Netherlands Journal of Critical Care
Submitted October 2018; Accepted April 2019

CASE REPORT

New Year's Eve - an unintentional oral cocaine intoxication in an octogenarian

R.M. van der Ende[1], D.P. Vissers[2], A.C. Ledeboer[3], R. Peters[1]
The first two authors contributed equally to this work
Departments of [1]Intensive Care Medicine, [2]Internal Medicine, [3]Clinical Pharmacy, Haaglanden Medical Centre, The Hague, the Netherlands

Correspondence
A.C. Ledeboer - aletta.ledeboer@haaglandenmc.nl

Keywords - **cocaine, unintentional intoxication, elderly patient, octogenarian, delayed presentation**

Abstract

In this case report we present an unintentional oral cocaine intoxication with an uncommon, delayed presentation in an octogenarian. The patient initially presented with the feeling of malaise after drinking wine. Three hours after presentation he developed progressive neurological symptoms and a hypertensive emergency. The urine sample turned out to be positive for cocaine. We recommend to consider intoxication in any patient with unexplained neurological and cardiovascular symptoms. It is important to emphasise that the onset of toxic effects after oral ingestion of cocaine may be delayed, especially in the elderly.

Introduction

Unintentional intoxications are most frequently observed in children, but are also described in adults and the elderly. Unintentional and intentional poisoning, including cocaine intoxication, remain a significant cause of morbidity and mortality worldwide and therefore it is important to increase the awareness of healthcare providers.[1] In this article we focus on the epidemiology and management of unintentional intoxications, the pharmacokinetics, clinical manifestations and therapeutic options of cocaine intoxication.

Cocaine is an indirect sympathomimetic agent which blocks the reuptake of biogenic amines in neurons containing serotonin and catecholamines.[2,3] The inhibition of neuronal serotonin reuptake results in euphoria.[4] Virtually every organ system can be affected by cocaine, primarily through its haemodynamic effects. These clinical manifestations are outlined in *table 1*.

Case

On New Year's Eve, a man aged 81 came to the emergency department with discomfort and malaise after taking a sip out of a bottle of wine from Bolivia, which was a gift from a friend *(see figure 1.)* The liquid tasted foul. The patient had no prior medical history, medication use or substance abuse. At presentation the patient complained of dizziness without a headache or vision disturbance. His blood pressure was 204/94 mmHg with a normal pulse rate of 88 beats/min and a respiratory rate of 20. During physical examination, the systolic blood pressure decreased to 180 mmHg. He was alert and well oriented, but his speech was slow, without dysarthria or other neurological disturbances. He had normal pupillary size and response. There were no other significant findings during physical examination. Laboratory results were unremarkable and the ethanol level was below detection level (<0.10 ‰).

Table 1. Clinical presentation of cocaine intoxication (source UptoDate Cocaine - Acute intoxication)

Organ system	Clinical manifestations
Cardiovascular	Tachycardia, hypertension, cardiac ischaemia, heart failure, supraventricular and ventricular dysrhythmias, aortic dissection
Pulmonary	Bronchospasm, crack lung, smoking: pneumothorax
Central nervous system	Mydriasis, psychomotor agitation, seizures, coma, headache, intracranial haemorrhage, and focal neurological symptoms
Renal	Acute tubular necrosis due to rhabdomyolysis, renal infarction
Gastrointestinal	Perforated ulcers, ischaemic colitis, intestinal infarction
Other	Hyperthermia, metabolic acidosis

Nearly three hours after presentation, the patient's behaviour changed. He experienced disturbances in coordination and balance, his speech was different and he seemed to have visual hallucinations. His blood pressure had increased to 221/119 mmHg with a stable pulse rate of 85 beats/min, respiratory rate of 24 with normal oxygen saturation and a body temperature of 36°C. Neurological examination showed decreased interaction,

progressive confusion and less fluent speech. Furthermore, abnormal uncoordinated movements of arms and legs were noted. After ruling out intracranial pathology by CT scan of the brain, we suspected hypertensive encephalopathy.

The patient was admitted to the intensive care unit for monitoring and treatment of ongoing hypertensive emergency and progressive neurological symptoms. At that time his blood pressure was 220/110 mmHg and nicardipine infusion was started. Arterial blood gas analysis showed mild hypoxaemia, but no acid-base disturbances. The anion and osmol gaps were not elevated. Electrocardiography was normal. Nearly five hours after taking the sip of the foul-tasting wine, the serum methanol turned out to be slightly elevated at 0.093 ‰ (cut-off 0.025 ‰). Other toxic alcohols were negative. It was decided to run a urine test on drugs of abuse. While the neurological symptoms and hypertension resolved over the next few hours, the test turned out to be positive for cocaine. Unfortunately, we were not able to investigate the exact amount of cocaine in the bottle, or the solvent used. The patient was observed for a few hours and discharged from the hospital the same day.

Figure 1. Bottle of wine containing the cocaine

Discussion

The management of patients with unintentional intoxication in the emergency department can be challenging, especially in the elderly where intoxications are less frequently described.

