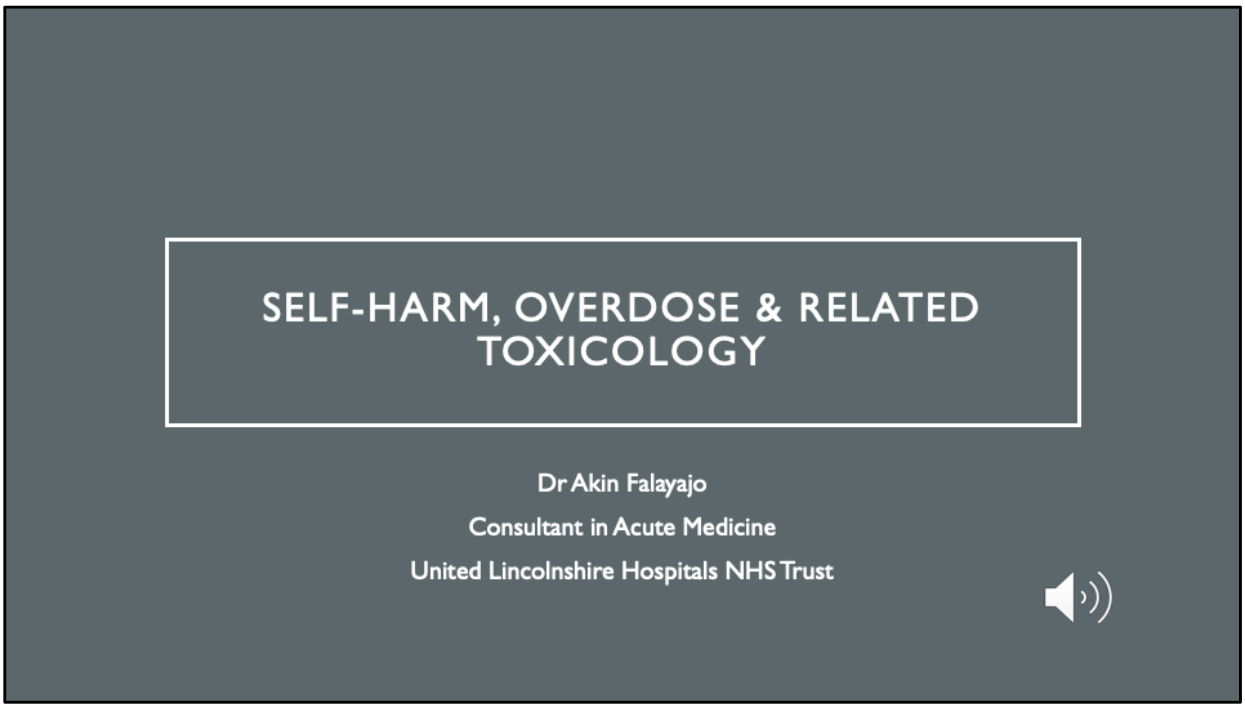
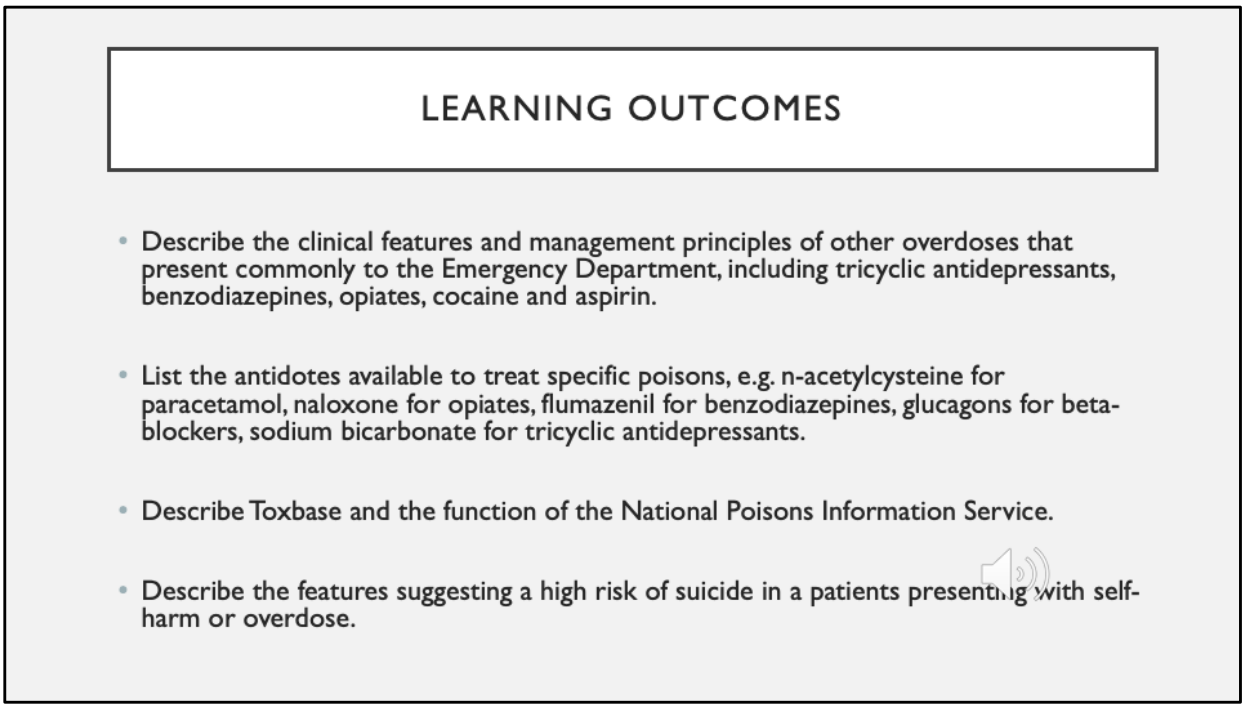


Hello
My name is Akin Falayajo. I am an acute physician at ULHT.
Over the next 30 to 40 mins, I hope we will have a conversation about self-harm, overdose and toxicology through these slides.
We are not going to discuss paracetamol poisoning in any detail because this has already been covered in CP1.
It is also assumed that you have a basic understanding of the general principles in the assessment and treatment of patients presenting with an overdose.
I have pitched this at the level of what you are expected to be able to do as an F1 doctor in about a year's time. And to do this well, we will use clinical scenarios to apply some of the knowledge you have and then go a bit further by building on this.



To help you describe the clinical features and management principles of some overdoses we will look at them through the lens of clinical toxidromes – toxidromes a cluster of clinical features that help to identify a specific toxicological mechanism so that appropriate antidotes and other treatments can be considered. You already might be able to identify some of these, so this will be a bit of practice for you. You may also identify some clinical features you might have overlooked in the past.

It is important that you are aware of antidotes of specific poisons. Whilst the mainstay of the management of most poisoning is supportive care, some poisons have antidotes that help to remedy the effects of the poison – you may recall N-acetylcycteine in paracetamol poisoning.

You are not expected to know how to manage all cases of poisoning you will come across in your clinical practice. But it s expected that you know where to go for clinical information to support you with the mgt of your patient. This is where Toxbase and the NPIS becomes relevant.

Although we will allude to some high-risk features of suicide during some of the scenarios, we will summarise this at the end as well.

I would like to add here that you could contact your GP or mental health practitioner if you need support with your mental health because I am aware that some of the cases we discuss could leave you thinking about previous episodes of self-harm involving yourself or some close to you.

