., GCS or AVPU • Perform a focussed neurological examination • In patients with reduced GCS, assess for signs of focal neurology e.g., change in pupillary responses, facial droop, changes in tone, unilateral weakness • Consider a CT scan of the head
E	• Examine abdomen • Look for any other indications of cause for deterioration • Look for evidence of head injury • In a patient with reduced GCS, we need to consider sedation with drugs. Look for signs of drug use such as needle marks or powder around mouth or nose. Sedation may be iatrogenic from prescribed medications, so check for medications such as fentanyl patches

Assessment

A	Arthur is snoring loudly. This resolves with a jaw thrust. An oropharyngeal airway is inserted, and the snoring ceases. Arthur is referred to critical care due to his low conscious level, and concern about his airway
B	RR 14, SpO2 80% on air SpO2 improves to 97% on 15l of oxygen via non-rebreather mask Chest clear on auscultation Portable CXR normal AGB on 15l oxygen with normal ranges in brackets: • H^+ 44 (35 – 45 nmol/L) • pO_2 21.4 (11.1 – 14.4 kPa) • pCO_2 5.7 (4.7 – 6.4 kPa) • HCO_3^- 24 (22 – 28 mmol/L) • Base excess 0 (-2 – 3 mmol/L)
C	HR 64, BP 185/102 Warm and well perfused, CRT <2s, no peripheral oedema, JVP not elevated, HS 1+2+0 ECG – normal sinus rhythm Cannula inserted and blood tests sent
D	Temperature 37.2 Capillary blood glucose – 8.2 GCS E1V1M1 – 3/15 Pupils sluggish, but equal and reactive Right sided facial droop Increased tone in right arm and leg Right sided plantar response upgoing
E	Abdominal examination normal No medication patches Haematoma over the left parietal region of the scalp

<u>Knowledge Check Two</u>

1. With this further information, what is the most likely diagnosis? Why?
2. What further investigation is required to confirm this?

Knowledge Check Two - Answers

1. Arthur has a markedly reduced GCS, and he is unable to maintain his own airway. He has evidence of a head injury, and he is on warfarin. There is also lateralising neurology with increased tone in the right arm and right leg, a right sided facial droop and an upgoing plantar on the right, which suggests an intracerebral lesion. All of these findings suggest intracranial haemorrhage.

2. A CT head is required to confirm the diagnosis.
   Blood tests should be taken in all acutely unwell patients. For Arthur, an INR would be essential. He should also have U&Es, magnesium, calcium, thyroid function, liver function, a full blood count and inflammatory markers.

Activity Two

Revise how to assess a patient's GCS. Patients on the ward who have had a head injury or have reduced GCS often have frequent neurological observations (usually just referred to as 'neuro obs'). Ask the nurses on the ward how to perform neuro obs and if there are any patients who require them. If so, perform neuro obs on the patient who requires them. If there are no patients who require neuro obs, then identify a patient with reduced conscious level, and check their GCS.

