CASE REPORT

Chest pain in the recovery room, following topical intranasal cocaine solution use

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SUMMARY

On awakening in the recovery room after a general anaesthetic for ear, nose and throat surgery, a 28-year-old woman reported central chest pain. She had received topical nasal cocaine solution preoperatively. She required intravenous opioids and sublingual glyceryl trinitrate before the pain settled. There was no evidence of significant myocardial injury and the patient was discharged later that day. The use of topical nasal cocaine solution in anaesthesia and its adverse myocardial effects are discussed.

BACKGROUND

Intranasal cocaine applications are commonly used in ear, nose and throat (ENT) surgery.¹ Although its toxic myocardial effects through recreational use are well known, there are relatively few case reports associated with its use as a topical local anaesthetic.^{2–6}

CASE PRESENTATION

A 28-year-old woman underwent septoplasty and submucosal diathermy to the inferior turbinates as elective day case surgery. She had been suffering with ongoing symptoms of nasal obstruction and was noted to have hypertrophied inferior turbinates on examination. She smoked 5 cigarettes per day but was otherwise well with no significant medical history, specifically no history of ischaemic heart disease, and took no regular medications. She was administered topical Moffett's solution (solution containing 10% cocaine, 1:10 000 epinephrine and 8.4% sodium bicarbonate)⁷ intranasally by the ENT surgeon after induction of general anaesthesia. The surgery lasted 30 min and was uneventful. The patient was cardiovascularly stable throughout and required no vasopressors or inotropes. On waking in recovery, the patient reported 'crushing' central chest pain radiating to her left shoulder.

INVESTIGATIONS

Observations showed the patient to be normotensive and with a heart rate within normal limits. Serial ECGs were unremarkable. A troponin level was taken and was normal.

DIFFERENTIAL DIAGNOSIS

The cardiac-sounding nature of the pain raised the possibility of acute myocardial ischaemia, possibility precipitated by coronary artery spasm in the context of the use of intranasal cocaine solution.

TREATMENT

Intravenous morphine, sublingual glyceryl trinitrate and oxygen were administered, after which the pain, lasting 30 min in total, settled.

OUTCOME AND FOLLOW-UP

After the pain settled the patient remained well with no return of symptoms, and was discharged later that day.

DISCUSSION

Cocaine (benzoylmethylecgonine) is an alkaloid extracted from the leaves of the *Erythroxylum coca* (coca) plant.⁶ It has been used medically as a local anaesthetic since 1884, and was first combined with epinephrine in 1930.⁸ It is also an illicit drug commonly used recreationally throughout the world. It is used locally in ENT surgery due to its features of anaesthesia and vasoconstriction. It is rapidly absorbed when applied intranasally, with an onset of action varying between 3 s and 5 min, and duration of action between 5 and 90 min.⁹

Cardiac dysfunction due to toxic levels of cocaine arises through several mechanisms. It causes a severe sympathomimetic response, primarily by inhibiting norepinephrine, serotonin and dopamine, at sympathetic preganglionic nerve endings.⁵ Cocaine also causes the release of epinephrine and norepinephrine from the adrenal medulla.⁹ Increased adrenergic activity increases myocardial rate, arterial pressure and ventricular contractility, and therefore oxygen demand, while conversely there is widespread vasoconstriction and reduced oxygen delivery.⁹ Coronary vasoconstriction is thought to be secondary to increased production of endothelin and decreased production of nitrous oxide.⁵ With a greater risk of focal occlusive vasospasm, there is also a prothrombotic state. Increased platelet activity and aggregation occurs, and intranasal administration is also associated with an increase in plasma plasminogen activator inhibitor.^{5,9}

Moffett's solution also contains epinephrine. Theoretically, this reduces systemic cocaine absorption due to vasoconstriction, although the evidence for this is variable.⁶ The epinephrine could potentially also enhance the sympathomimetic effects of the cocaine.

Cocaine applies its local anaesthetic effects by blocking sodium channels in neurones during depolarisation and therefore signalling.⁶ This mechanism can also impair cardiac impulse conduction and generate ventricular arrhythmias.⁵ Cocaine also prolongs the QT interval by inhibiting myocyte repolarisation.⁹ Intracellular calcium levels are

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increased by cocaine, which can also contribute to ischaemia and reduce vagal activity.⁹

Cocaine's toxic effects when used illicitly are well known, but cardiotoxicity from therapeutic use in nasal surgery is relatively rare. A search of the literature reveals only eight case reports of significant cardiotoxicity.^{2–6 10–12} These are mostly due to myocardial ischaemia, ranging from non-ST elevation myocardial infarction to ST elevation myocardial infarction with or without cardiogenic shock.^{2–6 10 12} There is also a case reported of ventricular fibrillation associated with topical cocaine solution.¹¹

Several alternatives to cocaine have been proposed, including local anaesthetic combinations, and have shown to be equally efficacious with a lower cardiac risk profile.^{5 6}

Learning points

- ▶ Cocaine remains widely used in nasal surgery, despite its potential for cardiotoxicity.
- ▶ It can cause cardiotoxicity through several mechanisms, resulting in arrhythmias and myocardial ischaemia.
- ▶ Alternative options are available, which should be considered, especially in patients with risk factors for ischaemic heart disease.

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Competing interests None declared.

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