CASE 1

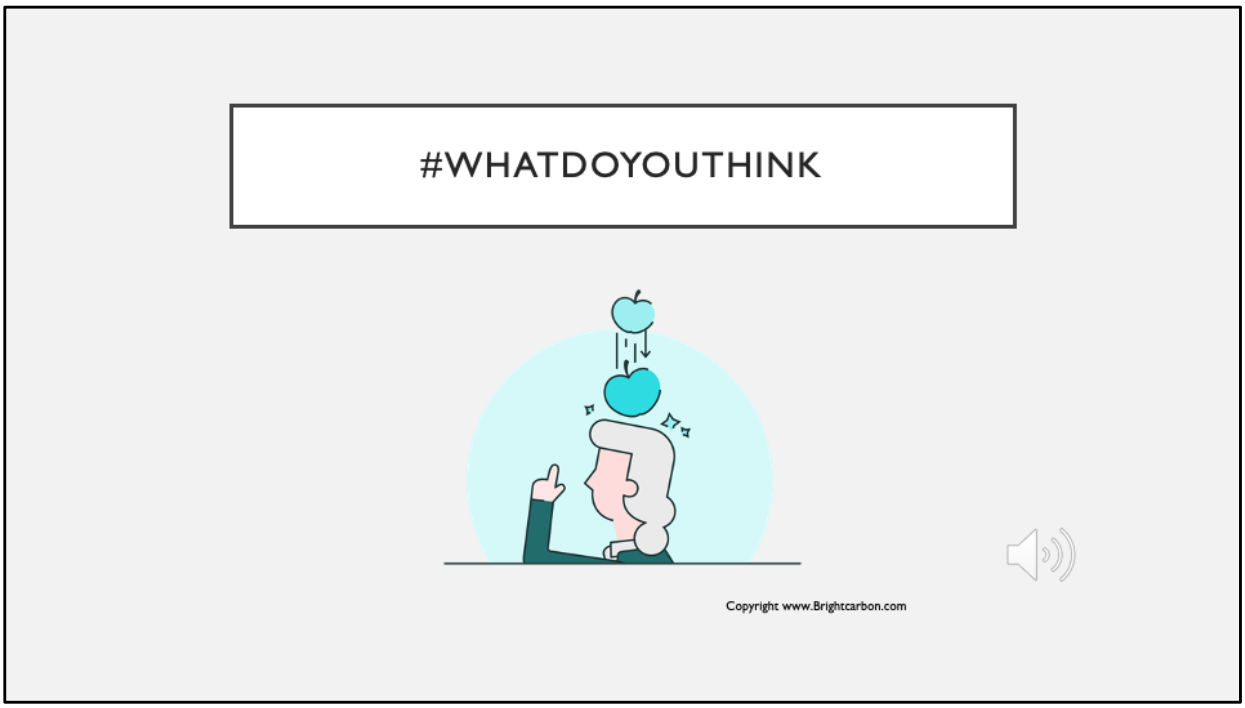
42-year-old male (John)

Found wandering in the park; looked disheveled

Brought to ED by the Police as they were concerned for his physical health

The Police have contacted his partner.

So we will get stuck into the first case.
This is a 42year old chap that was found wandering in the park, looked unkempt. The Police were called. They brought him to A&E where you are the F1 doctors. The police are concerned for his physical health. They were able to contact his partner and have informed you that she is making her way to the hospital.



Whilst you are talking to the police officers, the nurse is undertaking some vital signs.

I would like you to take a moment to think about what questions you will ask John's partner when she arrives in his cubicle. He is drowsy and unable to give a reliable history.

She is just coming through reception. You may wish to pause the slides here and write down your questions.

HISTORY FROM JOHN'S PARTNER

- They had an argument last night before she left for work
- She found some of her tablets missing this morning – MST continus 10mg
- She thinks he may have taken these.
- History of anxiety and depression. No prescribed medication. Currently in between jobs.

Unsure how many and when he might have taken these as she has been on a night shift.

Self-harmed 5 week before and was being followed up by the community mental health team.

Is there anything else you want to know from the history.

ON EXAMINATION

A: Noisy breathing – tolerates NPA

B: Shallow breathing. RR 8. Oxygen Saturation 92% on room air. Upper airway noises. Vesicular breath sounds.

C: HR 92. BP 89/50. CRT 2secs. HS: 1+2, no murmur

D: AVPU. GCS: E3, V3, M5. BM 6.0. Pin-point pupils (miosis). Normal tone and reflexes

E: Abdomen: NAD. Temp. 36.8 centigrade

You proceed to examine him and this is what you find.

What are your thoughts?

#WHATDOYOUTHINK

A: Noisy breathing – tolerates NPA

B: Shallow breathing. RR 8. Oxygen Saturation 92% on room air. Upper airway noises. Vesicular breath sounds.

C: HR 92. BP 89/50. CRT 2secs. HS: 1+2, no murmur

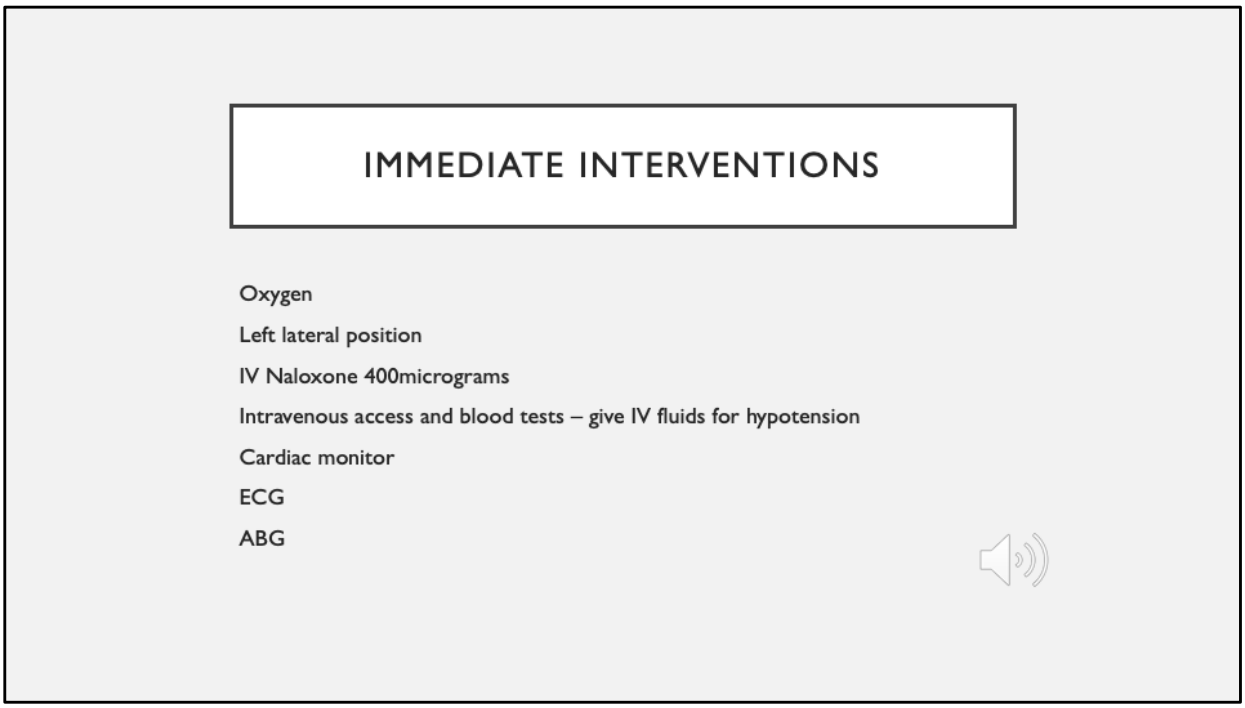
D: AVPU. GCS: E3, V3, M5. BM 6.0. Pin-point pupils. Normal tone and reflexes

E: Abdomen: NAD. Temp. 36.8 centigrade

What about the clinical data you have gathered so far in the history and examination is concerning (if at all)

Do you recognize any clinical pattern or toxidrome?

Do you have any thoughts about what you would like to do next?



Oxygen: titrate to achieve saturation of 94-98%

Left lateral position – this will help to protect his airway and reduce the risk of aspiration if he vomits.

Request Naloxone 400micrograms – give this as an IV bolus and you can repeat every 2-3 mins until the patient is rousable and the respiratory depression is corrected. In this case, the RR >12, saturation improves off oxygen.

