

SELF-HARM, OVERDOSE & RELATED TOXICOLOGY

Dr Akin Falayajo

Consultant in Acute Medicine

United Lincolnshire Hospitals NHS Trust



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 Service.
- Describe the features suggesting a high risk of suicide in a patients presenting with self-harm or overdose.



CASE I

42-year-old male (John)

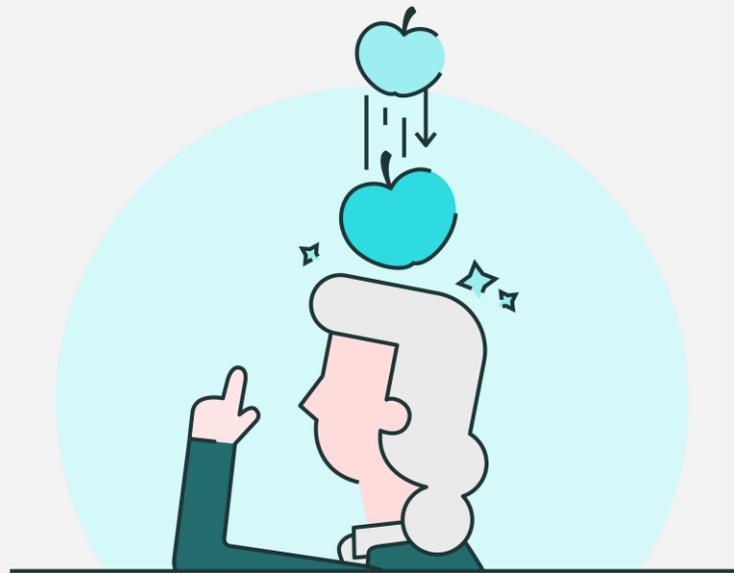
Found wandering in the park; looked disheveled

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

The Police have contacted his partner.



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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.



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: I +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



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IMMEDIATE INTERVENTIONS

Oxygen

Left lateral position

IV Naloxone 400micrograms

Intravenous access and blood tests – give IV fluids for hypotension

Cardiac monitor

ECG

ABG



...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?



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RR 8

BP 85/52

GCS 10/15

NALOXONE VS LONG-ACTING OPIOIDS



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OTHER ACTIONS

Review Toxbase

Admit to medical HDU

Psychological assessment



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https://www.toxbase.org

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The primary clinical toxicology database of the National Poisons Information Service

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MST continus

Name contains Name starts with [Symptom search](#)

BREAKING NEWS

29/01/2020

Shortage of calcium chloride injection
Specialist Pharmacy Services have advised there is a shortage of calcium chloride injection 10 milligrams in 10 ml and 5 milligrams in 5

https://www.toxbase.org/Poisons-Index-A-Z/M-Products/MST-Continus/

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ACCEPT

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MST Continus [Printable version](#)
Updated 10/2018

Type of Product	Type of Product Opioid analgesic with agonist activity.
Ingredients	Ingredients Morphine sulphate
Toxicity	Toxicity Modified release tablets - 5 mg, 10 mg, 15 mg, 30 mg, 60 mg, 100 mg, 200 mg Granules (for modified release suspension) per sachet - 20 mg, 30 mg, 60 mg, 100 mg, 200 mg
Alert	
Features	
Management	
Additional Information	

The effects in overdose will be potentiated by simultaneous ingestion of alcohol and psychotropic drugs. The fatal dose is very variable according to individual tolerance, as little as 10 mg in adults. Morphine salts are rapidly absorbed from the gut but undergo significant first pass metabolism. Metabolites of morphine may contribute to or antagonise the analgesic effect. Morphine is readily available following subcutaneous or intramuscular injection (Martindale, 2012). A mean plasma elimination half-life for morphine of about 2 hours has been reported (Martindale, 2012). However, in overdose duration of effect is usually longer due to active metabolites, delayed absorption or use of modified release products. Time to peak concentrations from different formulations and peak analgesic effects in therapeutic doses vary. In

OPIOID TOXIDROME

Central nervous system depression,
respiratory depression,
hypotension,
miosis including 'pinpoint' pupils