In 2017 the US Poison Control Centers documented over 2.1 million poison exposures, which are more frequently observed in children aged under 6 years (45.2%). However, poisoning also occurs in adults (39.5%) of which 1.3% are octogenarians. Of all reported intoxications 77.0% are unintentional, in children and adults the percentages of unintentional poisonings are 99.4 and 59.4% respectively. Stimulants and street drugs, including cocaine, were involved in 3.6% of all reported intoxications in adults.[1] In 2016 about 18.2 million people, aged 15 to 64 years, used cocaine worldwide.[5] The prevalence of unintentional oral cocaine intoxication in the elderly is not described in the literature. Unintentional cocaine ingestion in children and oral ingestion of cocaine in body packers are more frequently described.[6-12]

Cocaine comes in two forms: salt (cocaine hydrochloride) and base. These forms differ in physical properties allowing different routes of administration. Cocaine hydrochloride is highly water soluble and is used intranasally and sublingually. Cocaine base is relatively insoluble in water and is usually smoked. Coca paste is produced from the coca leaf via both solvent and acid extraction techniques. The next steps are purification of coca paste to cocaine base and conversion of cocaine base to cocaine hydrochloride.[13] In both techniques organic solvents such as gasoline and kerosene are used. Smuggling dissolved drugs, especially cocaine, in bottled liquids is an ongoing problem at borders.[14]

The route of administration determines the onset of toxic effects. Intravenous and smoked administration results in onset of effects within minutes, lasting for 15 to 30 minutes, while intranasal and gastrointestinal administration result in slower onset.[15] After oral administration cocaine hydrochloride has a lag phase of about 30 minutes but reaches peak concentrations (T max) in approximately 1.3 hours.[16] Cocaine is metabolised quickly and only detectable in blood and urine for a few hours after use, the serum half-life is 0.5 to 1.5 hours. A small amount is excreted unchanged in the urine.[17] Benzoylecgonine is the main metabolite of cocaine and can be detected in the urine several days following use.

The patient showed onset of toxic effects three hours after ingestion and the symptoms lasted about six hours, which is contradictory to what is described in the literature. Although the patient only ingested a small amount of the liquid, it probably contained a large amount of cocaine paste or cocaine base dispensed in organic solvent. This might have delayed the absorption in the gastrointestinal tract. Due to the smell from the bottle, we suspect gasoline or kerosene to be the organic solvent used in this bottle. Methanol can be a possible component of gasoline or kerosene, which could be an explanation for the elevated serum levels of methanol nearly five hours after ingestion. Later, crystals were visible around the opening of the bottle, see *figure 2*.

Another explanation for the divergent pharmacokinetics could be the high age of the patient. Ageing is associated with reduction in first-pass metabolism, therefore bioavailability of drugs can be increased. The water content of the ageing body decreases and the fat content rises, hence the distribution volume of hydrophilic compounds is reduced in the elderly, whereas that of lipophilic drugs is increased.[18] Also, ageing involves progressive impairments in the functional reserve of multiple organs, which might affect drug metabolism and pharmacokinetics. Drugs with a high hepatic extraction ratio display some age-related decrease in systemic clearance. Pharmacokinetics are also influenced by a decline in renal function in the elderly. Drug transporters play an important role in pharmacokinetic processes, but their function and pharmacology have not yet been fully examined for age-related effects. In the elderly a large interindividual variability in drug disposition is particularly prominent.[19,20] Intestinal absorption of most drugs is not altered in the elderly.[18]

Figure 2. White crystalline powder visible around the opening of the bottle

In this case the patient presented with uncommon delayed neurological and cardiovascular symptoms after an unintentional cocaine intoxication. The differential diagnosis of the neurological disturbances consisted of: ischaemic stroke, intracranial haemorrhage, hypertensive encephalopathy and drug-induced or toxic neuropathies. Biased by the patient's age we were rather late in ordering a drugs of abuse test. Perhaps we should have considered it earlier in the process. Therefore, we would like to emphasise the importance of considering testing for drugs of abuse in patients presenting with unexplained symptoms, even in the octogenarian patient.

The focus of the therapeutic management in patients with acute cocaine intoxication lies on preventing myocardial ischaemia and tachyarrhythmias by treating the symptoms related to the intoxication. Agitation and aggression can be minimalised by adjusting the surroundings of the patient and epileptic seizures can be managed with diazepam.[21] National and international guidelines recommend use of benzodiazepines in an early stage to reduce agitation, which might also have an optimal effect on the blood pressure.[21,22] Other therapeutic agents in the management of cocaine-associated hypertension recommended in the literature are sodium nitroprusside or nitroglycerin (nitrovasodilators), phentolamine (α-adrenergic antagonist) and calcium channel blockers. The evidence, however, is limited, especially for calcium channel blockers.[21-23] The use of β-blockers in patients with acute cocaine intoxication remains controversial, because of the unopposed α-stimulation phenomenon which can lead to unwanted vasoconstriction.[21,24] In this case, not knowing that cocaine was involved, the ongoing hypertensive emergency was treated with nicardipine with good result.