Intravenous access and blood tests – Request U&E, CK (wandering, may be dehydrated and could have had a fall); Paracetamol concentration should be measured in all patients who present after overdose, particularly those who are unconscious or who are unable to give a reliable history. You want to a grey or green PVC in the anticubital fossa and give fluid boluses (10-20ml/kg or 500mls) which should be titrated to clinical effect. You should also raise the foot of the bed.

Cardiac monitor – He should be in the resuscitation area of ED and should be connected to a cardiac monitor because of the risk of arrhythmias

ECG – In this patient, it is unclear if he took any other medication that we are currenty unaware of. An ECG may detect occult cardiac conduction abnormalities of diagnostic and prognostic importance. An ECG should therefore be done to look for arrhythmias, the QRS duration and QT interval which may be pointers to a risk of arrhythmias.

ABG – This is important to understand his acid-base balance, especially if he could have ingested other drugs or substances.

…AND THEN

A total of 1000micrograms of Naloxone was given to rouse him and achieve:
RR 14, BP 100/60.

Forty minutes later his RR 8, BP 85/52 and his GCS has drifted down again.
What do you think is happening?

#WHATDOYOUTHINK

RR 8

BP 85/52

GCS 10/15

NALOXONE VS LONG-ACTING OPIOIDS

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Provision of an adequate airway and ventilation, and the appropriate use of naloxone remain the most important aspects in treatment of acute opioid toxicity.

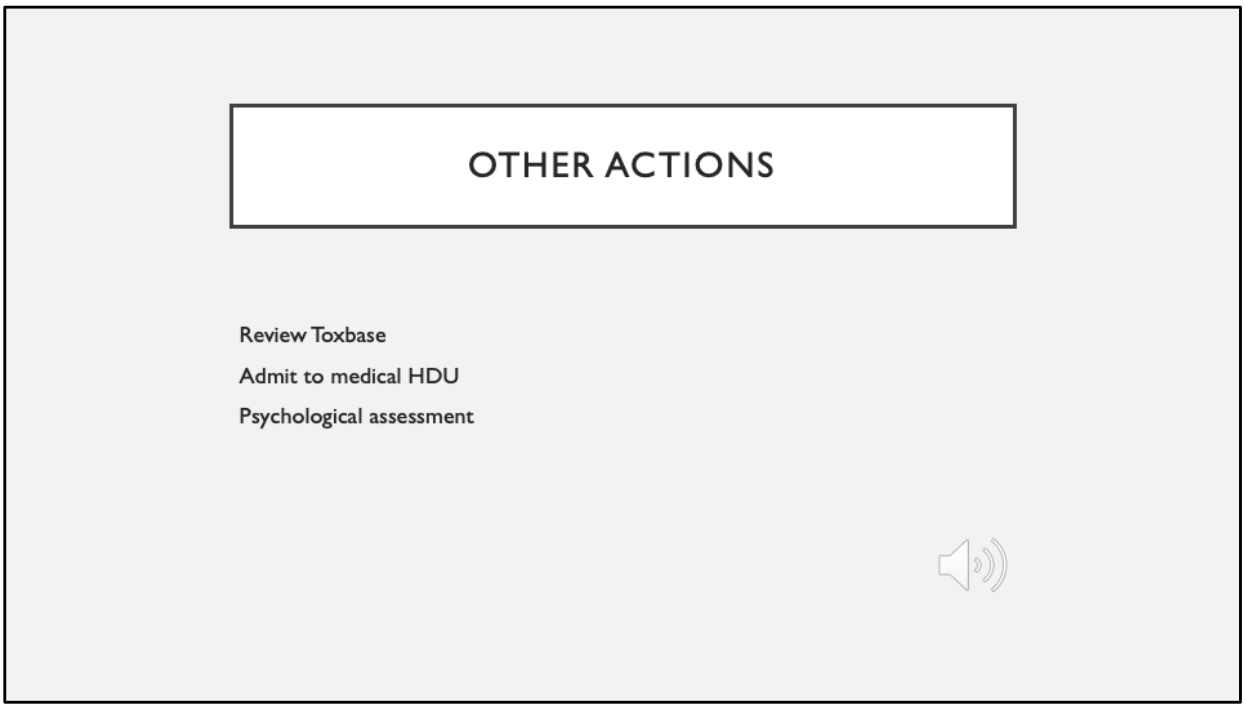
Naloxone is a pure opiate antagonist and has a half life of 30-100 mins, which is short compared to that of long-acting opioids – MST, another example is methadone. In this case, the effect of naloxone has worn off.

The next step is to repeat the titrated doses of naloxone and then start him on an infusion of naloxone to keep the antagonistic effect. The infusion should be started at two-thirds the dose required to rouse the patient and improve his RR and sats. In this case approx. 650mcg/hr would be a safe place to start. The infusion may be required for up to 72 hours in some cases. The key thing is continuously monitoring the level of consciousness with a GCS, RR, sats and BP.

Naloxone can also be administered IM, intranasally, or via an endotracheal tube. Administration of naloxone via other routes can lead to unpredictable absorption and does not permit accurate dose titration.

Our patient is admitted to the medical HDU and continues to make satisfactory

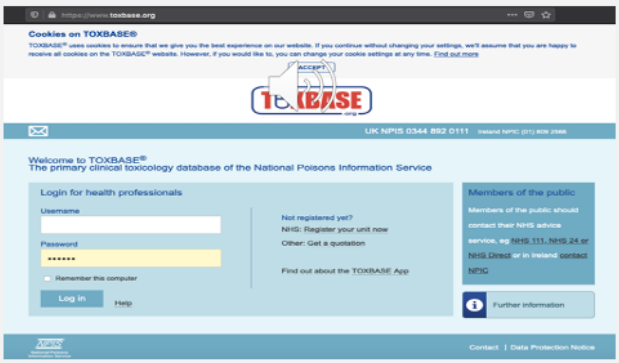
recovery.



Remember, he requires inpatient psychological assessment prior to discharge. In most hospitals, it is the CRISIS team that complete this and advise on follow-up. You must not discharge a patient with deliberate self harm without this assessment.

In some cases, if the patient expresses ongoing ideation of suicide, the psychological assessment should be done before the medical treatment is completed.

