

ED QUICK QUIZ

WHAT IS THE DIAGNOSIS?

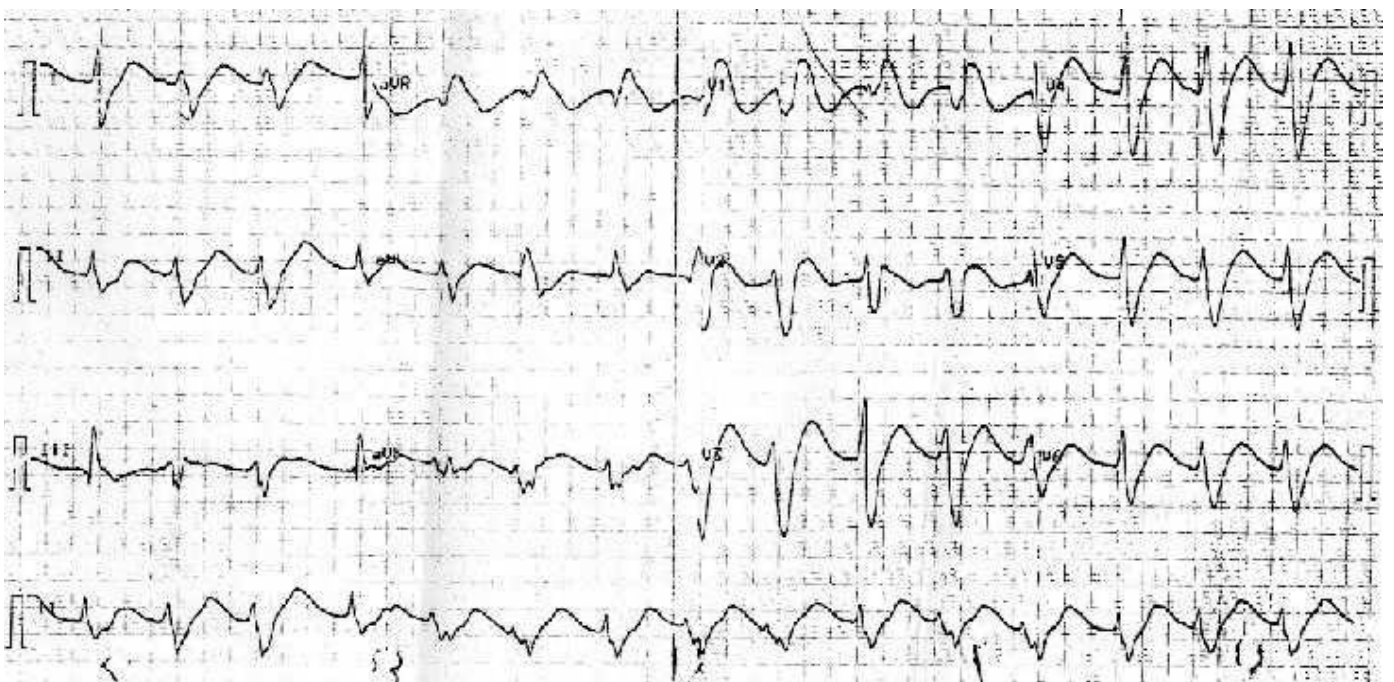
BACKGROUND

A 19-year-old man is brought in by ambulance after he ingested a bottle of pills in an apparent suicide attempt. His parents found him in his bedroom, confused and agitated with an empty pill bottle next to him.

The paramedics report that the pills had been prescribed for his grandmother; nightly for chronic leg pain.

On his arrival to the Emergency Department, the patient is agitated and disoriented. He has a heart rate of 140 bpm and a blood pressure of 82/45 mm Hg. His temperature is 38°C. His cardiac and pulmonary findings are normal, and a limited neurologic examination reveals no focal findings. A VBG shows a mixed acidosis with a glucose of 6.3 mmol/l.

ECG is performed, and shortly thereafter, the patient has a generalized tonic-clonic seizure.



QUESTIONS

1. What is the cause of his abnormal ECG and altered mental status and seizure activity?
2. What are the steps in management?

ANSWERS & DISCUSSION

1. Amitriptylline (Tricyclic antidepressant TCA) poisoning

This patient has a typical presentation for TCA overdose, given his altered mental status, sinus tachycardia with a prolonged QRS interval, metabolic acidosis (with respiratory component if ventilation impaired) right axis on ECG, and ultimately a seizure.

Although prescribed less commonly than previously, TCAs continue to be widely used in the management of chronic pain, selected psychiatric illnesses, enuresis and migraine prophylaxis.

TCAs have a narrow therapeutic index and can cause toxicity, even at therapeutic doses. The toxicity is related to their mechanism of action. These drugs block not only fast sodium channels in myocytes but also alpha-adrenergic receptors and amine uptake (e.g. norepinephrine), and they competitively inhibit muscarinic, histaminic, and gamma-aminobutyric acid (GABA)-A receptors.