Antidote: **NALOXONE**



CASE II

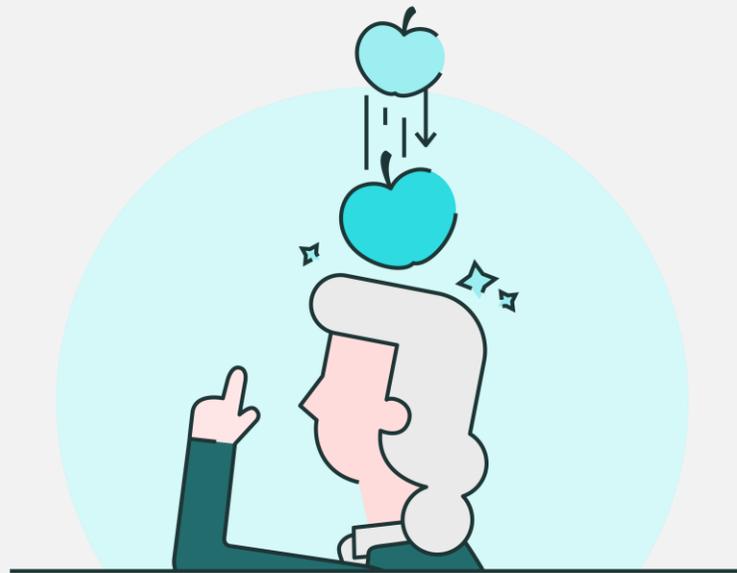
30-year-old lady (Amy)

Self-presented to ED 30 mins after taking 40 tablets of Amitriptyline 25mg with a Litre of cider.

She is agitated and would 'like to end it all.'



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ON EXAMINATION

A: Patent

B: RR 22. Oxygen Saturation 95% on room air. Vesicular breath sounds.

C: HR 122. BP 80/50. CRT 3secs. HS: I+2, no murmur

D: **A**VPU. GCS: E4, V5, M6. BM 7.2. Pupils are poorly reactive and dilated. Brisk reflexes

E: Abdomen: NAD. Temp. 37.6 centigrade



FURTHER TESTS & INTERVENTIONS

ECG: abnormalities include QRS, QT, and PR prolongation, and right axis deviation.

ABG: metabolic acidosis

Blood tests – U&E, paracetamol levels

IV Sodium Bicarbonate

Continuous cardiac monitoring



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

Waring, W., 2017

...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.



TOXIDROMES IN TCA

SEROTONERGIC: Agitation, acute delirium, hyperreflexia, myoclonus, tremor, fever, unstable heart rate or blood pressure, seizures

ANITOCHOLINERGIC: Tachycardia, dry mouth, agitation with or without acute psychosis, acute urinary retention