TOXBASE®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Log in
Help
Not registered yet?
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Members of the public should contact their NHS advice service, eg NHS 111, NHS 24 or NHS Direct or in Ireland contact NPIC
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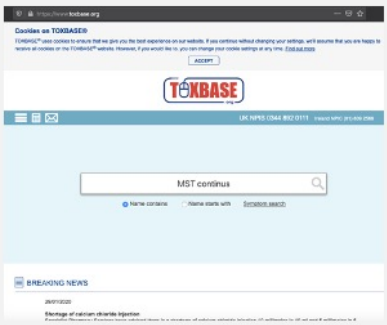
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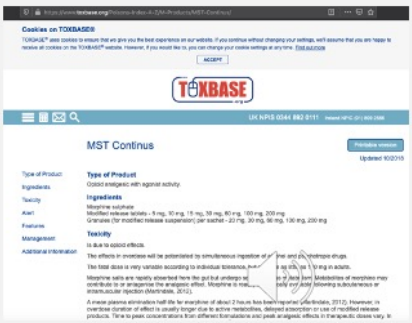
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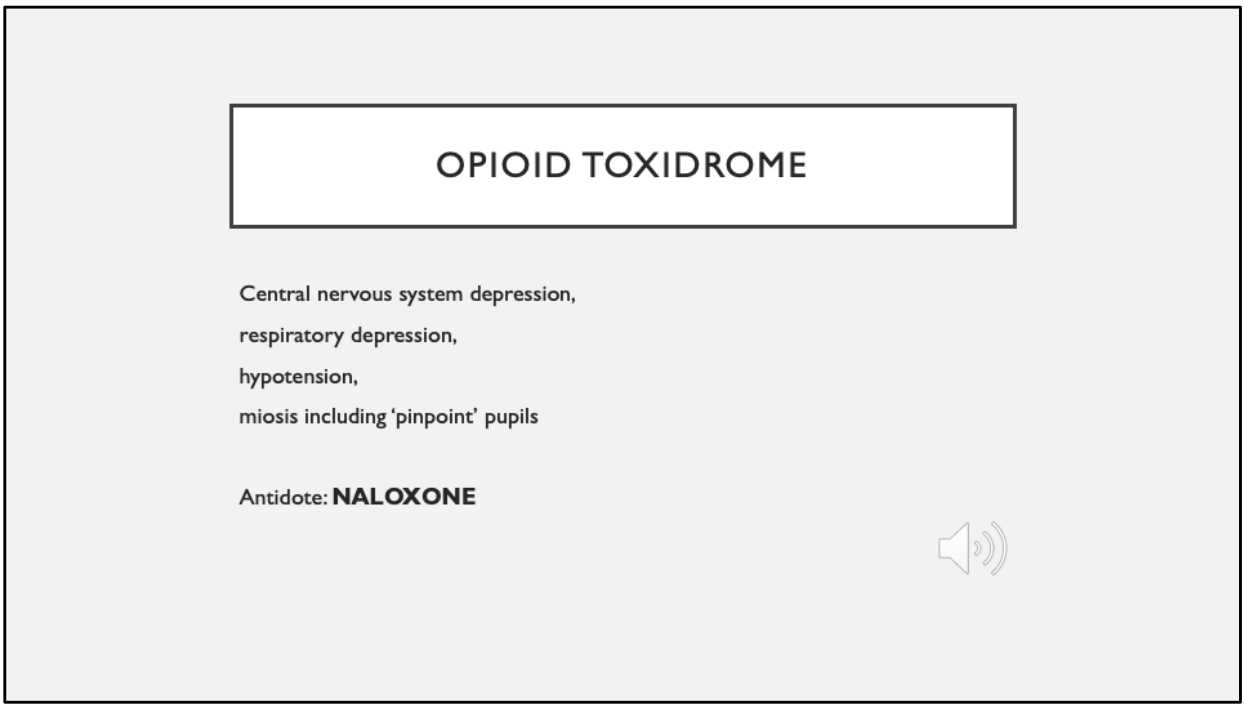
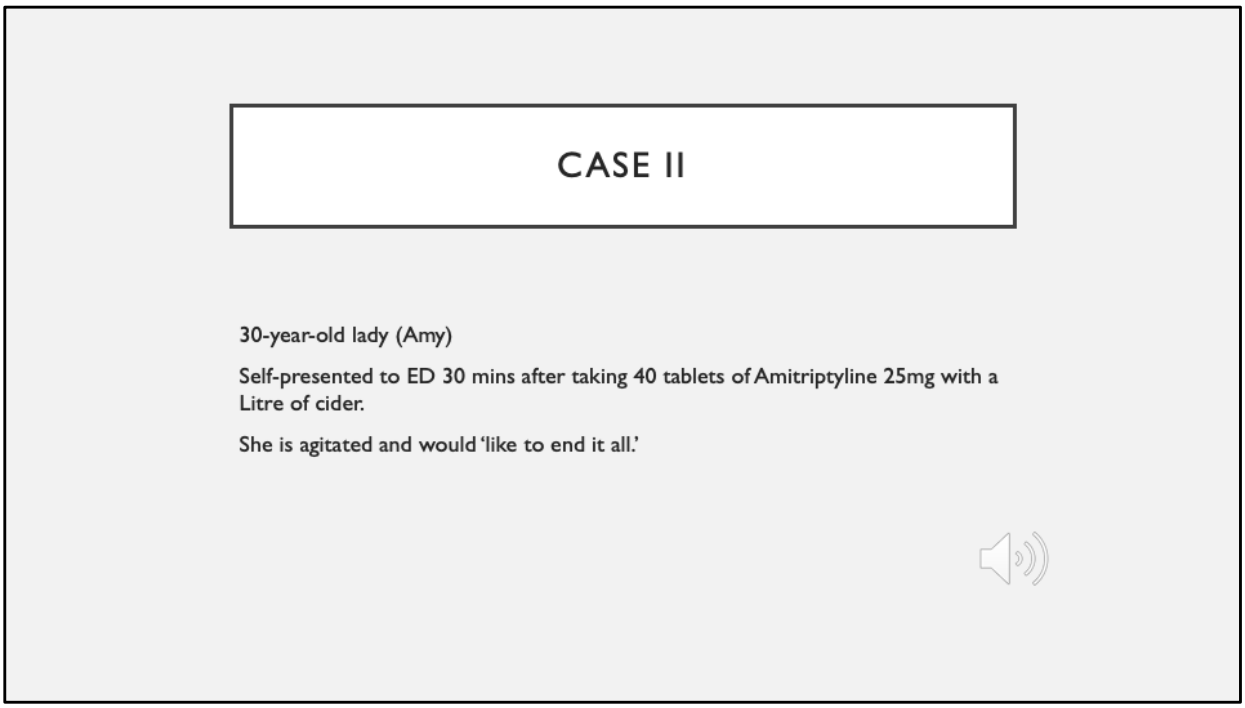


To tie this up - these are the clinical features of pure opioid overdose that constitute the toxidrome. This is the slide you should remember.

Mixed pharmacological effects may arise from preparations containing an opioid and a stimulant drug – for example cocaine and heroin combined as a ‘‘speedball’’) which may cloud this typical clinical picture.

The opioid component of coproxamol, dextropropoxyphene, has membrane stabilising effects and can produce QRS prolongation and negative cardiac inotropy. Cardiovascular compromise associated with QRS prolongation after coproxamol overdose may respond to IV sodium bicarbonate. This is more likely to lead to death after overdose.



What else would you like to know?

We already when she took the tablet and that she self-presented.

You should ask about her mental health history - including previous episodes of self-harm. She tells you that she self-harms regularly with medication and self-mutilation. The last time she did this was 3 months ago and was admitted to the mental health ward for two weeks. She has depression.

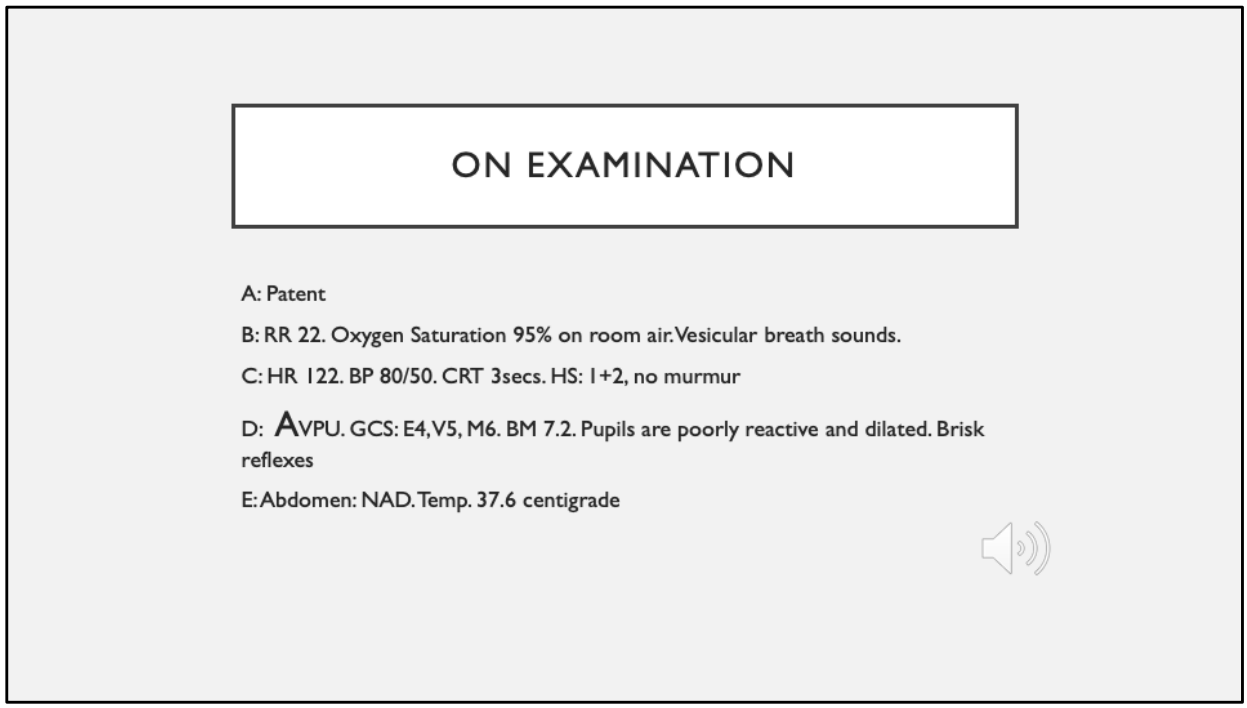
You also want to know if she ingested any other drugs; if the amitriptyline is her prescribed medication; if she has access to any other medication; I always specifically ask about paracetamol.