Conclusion

In this case report we present a case of an unintentional oral cocaine intoxication with an uncommon, delayed presentation in an octogenarian. Unintentional intoxications remain a significant cause of morbidity and mortality worldwide and therefore it is important to consider intoxication, and more specifically cocaine poisoning, in the differential diagnosis of unexplained neurological and cardiovascular symptoms. The onset and duration of toxic effects is determined by the route of administration and may be delayed when ingested orally, especially in the elderly.

Disclosures

All authors declare no conflict of interest. No funding or financial support was received.

References

1. Gummin DD, Mowry JB, Spyker DA, et al. 2017 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 35th Annual Report. Clin Toxicol (Phila). 2018;56:1213-415.
3. Tella SR, Schindler CW, Goldberg SR. Cardiovascular effects of cocaine in conscious rats: relative significance of central sympathetic stimulation and peripheral neuronal monoamine uptake and release mechanisms. J Pharmacol Exp Ther. 1992;262:602-10.
4. Tella SR, Schindler CW, Goldberg SR. Cocaine: cardiovascular effects in relation to inhibition of peripheral neuronal monoamine uptake and central stimulation of the sympathoadrenal system. J Pharmacol Exp Ther. 1993;267:153-62.
5. Ritz MC, Lamb RJ, Goldberg SR, et al. Cocaine receptors on dopamine transporters are related to self-administration of cocaine. Science.1987;237:1219-23.

6. World Drug Report 2016. Report no. E.16.XI.7, United Nations Office on Drugs and Crime, Vienna, Austria 2016.
7. Traub SJ, Hoffman RS, Nelson LS. Body packing--the internal concealment of illicit drugs. N Engl J Med.2003 Dec 25;349(26):2519-26.
8. June R, Aks SE, Keys N, et al. Medical outcome of cocaine bodystuffers. J Emerg Med. 2000;18:221-4.
9. Pollack CV Jr, Biggers DW, Carlton FB Jr, et al. Two crack cocaine body stuffers. Ann Emerg Med. 1992;21:1370-80.
10. Lustbader AS, Mayes LC, McGee BA, et al. Incidence of passive exposure to crack/cocaine and clinical findings in infants seen in an outpatient service. Pediatrics. 1998;102:e5.
11. Mott SH, Packer RJ, Soldin SJ. Neurologic manifestations of cocaine exposure in childhood. Pediatrics.1994;93:557-60.
12. Bateman DA, Heagarty MC. Passive freebase cocaine ('crack') inhalation by infants and toddlers. Am J Dis Child. 1989;143:25-7.
13. Armenian P, Fleurat M, Mittendorf G, et al. Unintentional Pediatric Cocaine Exposures Result in Worse Outcomes than Other Unintentional Pediatric Poisonings. J Emerg Med. 2017;52:825-32.
14. Casale JF, Klein RF. Illicit Production of Cocaine. Forensic Sci Rev. 1993;5:95-107.
15. Grabbher S, Ross S, Regenscheit P, et al. Detection of smuggled cocaine in cargo using MDCT. AJR Am J Roentgenol. 2008;190:1390-5.
16. Jeffcoat AR, Perez-Reyes M, Hill JM, et al. Cocaine disposition in humans after intravenous injection, nasal insufflation (snorting), or smoking. Drug Metab Dispos. 1989;17:153-9.
17. Coe MA, Jufer Phipps RA, Cone EJ, et al. Bioavailability and Pharmacokinetics of oral cocaine in Humans. J Anal Toxicol. 2018;42:285-92.
18. Jatlow PI. Drug of abuse profile: cocaine. Clin Chem. 1987 Oct;33(11 Suppl):66B-71B.
19. Turnheim K. When drug therapy gets old: pharmacokinetics and pharmacodynamics in the elderly. Exp Gerontol. 2003;38:843-53.
20. Klotz U. Pharmacokinetics and drug metabolism in the elderly. Drug Metab Rev. 2009;41:67-76.
21. Shi S, Klotz U. Age-related changes in pharmacokinetics. Curr Drug Metab. 2011;12:601-10.
22. Kramers C, Aarnoutse R. Cocaine. Website Toxicologie.org. Available via: https://toxicologie.org/monografie/cocaine. Consulted on 24 February 2019.
23. McCord J, Jneid H, Hollander JE, et al. Management of cocaine-associated chest pain and myocardial infarction: a scientific statement from the American Heart Association Acute Cardiac Care Committee of the Council on Clinical Cardiology. Circulation. 2008;117:1897-907.
24. Richards JR, Garber D, Laurin EG, et al. Treatment of cocaine cardiovascular toxicity: a systematic review. Clin Toxicol (Phila). 2016;54:345-64.
25. Richards JR, Hollander JE, Ramoska EA, et al. B-blockers, Cocaine, and the unopposed α-Stimulation Phenomenon. J Cardiovasc Pharmacol Ther. 2017;22:239-49.