Case continued…

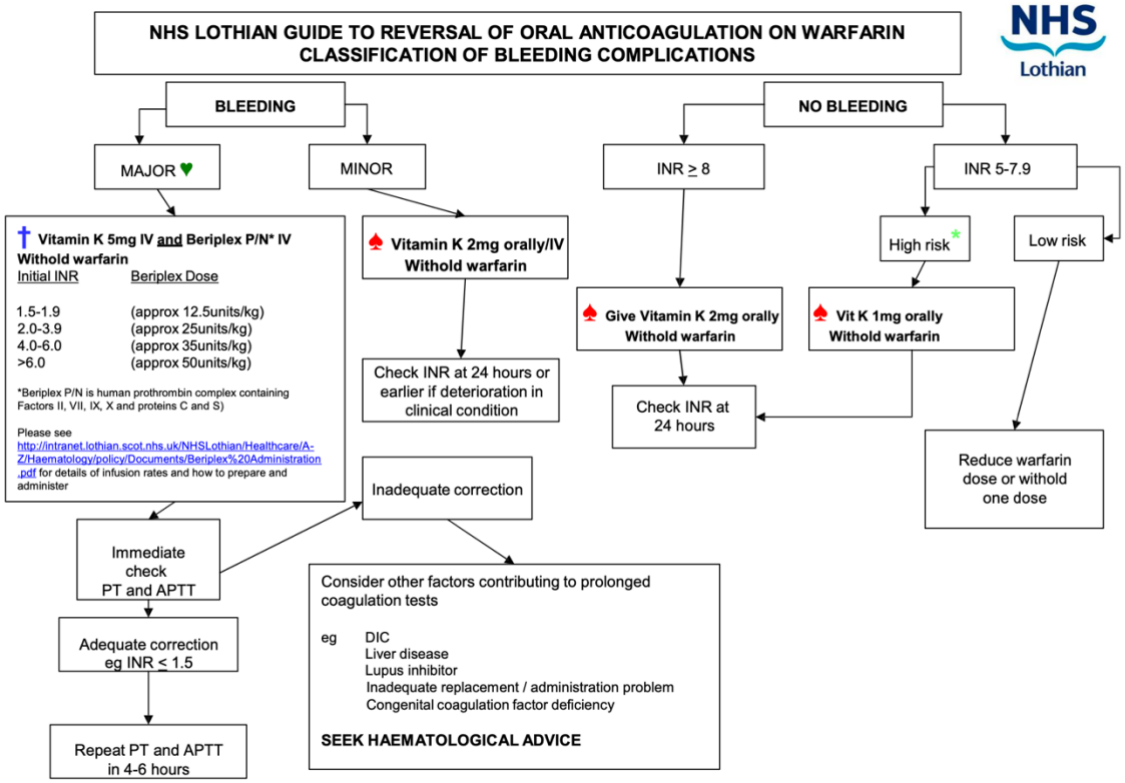
The critical care team come to assess Arthur. The medical team and the critical care team agree that Arthur should be taken for a CT scan to further investigate the drop in his GCS. To protect his airway while this is done, Arthur is intubated and taken to be scanned on the ventilator. He has a bed booked in Critical Care for after the scan.

The CT scan confirms a left sided acute subdural haematoma with associated midline shift.

While Arthur is at the CT scanner, you receive a call from the Haematology laboratory technician. The technician tells you that Arthur's INR is 8.2.

Interpretation One

1. Enclosed in the pack is the NHS Lothian guide to reversal of warfarin. Now that an intracranial haemorrhage has been confirmed, what medicines would you give to reverse the action of warfarin? What doses would be required?