Not Recently bereaved
Unemployed
No Suicide note
No Evidence of planning of overdose – impulsive when she had some trouble with her disability payments
No terminal illness

#WHATDOYOUTHINK

What other clinical features would you expect in a patient who has ingested a significant quantity of TCA?

What action/intervention would you consider to take within an hour of ingestion of a poison?



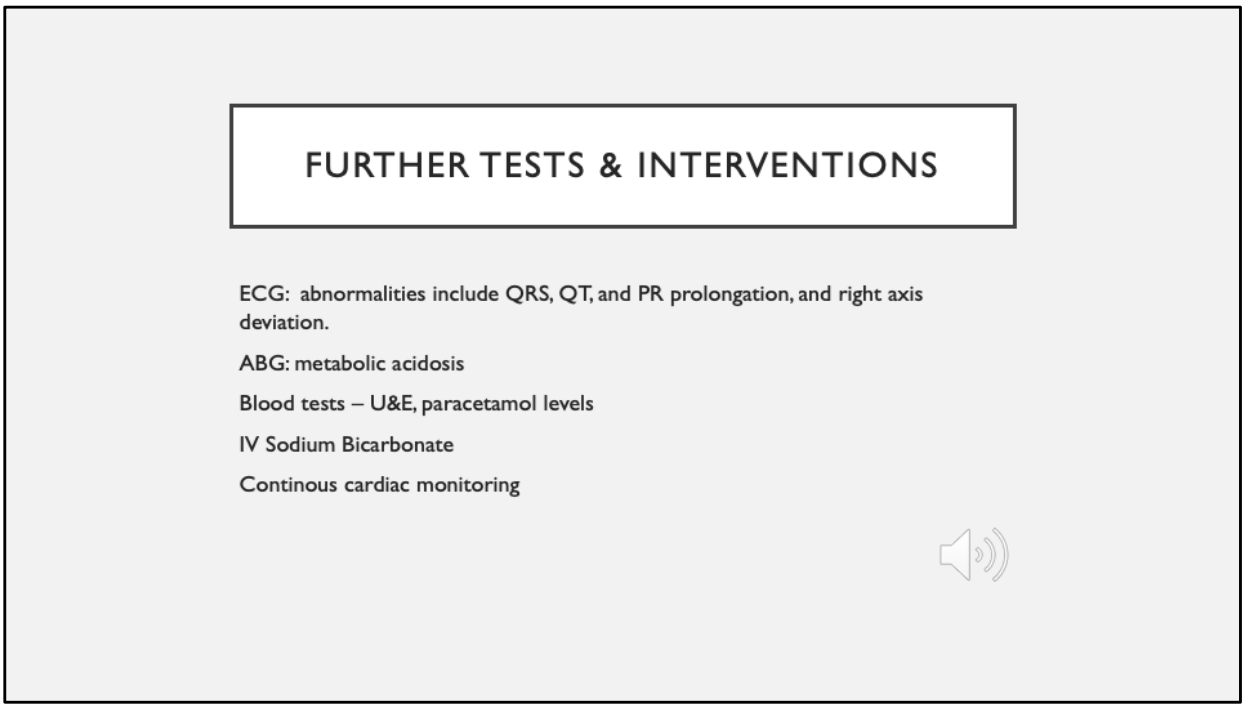
These are the features you find on clinical examination – you will note the tachypnoea, tachycardia, hypotension, dilated pupils and low-grade pyrexia. Are these similar to what you thought earlier?

If a patient presents to you within an hour of ingestion of a poison or an overdose, you should give oral activated charcoal. Oral activated charcoal should be used with caution in patients with reduced conscious level because of the risk of aspiration, especially if vomiting or paralytic ileus is suspected.
It is effective in adsorbing a broad range of different drugs and chemicals so that their gastrointestinal absorption is reduced and they are eliminated by gastrointestinal transit.
Multiple doses of oral activated charcoal can be effective in enhancing gastrointestinal drug elimination by interfering with enterohepatic recirculation, distinct from an effect on initial drug absorption. Key examples of where multiple dose therapy can be effective include carbamazepine, theophylline, quinine and aspirin.

Activated charcoal (AC) is a safe and probably effective agent used to decrease the amount of amitriptyline absorbed from the gastrointestinal (GI) tract into the

bloodstream.
There is little evidence for the effectiveness of AC in reducing GI absorption of toxins if given beyond an hour after ingestion, however it should be considered in large overdoses of toxic drugs where delayed GI absorption is possible (for example, TCAs,

What investigations would you request next that will guide you treatment of Amy?



ECG
abnormalities include QRS, QT, and PR prolongation, and right axis deviation.
QRS duration is a prognostic factor and should be measured in all patients who have ingested a TCA in overdose.
The cardiac conduction abnormalities is caused by sodium channel block as a consequence of the overdose. The alpha receptor block contributes to sedation and worsens systemic cardiovascular function by causing vasodilatation.

ABG
Administration of intravenous sodium bicarbonate 8.4% allows restoration of normal QRS duration after tricyclic poisoning, and can be titrated to achieve an arterial pH of 7.45 to minimize the risk of arrhythmia.

Some poisonings associated with metabolic acidosis and mechanism

Mechanism of acidosis	Example
Ingestion of acidic drug (pKa <7)	Aspirin, tricyclic antidepressant
Substances that are metabolized to anions	Ethanol, ethylene glycol, methanol
Altered liver blood flow, lactate formation	Salbutamol, paracetamol
Lactate dehydrogenase inhibition	Metformin
Impaired oxidative metabolism	Cyanide, carbon monoxide
Seizures or rhabdomyolysis	Tricyclic antidepressants, venlafaxine, antipsychotics
Acute kidney injury	Non-steroidal anti-inflammatory drugs, angiotensin-converting enzyme inhibitors

