

Candidate number		Score	
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Toxicology Viva

Viva Objectives:

- *To formulate a plan for an overdose of an unknown substance*
- *To modify the plan in light of new information and deteriorating patient status*
- *List components of the anticholinergic and serotonergic toxidrome*
- *Demonstrate knowledge of advanced elimination techniques*
- *Understand rationale for MDAC in the setting of carbamazepine overdose*

Stem

You are the Intensivist in a level one Intensive Care Unit and the Emergency Department registrar has referred to you a 51 year old woman for review and possible monitored bed admission. The patient has taken a mixed overdose of an as yet unknown substance. The patient's daughter last saw her 2 hours ago and when she returned one hour later the patient had told her she had taken some medications. She appeared unsteady on her feet and collapsed. An ambulance was called.

Initial ambulance observations

- Heart Rate 105 bpm
- Respiratory Rate 32 bpm
- SpO2 94% on RA
- Blood Pressure 90/50mmHg
- Temperature 36.7°C
- Glasgow Coma Score E3 M5 V3 Blood Glucose 5.6mmol/L
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Describe the initial management you would expect in the Emergency Department

1. Expected management in ED

- Resuscitation
 - ABC
 - Detect and correct hypoglycaemia, seizures, hyper/hypo thermia
 - Antidote administration
- Risk Assessment
 - Agent
 - Dose
 - Time since ingestion
 - Clinical features and course
 - Patient factors
- Supportive care and monitoring
- Investigations (ECG, paracetamol level, other)
- Decontamination
- Enhanced Elimination
- Antidotes
- Disposition

/20 marks

/20



Show ECG and Venous Gas 1

2. Describe the ECG and Venous Gas findings

- NSR, normal QRS and normal QTc
- Mixed metabolic and respiratory acidosis with elevated lactate

/5 marks

In ED the patient receives 2L of crystalloid and is given a dose of naloxone. Her blood pressure improves and following the naloxone her GCS improves briefly. Over the next 30 minutes her GCS is fluctuating, the lowest being E2 M5 V3. Her daughter arrives and presents empty containers of prescription drugs that were dispensed yesterday. Based on the dispensed amount these are the potential quantities of ingested drugs

Show drug sheet

- Carbamazepine CR 28g
- Codeine 2.7g
- Venlafaxine 6g

3. What toxidromes are associated with carbamazepine and venlafaxine?

- Carbamazepine – anticholinergic
- Venlafaxine – serotonergic

/5 marks

4. List the features of the anticholinergic syndrome

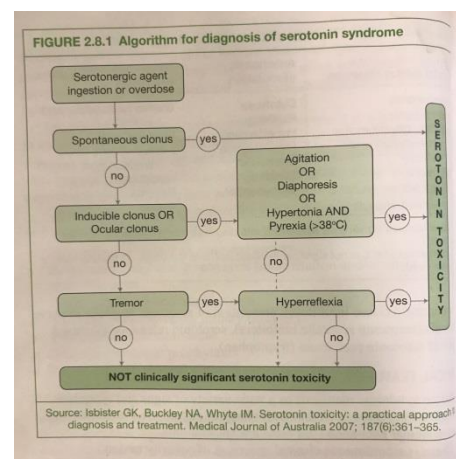
- Hyperthermia
- Dry mouth
- Urinary retention
- Fluctuating mental state
- Tachycardia
- Absent bowel sounds
- Mydriasis (enlarged pupils)
- Flushed skin

/20 marks

/30

5. List features of the serotonin syndrome

- Mental state changes
 - Apprehension
 - Anxiety
 - Agitation (psychomotor acceleration and delirium*)
 - Confusion
- Autonomic Stimulation
 - Diarrhoea*
 - Flushing
 - Hypertension
 - Hyperthermia
 - **Mydriasis***
 - **Sweating***
 - **Tachycardia***
- Neuromuscular excitation
 - **Clonus (esp ocular and ankle)***
 - **Hyperreflexia***
 - **Increased tone (Lower limb >Upper Limb)***
 - **Myoclonus***
 - **Rigidity**
 - **Tremor**



/20 marks

6. In light of this new information how will you proceed with managing this case?

- Continuous monitoring watching for possible serotonin or anticholinergic effects
- Access toxicology data sheet for medications
- Recognise significant polypharmacy overdose of all substances
- Recognise enormity of dose of carbamazepine and chance to intervene early
 - In light of fluctuating GCS: intubate and ventilate
 - NGT and MDAC (50g then 25g 2-4 hourly – rarely beyond Repeat carbamazepine levels 4 hourly for peak level)
 - NaHCO₃ for dysrhythmias
 - Benzos for seizures
 - Arrange transport to tertiary centre for dialysis/ongoing care in light of this being a level one unit and likelihood of prolonged need for intubation and ventilation

/15 marks

7. List enhanced elimination techniques

- MDAC
- Urinary alkalinisation
- Haemodialysis and haemofiltration
- Charcoal haemoperfusion

/10 marks

/45



8. By what two ways can MDAC work and what are the properties of the substances amenable for each?

- Interruption of enterohepatic circulation (effective if drug undergoes this and has a small Vd)
- “GI dialysis”- sets up concentration gradient across mucosa so drug moves from mucosa to lumen aided by ongoing charcoal adsorption (small molecules, lipid soluble, small Vd and low protein binding)

(other drugs amenable for MDAC incl dapsone, phenobarbitone, quinine, theophylline)

/5 marks

Feedback	Total	/100
General viva comments		
Viva specific comments		
Top-tip		