Patient presentations vary substantially and can range from that of:

Mild antimuscarinic symptoms

- Dry mucous membranes, hot dry skin, sinus tachycardia, depressed mental status, urinary retention dilated pupils progressing to ataxia, nystagmus, divergent squint

Severe and life-threatening complications

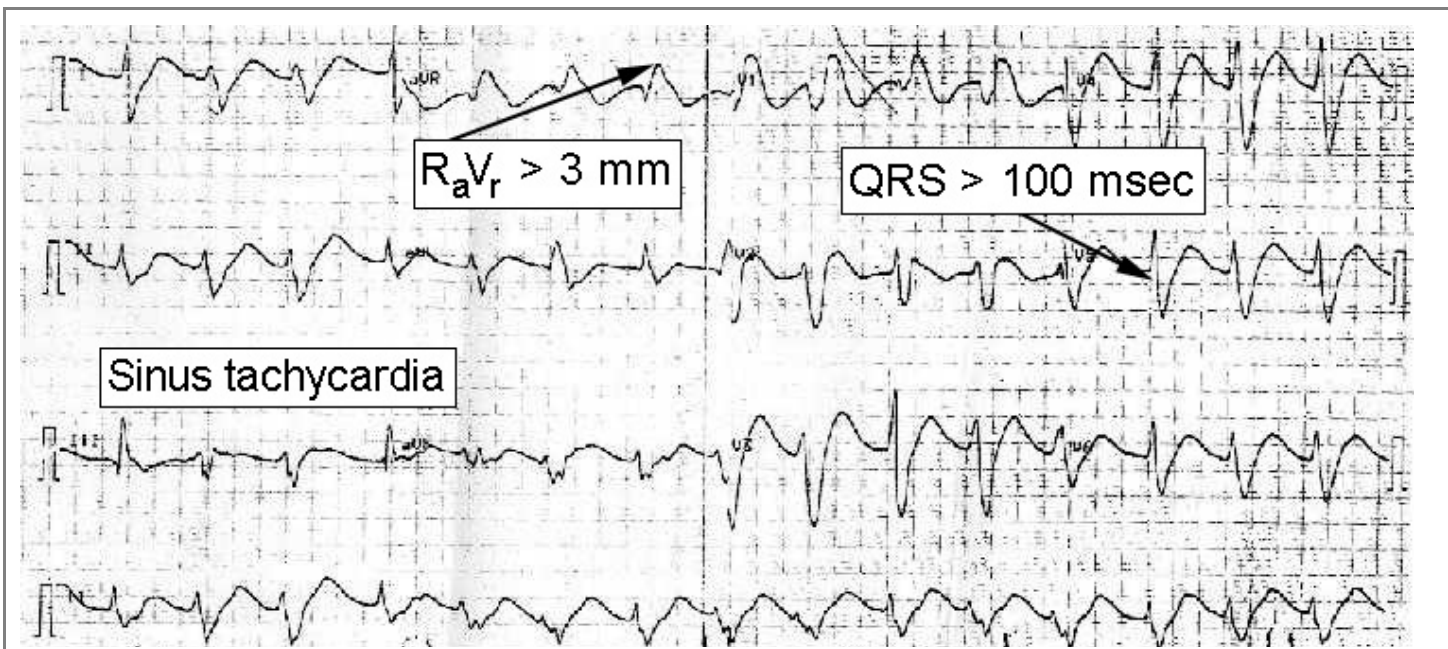
- Cardiac (supraventricular or ventricular tachycardia, hypotension)
- Neurological (confusion, seizures in >5%, coma)
- Pulmonary (respiratory depression, adult respiratory distress syndrome, pulmonary oedema)

Life-threatening complications usually occur within 6 h of ingestion.

- Secondary complications
- Aspiration pneumonia
- Hyperthermia (serotonin syndrome)
- Rhabdomyolysis
- Anoxic encephalopathy.

Hypothermia and rhabdomyolysis may occur in patients who have been unconscious.

Occasionally skin blisters may occur.



ECG features include prolongation of the PR, QRS and QT intervals, non-specific ST segment and T wave changes and atrioventricular block. Although sinus tachycardia is the most common ECG abnormality, it is only 70% sensitive for the symptomatic presentation of life-threatening complications. QRS intervals of 100 ms or longer may be predictive of seizures and ventricular arrhythmias. The height of the R wave in lead aVR from the baseline PQ segment (R_{aVR}) of 3 mm or more has been reported as more predictive of life-threatening adverse outcomes than a QRS interval of 100ms. QRS duration of > 120 ms is used for practical purposes. The ECG may need repeated.

2. Key Management Points

- **Do not** give flumazenil to reverse depressed conscious level if suspected mixed overdose
- Maintain a clear airway and adequate ventilation.
- **Sodium bicarbonate** - 50mmols (333mls 1.26%). Aim H^+ 28-32) if
 - Increased QRS/Acidosis
 - Arrhythmias
 - Hypotension resistant to fluid resuscitation
 - Seizures
- Severe hypotension, heart failure or cardiogenic shock - **Glucagon** administered over 1-2 minutes to minimize the risk of vomiting and aspiration.
- If cardiotoxicity is unresponsive to the above consider the use of **Intralipid** (see Toxbase)
- **Convulsions** – check BM.
 - Single brief convulsions do not require treatment.
 - Frequent or prolonged treat initially with benzodiazepines. Phenobarbital (not phenytoin) and ultimately anaesthetics may be used for refractory seizures.

- **Cardiac arrest** (hospital or witnessed out of hospital cardiac arrest with bystander CPR) resuscitation continued for > 1 hour. Only stopped after discussion with a senior doctor.