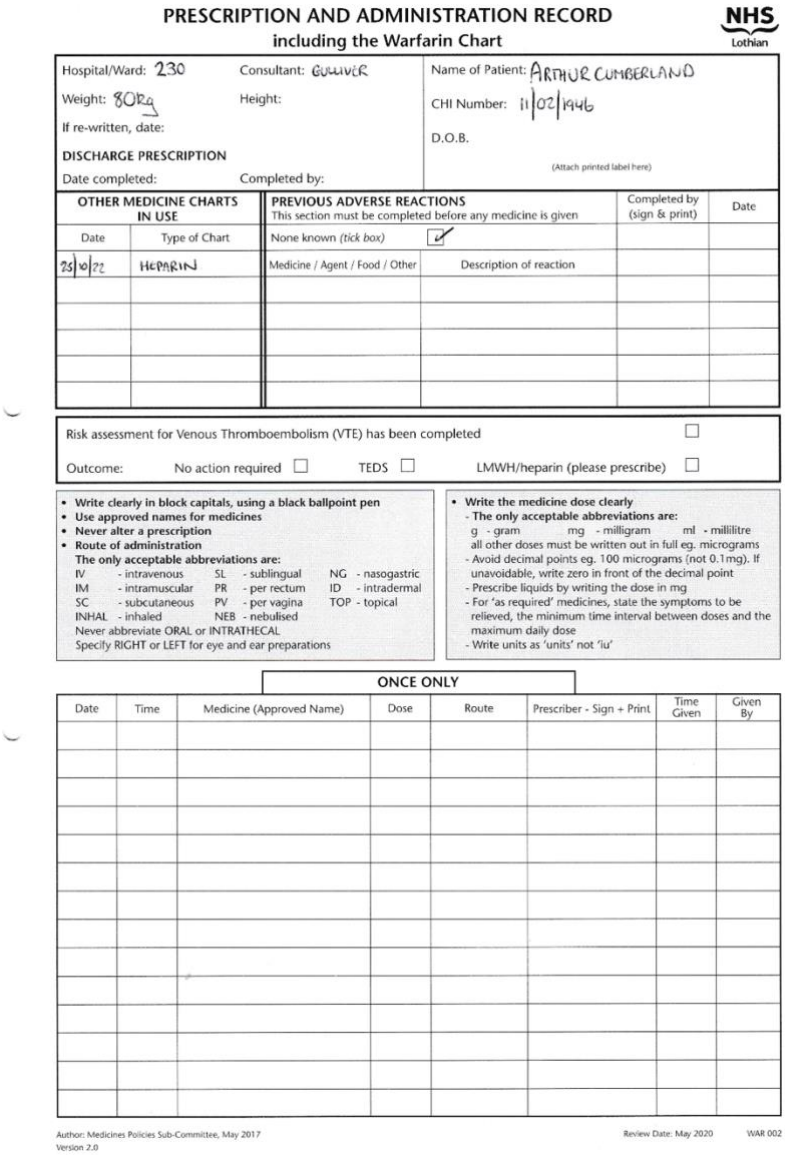
Interpretation One - Answers

1. This scenario would be categorised as major bleeding. Therefore, 5mg of IV vitamin K should be given, and 4000 units of prothrombin complex concentrate (otherwise known as Beriplex) should be given.

A few days later…

Arthur is taken by the Neurosurgeons for a left sided burr hole procedure to drain the subdural haematoma. He is then taken to critical care for supportive management. He is successfully extubated after 48 hours and transferred to the Neurosurgical ward for ongoing rehabilitation. His Kardex on transfer to the neurosurgical ward is enclosed in the pack.

You are now on night shifts, and you are asked to see Arthur because he has become drowsy on the ward. The outcome of your A to E assessment can be seen on page 11.



PRESCRIPTION AND ADMINISTRATION RECORD
including the Warfarin Chart

NHS Lothian

Hospital/Ward: 230 Consultant: GULLIVER
Weight: 80kg Height:
If re-written, date:
DISCHARGE PRESCRIPTION
Date completed: Completed by:

Name of Patient: ARTHUR CUMBERLAND
CHI Number: 11/02/1946
D.O.B.
(Attach printed label here)

OTHER MEDICINE CHARTS IN USE		PREVIOUS ADVERSE REACTIONS This section must be completed before any medicine is given		Completed by (sign & print)	Date
Date	Type of Chart	None known *(tick box)* ✓			
25/10/22	HEPARIN	Medicine / Agent / Food / Other	Description of reaction		

Risk assessment for Venous Thromboembolism (VTE) has been completed ☐

Outcome: No action required ☐ TEDS ☐ LMWH/heparin (please prescribe) ☐

- **Write clearly in block capitals, using a black ballpoint pen**
- **Use approved names for medicines**
- **Never alter a prescription**
- **Route of administration**

The only acceptable abbreviations are:

IV	- intravenous	SL	- sublingual	NG	- nasogastric
IM	- intramuscular	PR	- per rectum	ID	- intradermal
SC	- subcutaneous	PV	- per vagina	TOP	- topical
INHAL	- inhaled	NEB	- nebulised		

Never abbreviate ORAL or INTRATHECAL
Specify RIGHT or LEFT for eye and ear preparations

- **Write the medicine dose clearly**
- **The only acceptable abbreviations are:**
  g - gram mg - milligram ml - millilitre
  all other doses must be written out in full eg. micrograms
- Avoid decimal points eg. 100 micrograms (not 0.1mg). If unavoidable, write zero in front of the decimal point
- Prescribe liquids by writing the dose in mg
- For 'as required' medicines, state the symptoms to be relieved, the minimum time interval between doses and the maximum daily dose
- Write units as 'units' not 'iu'