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…AND THEN

Observed generalized tonic-clonic seizures lasting 2mins

ABCDE approach

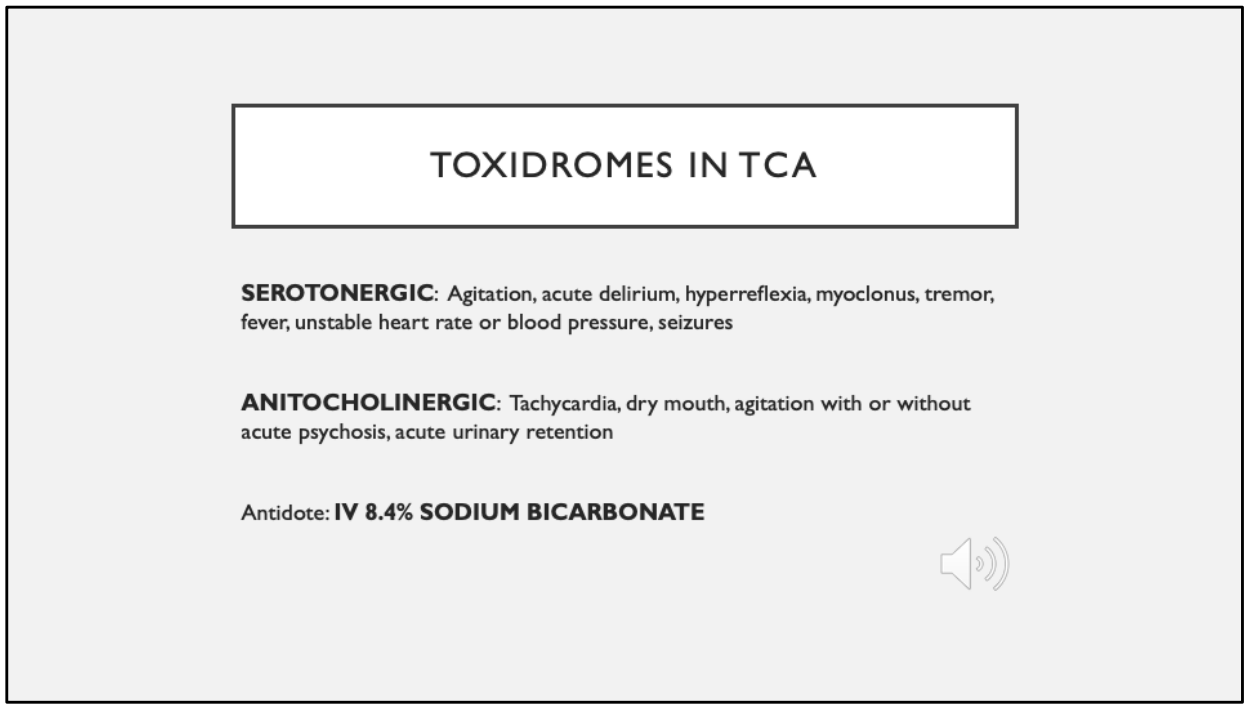
She is given IV Lorazepam 4mg

Urgent ICU referral

Further seizures.

GA, intubated and ventilated

IV Sodium bicarbonate continued.



Serotonergic: Drugs that enhance serotonin in the central nervous system, typically when combined: selective serotonin reuptake inhibitors, tricyclic antidepressants, venlafaxine, monoamine oxidase inhibitors, tramadol, linezolid, St John's wort, cocaine, ecstasy, amphetamines, novel recreational drugs

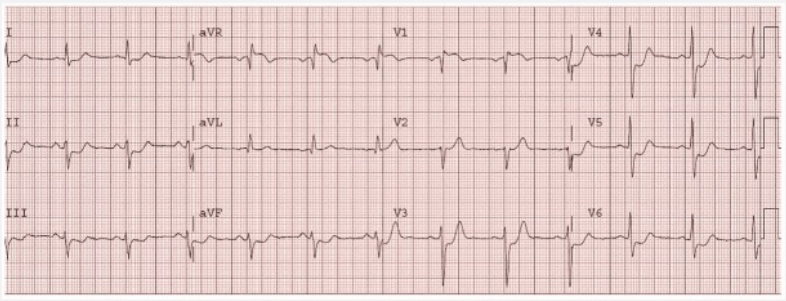
Anticholinergic: Tricyclic antidepressants, antipsychotics, antihistamines

QUESTION

What drug do you think this patient ingested?

52-year-old male investment banker who presents with chest pain after a night out at the weekend. He alludes to snorting 'some stuff' but unwilling to go into details. He is tachycardic (130bpm), normotensive and diaphoretic. ECG is abnormal (next slide).

ECG



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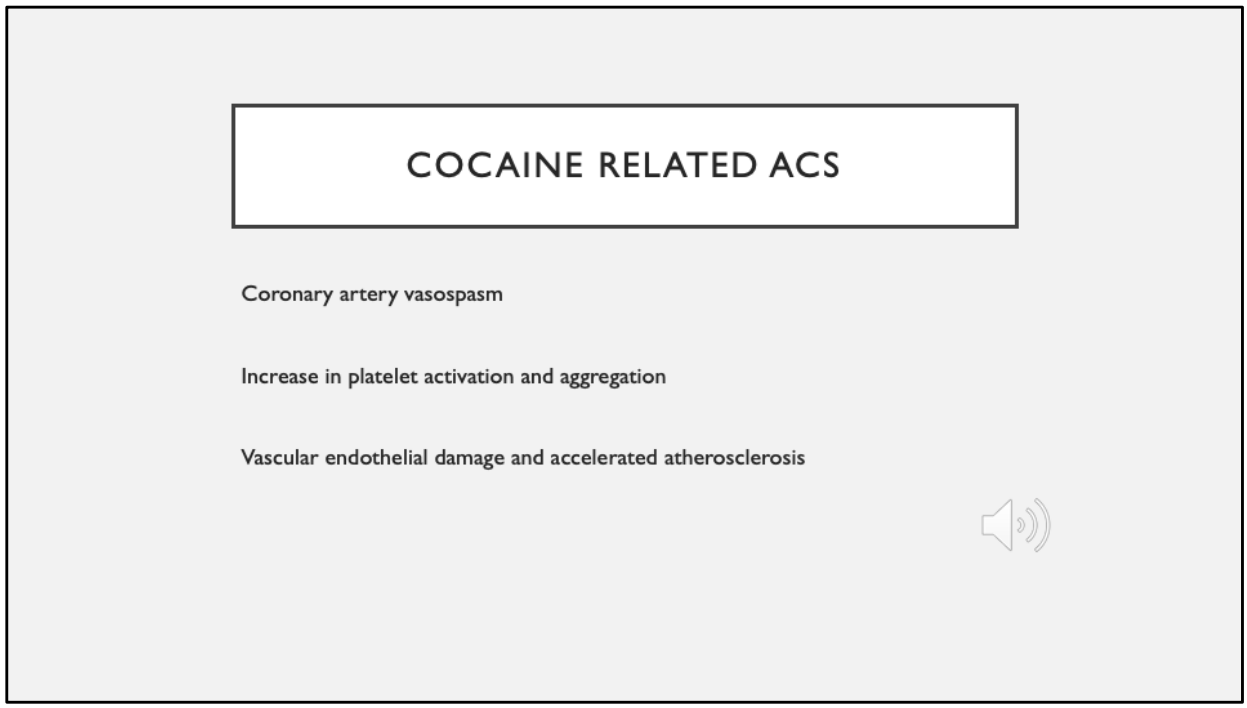
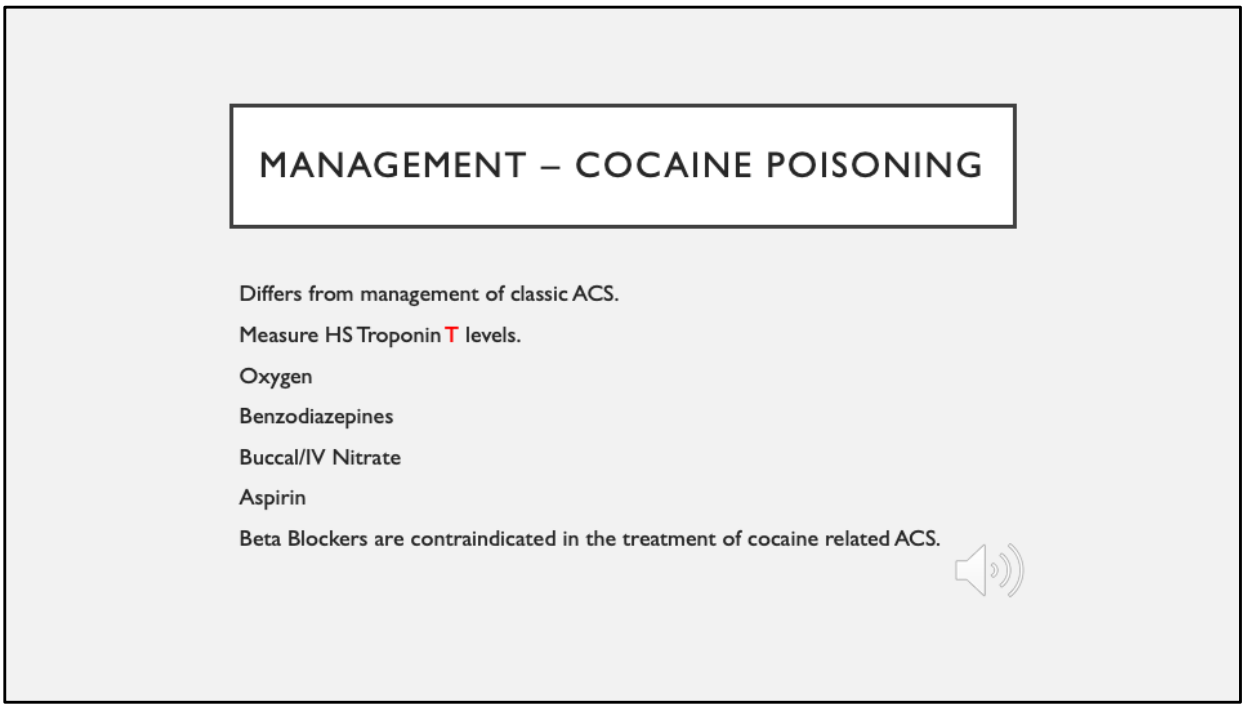