Antidote: **IV 8.4% SODIUM BICARBONATE**



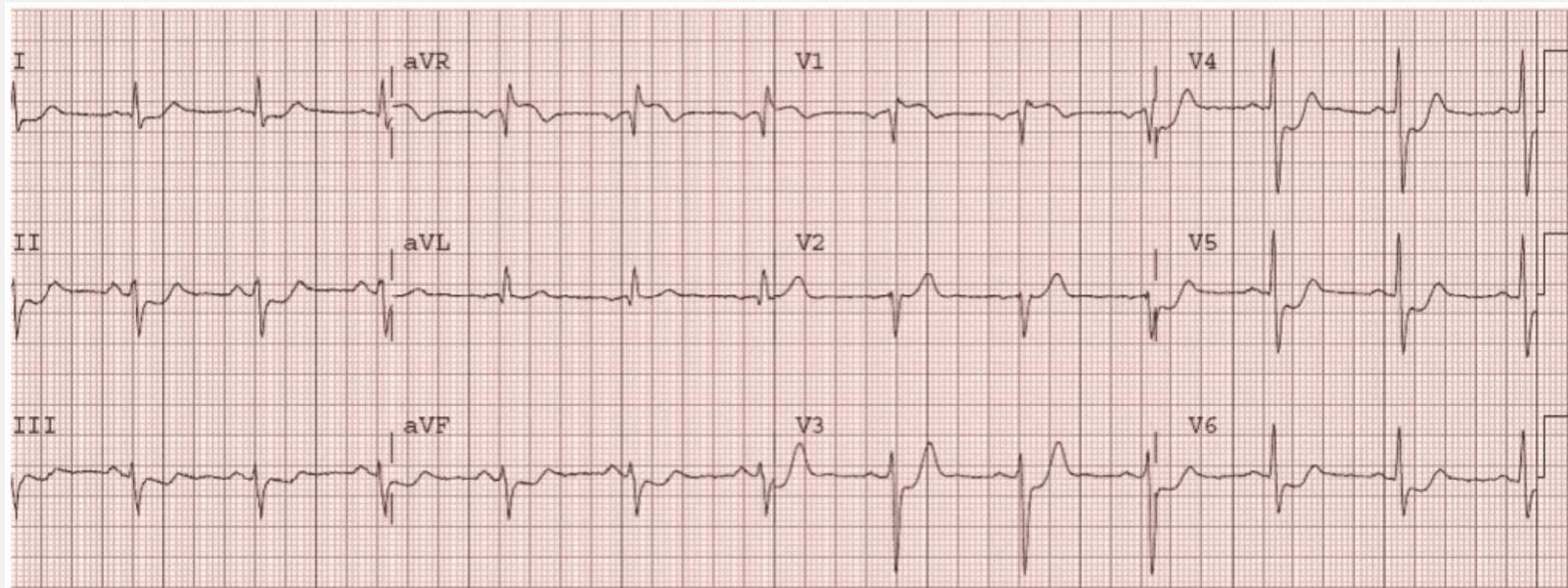
QUESTION

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



COCAINE RELATED ACS

Coronary artery vasospasm

Increase in platelet activation and aggregation

Vascular endothelial damage and accelerated atherosclerosis



MANAGEMENT – COCAINE POISONING

Differs from management of classic ACS.

Measure HS Troponin **T** levels.

Oxygen

Benzodiazepines

Buccal/IV Nitrate

Aspirin

Beta Blockers are contraindicated in the treatment of cocaine related ACS.



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



ANSWER

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SEDATIVE-HYPNOTIC TOXIDROME

Depression of central nervous system

Respiratory depression

Hypotension

In contrast to opioid toxidrome, pupil size is normal

Antidote: **Supportive Care, FLUMAZENIL**



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: I+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



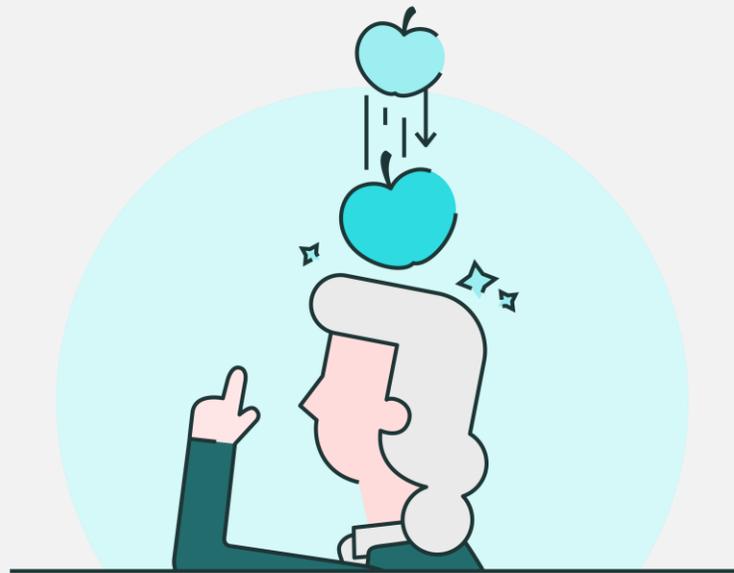
SALICYLATE POISONING

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 Children/elderly people 200–450 mg/l	Lethargy Nausea Vomiting Tinnitus Dizziness	MDAC until salicylate concentration peaks 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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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	<i>N</i> -acetylcysteine
Opioids	Naloxone
Sulfonylureas	Octreotide
Tricyclic antidepressants	Sodium bicarbonate



NPIS & TOXBASE®

National Poisons Information Service: A service commissioned by Public Health England.

Toxbase: an online poisons information database providing clinical toxicology advice to healthcare professionals managing poisoned patients. It is the primary clinical toxicology database of the NPIS.



OTHER THINGS TO SAY...

- Gastric decontamination: gastric lavage, whole bowel lavage
- Intralipid



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 I

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.
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www.toxbase.org