ONCE ONLY

Date	Time	Medicine (Approved Name)	Dose	Route	Prescriber - Sign + Print	Time Given	Given By

Author: Medicines Policies Sub-Committee, May 2017
Version 2.0

Review Date: May 2020 WAR 002

REGULAR THERAPY

Name of Patient:
CHI Number:
D.O.B.:
(Attach printed label here)

CODES FOR NON-ADMINISTRATION OF PRESCRIBED MEDICINE

If a dose is not administered as prescribed, initial and enter a code in the column with a circle drawn round the code according to the reason as shown below. **Inform the responsible doctor in the appropriate timescale.**

1. Patient refuses
2. Patient not present
3. Medicines not available - CHECK ORDERED
4. Asleep / drowsy
5. Administration route not available - CHECK FOR ALTERNATIVE
6. Vomiting / nausea
7. Time varied on doctor's instructions
8. Once only / as required medicine given
9. Dose withheld on doctor's instructions
10. Possible adverse reaction / side effect

OXYGEN	Start Date	Start Time	Mask (%)	Route Prongs (l/min)	Prescriber - Sign + Print	Administered by	Stop Date	Stop Time

PRESCRIPTION	Dose	Route	Start Date	Prescriber	Times (circled)	25/10	24/10	27/10
TEDS	1 application	TOP	25/10/22	MERRIMAN	6–22	AM (6)	AM (6)	AM (6)
LISINOPRIL	10mg	PO	25/10/22	MERRIMAN	8	AM	AM	AM
AMLODIPINE	5mg	PO	25/10/22	MERRIMAN	8	AM	AM	AM
ALLOPURINOL	300mg	PO	25/10/22	MERRIMAN	8	AM	AM	AM

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REGULAR THERAPY

Name of Patient:
CHI Number:
D.O.B.:
(Attach printed label here)

PRESCRIPTION	Dose	Route	Start Date	Prescriber	Times (circled)	25/10	26/10	27/10	28/10
GLICLAZIDE	80mg	PO	25/10/22	MERRIMAN	8, 18	AM / AM	AM / AM	AM / AM	
WARFARIN	AS PER CHART	PO	25/10/22	MERRIMAN	18	9	9	9	9
HEPARIN INFUSION	AS PER CHART	IV	25/10/22	MERRIMAN	6–22	AM (6)	AM (6)	AM (6)	
PARACETAMOL	1g	PO	25/10/22	MERRIMAN	8, 12, 18, 22				

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AS REQUIRED THERAPY

Name of Patient:
CHI Number:
D.O.B.:
(Attach printed label here)

OXYCODONE I/R — Dose + frequency + max: 5mg Max 1° — Route: PO — Indication: PAIN — Start Date: 25/10/22 — Prescriber: MERRIMAN

Date	25/10	25/10	25/10	25/10	25/10	25/10	25/10	25/10	25/10	25/10	25/10	25/10
Time	05:00	09:15	10:30	11:45	13:06	14:12	15:28	16:30	17:50	18:59	20:00	21:20
Dose	5mg	5mg	5mg	5mg	5mg	5mg	5mg	5mg	5mg	5mg	5mg	5mg
Initials	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	LB	LB
Date	25/10	25/10	26/10	26/10	26/10	26/10	26/10	26/10	26/10	26/10	26/10	26/10
Time	22:40	23:30	02:15	04:30	06:12	08:00	011:15	14:22	16:51	17:58	20:15	21:45
Dose	5mg	5mg	5mg	5mg	5mg	5mg	5mg	5mg	5mg	5mg	5mg	5mg
Initials	LB	LB	LB	LB	LB	AM	AM	AM	AM	AM	LB	LB

OXYCODONE I/R — Dose + frequency + max: 5mg Max 1° — Route: PO — Indication: PAIN — Start Date: 25/10/22 — Prescriber: MERRIMAN