Cocaine related ACS is caused by a number of mechanisms. The sympathomimetic action of cocaine produces an increase in myocardial oxygen demand by increasing heart rate and myocardial contractility. In the face of increased myocardial oxygen demand, supply is limited by direct cocaine induced coronary artery vasospasm, an effect more pronounced in diseased vessels and smokers. Cocaine increases platelet activation and aggregation, and can produce vascular endothelial damage and accelerated atherosclerosis in long term users.



The management of cocaine related ACS differs from that of classic ‘‘medical ACS’’ because of cocaine induced coronary artery spasm that is present in addition to possible coronary artery thrombosis (secondary to coagulation abnormalities and advanced atheromatous disease).

benzodiazepines (which reduce central stimulation, tachycardia, and hypertension), IV or buccal nitrates (to overcome coronary artery vasospasm), and
Aspirin (to reduce platelet aggregation

Second line agents include calcium channel blockers (verapamil) and a blockers such as phentolamine. Patients with continuing chest pain and/or ECG changes despite these measures should undergo coronary angiography.

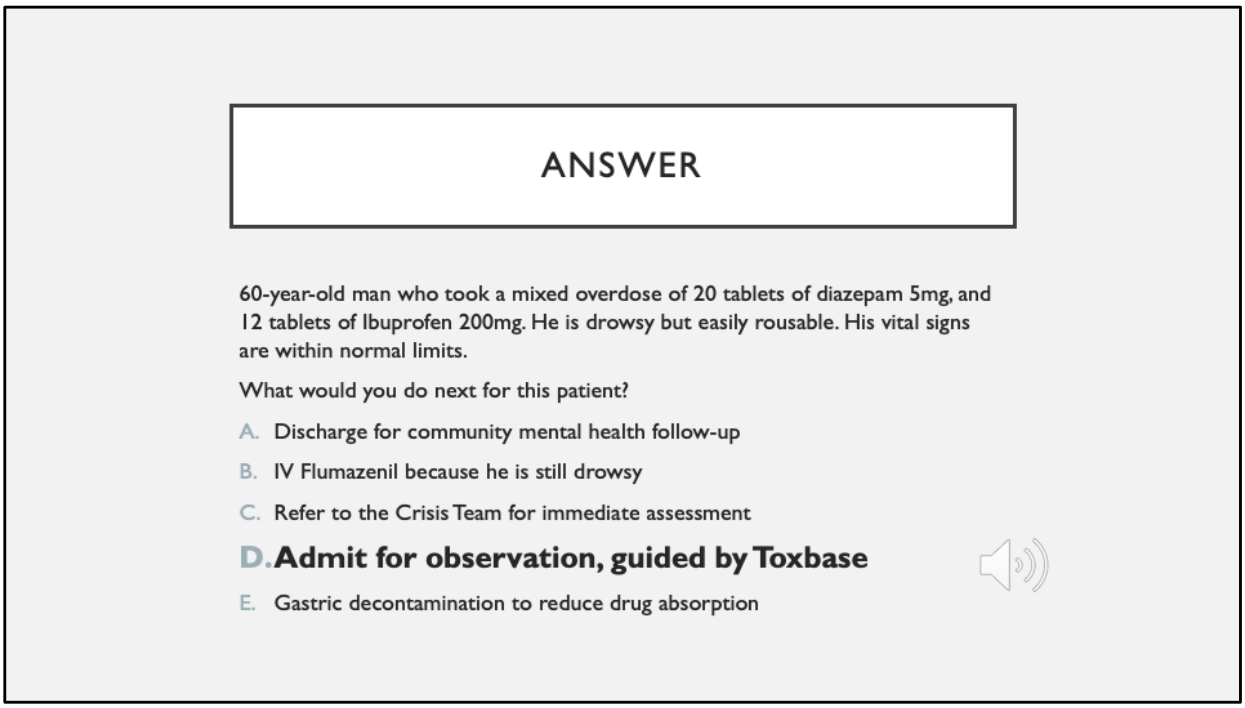
Beta Receptor block produces unopposed a receptor stimulation and worsening of coronary artery spasm and systemic hypertension.

QUESTION

60-year-old man who took a mixed overdose of 20 tablets of diazepam 5mg, and 12 tablets of Ibuprofen 200mg. He is drowsy but easily rousable. His vital signs are within normal limits.

What would you do next for this patient?

A. Discharge for community mental health follow-up
B. IV Flumazenil because he is still drowsy
C. Refer to the Crisis Team for immediate assessment
D. Admit for observation, guided by Toxbase
E. Gastric decontamination to reduce drug absorption



Talk through each to disopute
LP:
Benzodiazepine toxicity commonly produces drowsiness, and mid-sized or dilated pupils. Dysarthria, ataxia, nystagmus, agitation, and confusion can occur, however after lone benzodiazepine ingestion symp
toms and signs are usually mild, well tolerated, and resolve within 24 hours.

Flumazenil is a benzodiazepine antagonist acting on the GABA receptor. We do not advocate the use of flumazenil as either a diagnostic or therapeutic tool in the treatment of acute poisoning. Administration of flumazenil after a mixed overdose may unmask adverse effects of coingestants, particularly cardiotoxic agents such as TCAs leading to seizures or malignant arrhythmias. Patients who have
a history of seizures may develop uncontrolled seizures after receiving flumazenil

It is much safer to provide supportive care until benzodiazepine toxicity has resolved.

SEDATIVE-HYPNOTIC TOXIDROME

Depression of central nervous system

Respiratory depression

Hypotension

In contrast to opioid toxidrome, pupil size is normal

Antidote: **Supportive Care, FLUMAZENIL**

Benzodiazepines, ethanol, antipsychotics

CASE III

72-year-old retired policeman was brought into ED by his wife.

She had returned from a weekend get away to find him unwell.

Vomiting, sweating and very unsteady on his feet.

He tells you that he ingested over 200 tablets of Aspirin 75mg over 8 hours.

ON EXAMINATION

A: Patent

B: RR 25. Oxygen Saturation 96% on room air.. Vesicular breath sounds.

C: HR 130. BP 105/60. CRT <2secs. HS: 1+2, no murmur

D: AVPU. GCS: E4, V5, M6. BM 9.5. Pupils are reactive. Ataxic gait

E: Abdomen: NAD. Temp. 40.1 centigrade

INVESTIGATIONS

ECG: Sinus tachycardia

ABG (on room air): pH 7.25, pCO2 4, pO2 16.0, HCO3- 14, Lactate 5.1

Serum Salicylate concentration: 650mg/l

U&E: Elevated Urea at 10.2, other components normal

What do you think about these?

