ED QUICK QUIZ

WHAT IS THE DIAGNOSIS?

BACKGROUND

A 27 year old man attends A&E with chest pain. He had been at a party and took an “upper” with his friends, though he doesn’t know what the drug was. He has had an hour of central, non-radiating chest pain which came on 40 minutes after taking the drug.

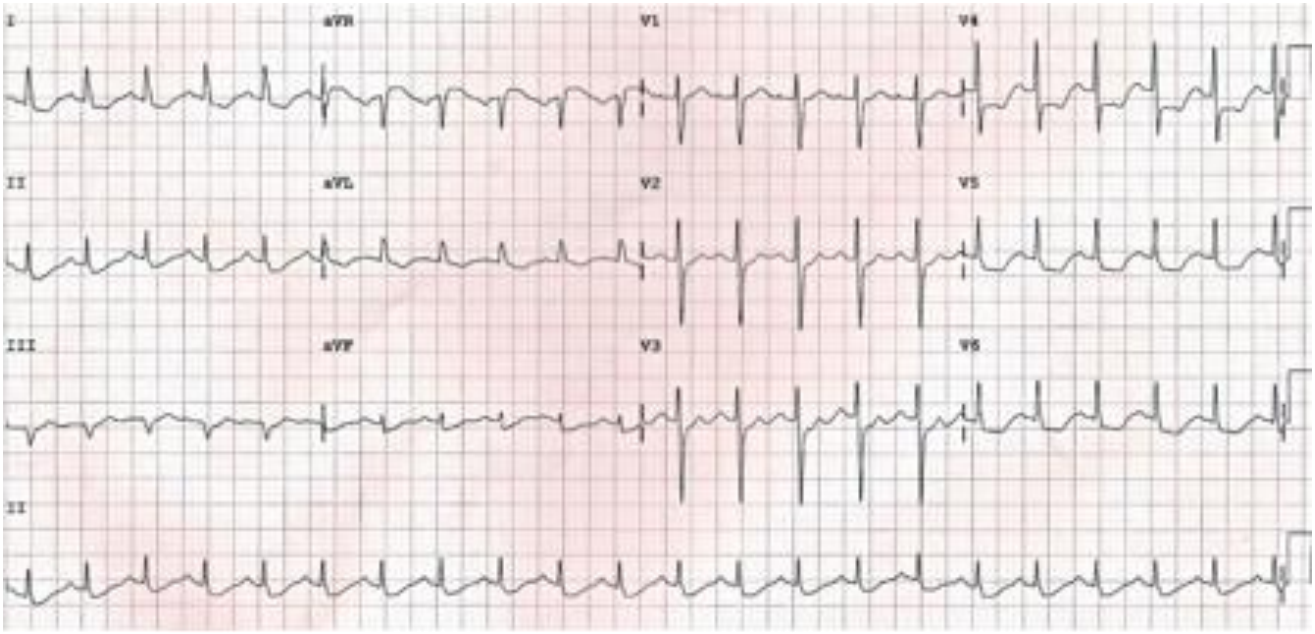
He has no medical history and is on no medication. He smokes 15 cigarettes per day and occasionally uses a variety of recreational drugs at parties, whatever is going around.

Examination

He is highly alert, restless, quite disinhibited and has pressure of speech.

Observations

HR 110, BP 260/110, RR 22, SpO2 96% on air, temperature 38.2 degrees, BM 6.7.



QUESTIONS

1. Which drugs are good candidates for this presentation?
2. What possible causes are there for his chest pain?
3. His ECG monitor shows him go into AF with a rate 180-190/minute. Which drug is contraindicated in the treatment of this?

ANSWERS & DISCUSSION

1. Cocaine is the most likely drug to cause myocardial ischaemia. Other possibilities include:

- **Sympathomimetics:** amphetamines/methamphetamines/MDMA
- **Anticholinergic poisoning** (skin will by dry, speech will be muffled)

The physiological actions of cocaine include:

- **Prevention of biogenic amine reuptake by presynaptic neurones**, potentiating their effects (esp. sympathetic stimulation by enhancing peripheral noradrenaline)
- **Binding to Na+ and K+ channels** (prolongs QRS & QT intervals, causing arrhythmias)
- **Stimulation of glutamate** (which lowers the seizure threshold)
- **Stimulation of platelet activation** (prothrombotic)

Thrombosis, vasospasm and increased **vascular shear forces** can cause **ischaemia, haemorrhage** or **dissection** in any organ system. Other complications include seizures, arrhythmias, hyperthermia, rhabdomyolysis, glaucoma and placental abruption.

Benzodiazepines are the main treatment for cocaine's complications as they reduce sympathetic outflow and raise the seizure threshold. They reduce blood pressure in hypertensive emergencies, reduce HR, BP and vasospasm in myocardial ischaemia, and reduce psychomotor agitation in hyperthermic patients. Checking for and treating rhabdomyolysis and actively cooling the hyperthermic patient are also vitally important.

2. Cocaine is a common cause of MI in the young – 6% of patients with chest pain following cocaine use have MI. Cocaine also causes chest pain through other mechanisms such as **aortic dissection, pneumothorax** (when snorted/smoked) and **pulmonary embolism**.

ACS following cocaine requires reversal of sympathetic stimulation in addition to standard management. Use IV lorazepam first line then consider a GTN infusion or phentolamine.

3. Beta blockers are contraindicated. Alpha adrenergic stimulation causes vasoconstriction while beta stimulation causes vasodilation. Beta blockade leads to **unopposed vasoconstriction**, precipitating or exacerbating cardiovascular complications.

Treat broadening of the QRS complex and metabolic acidosis with boluses of IV sodium bicarbonate. Manage narrow-complex tachyarrhythmias with benzodiazepines, calcium channel blockers or adenosine (depending on the arrhythmia). Treat broad-complex tachyarrhythmias with sodium bicarbonate followed by lidocaine. Treat torsades (due to K+ blockade) with IV MgSO4. Refractory cardiotoxicity can be managed with IV intralipid.