Date	26/10	27/10	27/10	27/10	27/10	27/10	27/10	27/10	27/10	27/10	27/10	27/10
Time	23:12	02:45	04:12	05:52	08:14	10:30	11:55	14:18	15:50	17:02	19:14	20:45
Dose	5mg	5mg	5mg	5mg	5mg	5mg	5mg	5mg	5mg	5mg	5mg	5mg
Initials	LB	LB	LB	LB	AM	AM	AM	AM	AM	AM	AM	AM
Date	27/10	27/10										
Time	22:16	23:45										
Dose	5mg	5mg										
Initials	LB	LB										

Assessment

A	No snoring, grunting or stridor No evidence of airway obstruction
B	RR 8, SpO2 85% on 4l SpO2 improves to 97% on 35% oxygen via Venturi mask Chest clear on auscultation Portable CXR NAD ABG on 35% • H^+ 59(35 – 45 nmol/L) • pO_2 11.3 (11.1 – 14.4 kPa) • pCO_2 7.9 (4.7 – 6.4 kPa) • HCO_3^- 26 (22 – 28 mmol/L) • Base excess 2 (-2 – 3 mmol/L)
C	HR 61, BP 139/75 Warm and well perfused, CRT <2s, pulse regular, no peripheral oedema, JVP not elevated, HS pure ECG - normal sinus rhythm Cannula in place Routine blood tests sent
D	Temperature 36.4 Capillary blood glucose - 7.3 GCS E3V3M5 – 11/15 Pupils <2mm, reactive Ongoing right sided symptoms, but stable compared to previous examination
E	Abdominal examination unremarkable Dressing over operation site with no strike-through on the dressing Patient not wearing any transdermal medication patches such as a fentanyl patch or nicotine patch

Interpretation Two

1. Interpret the ABG for Arthur
2. Arthur has no history of COPD or respiratory disease and is not wheezy. What is the explanation for the development of this ABG abnormality?
3. Use the information available to determine the most likely cause for Arthur's drowsiness. Explain your reasoning.
4. What would be your next step in Arthur's treatment?

Case continued…

Following treatment, Arthur's conscious level returns to normal. He continues to improve over the following days. Due to a residual right sided weakness, he requires input from the Physiotherapists and Occupational Therapists to facilitate a safe discharge home.

Activity Three

Rehabilitation will be an essential part of Arthur's journey. This will be led by the Physiotherapists (PTs) and the Occupational Therapists (OTs). Speak to either the PTs or OTs on the ward. See if you can accompany them on a session with a patient to gain a better understanding of their role.

Conclusion

Following a period of rehabilitation, Arthur is discharged home with a walking stick. Further input from community Occupational Therapy is planned, to determine whether he needs any additional support in his own environment.

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

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Dr Toby Merriman, Andrew.Merriman@nhs.scot

Interpretation Two - Answers

1. The ABG demonstrates an acute respiratory acidosis with type 2 respiratory failure (T2RF). Hydrogen ions are high indicating acidosis. pCO2 is high, indicating the acidosis is respiratory in origin. Bicarbonate is normal, indicating there has been no compensation.

2. Decompensations of COPD are not the only explanations for T2RF. Any condition that impedes the bodies' ability to remove carbon dioxide can result in T2RF. This could include respiratory muscle weakness, or respiratory depression.

3. The diagnosis in this scenario is opiate toxicity. Looking at Arthur's Kardex, you can see that he has been taking PRN doses of oxycodone very regularly. Clinical signs of opiate toxicity include pinpoint pupils, and respiratory depression. The respiratory depression is indicated by the low respiratory rate and T2RF on the ABG. A further bleed is a differential, but with these presenting features, opiate toxicity is much more likely.

4. The treatment for opiate toxicity is naloxone. Naloxone is given intravenously to reverse the action of the opiate. The aim is to reverse respiratory depression without completely reversing the action of opiate, which would result in acute pain for the patient. The initial dose of naloxone would be 100 to 200 micrograms. If there was no response after 60 seconds, a further 100 micrograms should be given. This process can be repeated depending on the response, until a dose of 2mg has been reached. A further 2mg can then be given if required. If there is no response to this, the diagnosis should be reconsidered. Naloxone is short acting, and the duration of action can be as little as 45 minutes. Repeat doses or an infusion may be required.

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.