SALICYLATE POISONING

Table 3 Toxicokinetics, clinical features, and recommended management of salicylate poisoning

Severity	Dose ingested	Salicylate concentration	Clinical features	Recommended management
Mild	>150 mg/kg	Adults 300–600 mg/l	Lethargy	MDAC until salicylate concentration peaks
		Children/elderly people 200–450 mg/l	Nausea Vomiting Tinnitus Dizziness	Oral or IV fluids
Moderate	>250 mg/kg	Adults 600–800 mg/l Children/elderly people 450–700 mg/l	Tachypnoea Hyperpyrexia Sweating Dehydration Ataxia	MDAC IV fluids Urinary alkalinisation
Severe	>500 mg/kg	Adults>800 mg/l Children/elderly people>700 mg/l	Hypotension Metabolic acidosis Renal failure Coma Convulsions	MDAC IV fluids Haemodialysis

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#WHATDOYOUTHINK

Pause and Reflect.

DRUGS & ANTIDOTES

Table 1 Antidotes used in the management of poisoned patients

Toxin	Antidote
β blockers	Glucagon
Oral anticoagulants	Vitamin K1 (phytomenadione)
Digoxin	Digoxin specific antibodies (Digibind)
Ethylene glycol/methanol	Ethanol/4-Methylpyrazole
Cyanide	Thiosulphate/dicobalt ededate/ hydroxycobalamin
Organophosphates	Atropine/oximes
Iron	Desferrioxamine
Heavy metals	EDTA, DMSA, DMPS
Paracetamol	*N*-acetylcysteine
Opioids	Naloxone
Sulfonylureas	Octreotide
Tricyclic antidepressants	Sodium bicarbonate

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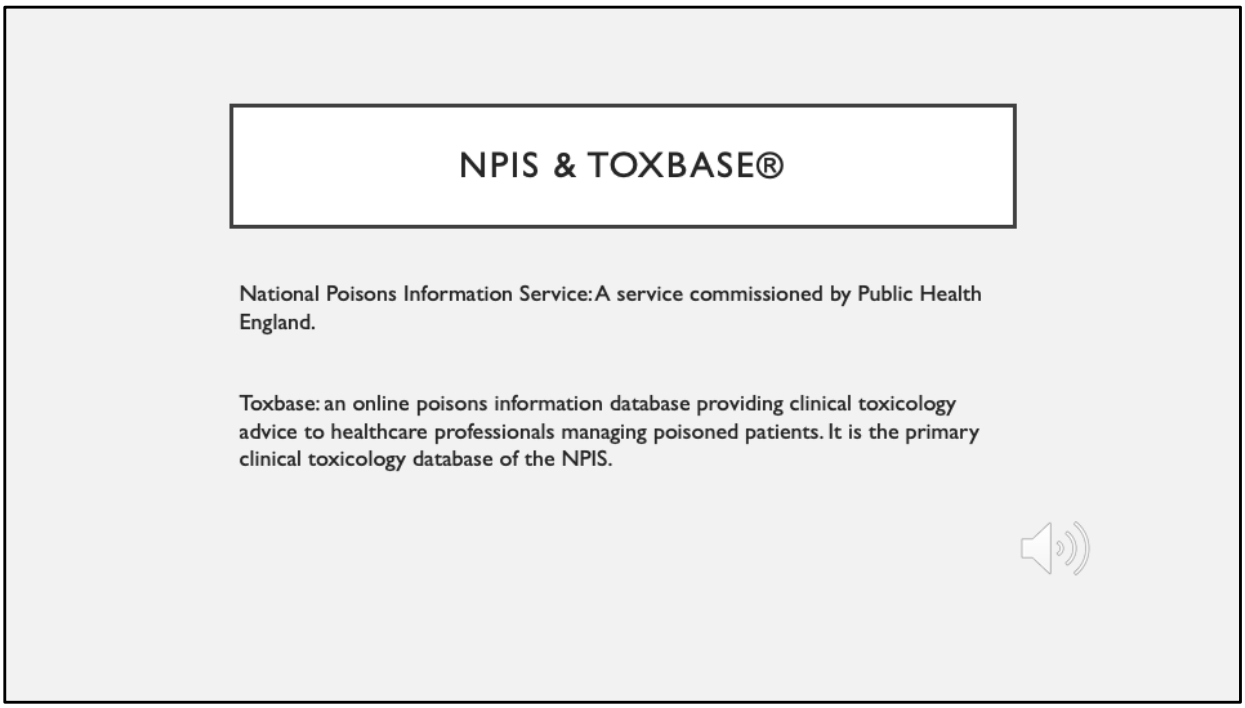

Clinical toxicologists have expertise in managing poisoned patients although in the UK such specialists are currently available in only a small number of hospitals, in contrast to other medical specialties. The National Poisons Information Service provides clinical management advice regarding poisoned patients via TOXBASEÒ, an internet-based resource that is freely available to registered healthcare professionals in the UK. It is supported by a telephone service that provides clinical management advice and is available 24 hours per day.

Gastric lavage was once widely applied to poisoned patients but offers little benefit and can actually enhance the rate and extent of drug absorption. Its only role is limited to specific circumstances where patients present within 1 hour of a life-threatening ingestion of certain agents such as lithium.

Whole bowel irrigation is a newer method of gut decontamination that entails administering polyethylene glycol (2 l/h adults, 500 ml/h pre-school children) orally until the resulting rectal effluent is clear. Contraindications to its use include obstructed bowel, ileus, or GI haemorrhage

Intralipid is a lipid-rich formulation used to provide intravenous calorific and nutritional support. It is capable of rapidly reversing the life-threatening cardiotoxicity seen after systemic exposure to local anaesthetic agents (e.g. lidocaine), and is included in resuscitation guidelines. Possible adverse effects include local vein irritation, acute pancreatitis and electrolyte disturbances.

HIGH-RISK SUICIDE FEATURES

Sex (male)
Age (elderly)
Recently bereaved
Unemployed
Suicide note
Evidence of planning of overdose
Presence of terminal illness
History of depression
Found in isolated place by another person after taking overdose

QUIZ 1

A 56-year-old man was admitted 40 minutes after an intentional overdose involving mirtazapine, gliclazide and probably other drugs. On examination, he was alert and orientated, with a Glasgow Coma Scale score of 15.

What is the most appropriate immediate treatment?

A. Oral activated charcoal

B. Intravenous acetylcysteine

C. Intravenous sodium bicarbonate

D. Haemodialysis

E. Intravenous infusion of dextrose 5%

QUIZ 2

A 54-year-old woman presented to the emergency department having been found collapsed in the street. She had a reduced conscious level and responded to voice. There was no information available about medication.

On examination, pulse rate was 104 per minute, blood pressure 154/86 mmHg. Limb reflexes were very brisk but symmetrical throughout the upper and lower limbs, and three or four beats of myoclonus at both ankles. Pupils were both 7 mm and constricted to light.

Investigations Resting ECG showed sinus tachycardia with QRS duration 76 milliseconds and QT 487 milliseconds.

QUIZ 2

Ingestion of which of the following drugs would best explain the clinical findings?

A. Amitriptyline

B. Citalopram

C. Fexofenadine

D. Tramadol

E. Zopiclone

IN SUMMARY…

- Take as good a history as possible
- ABCDE approach
- Antidote and Supportive care
- TOXBASE®
- Phone a Friend: NPIS
- Psychological Assessment a MUST

LEARNING OUTCOMES

- Describe the clinical features and management principles of other overdoses that present commonly to the Emergency Department, including tricyclic antidepressants, benzodiazepines, opiates, cocaine and aspirin.
- List the antidotes available to treat specific poisons, e.g. n-acetylcysteine for paracetamol, naloxone for opiates, flumazenil for benzodiazepines, glucagons for beta-blockers, sodium bicarbonate for tricyclic antidepressants.
- Describe Toxbase and the function of the National Poisons Information Services.
- Describe the features suggesting a high risk of suicide in a patients presenting with self-harm or overdose.

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