CASE REPORT

Acute nicotine poisoning associated with a traditional remedy for eczema

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Abstract
We present a case of severe acute nicotine poisoning in an 8 year old boy with moderate eczema after topical application of a traditional remedy from a book published in Bangladesh. Symptoms consistent with nicotine poisoning developed within 30 minutes of application of the remedy. The child subsequently improved with supportive care and was discharged after five days with no neurological sequelae. Diagnosis of nicotine poisoning was not initially made due to difficulty in obtaining an accurate history via an interpreter from the parents who did not speak English. Samples taken 12 hours after application of the remedy showed a serum nicotine of 89 µg/l, serum cotinine of 1430 µg/l, urine nicotine of 1120 µg/l, and a urine cotinine of 6960 µg/l confirming acute nicotine poisoning.

Keywords: nicotine poisoning and toxicity, traditional remedy, dermal absorption

This is the first report of nicotine poisoning secondary to dermal absorption from a traditional remedy. Nicotine is a highly toxic substance in overdose and is rapidly absorbed from the skin. We recommend that parents are educated about the potential toxicity of seemingly innocuous substances used in traditional remedies, and that extra care needs to be taken when taking a history through an interpreter. Health care professionals should be aware of the symptoms and signs of nicotine poisoning and that rapid absorption of the drug is possible through the skin. Treatment of nicotine poisoning is essentially supportive but atropine can specifically treat muscarinic symptoms such as bradycardia, salivation, and wheezing.

Case history
KR is a healthy 8 year old boy with moderate eczema. On the day of admission, he had been complaining of a mild headache but was otherwise well. In the evening his mother made up a medicinal paste for eczema, which was applied topically to his affected eczematous areas. He suffered from mild to moderate eczema affecting the flexures of the upper limbs and extensors of the lower limbs but his skin was essentially intact. Around 30 minutes later, he began to feel dizzy and went for a hot bath to wash the paste off. He then complained of laboured breathing, dizziness, unsteadiness, and nausea. Shortly afterwards he vomited and then became unresponsive and an ambulance was called. In the ambulance he initially regained consciousness but, after a further episode of vomiting and a period of agitation, he again became unresponsive.

On assessment in the Accident and Emergency Department, he was noted to be sweaty, vomiting, and agitated with a fluctuating level of consciousness and dilated pupils. Temperature and blood pressure were normal. His pulse rate on admission was 45 beats per minute, which increased following treatment with a single dose of atropine 20 µg/kg intravenously. Cardiac monitor trace subsequently remained normal. Due to his agitation he was electively intubated for a CT scan, which was normal. Full blood count, renal profile, liver function tests, and arterial blood gases were normal. As the diagnosis was unclear, he was initially treated as a case of acute meningo-encephalitis with ceftriaxone, vancomycin, erythromycin, and acyclovir. Information gathered from the child’s parents by a professional interpreter indicated the paste was made from betel nuts. He was transferred to intensive care where he had a stable course. He self-extubated on day 2 and had a lumbar puncture which showed no cells. He was transferred to the ward and was slightly ataxic for two days before discharge.

On further discussion with a Bengali speaking doctor (AP), the paste was found to have been made from a ground mixture of tobacco leaves.
leaves, lime, and freeze dried coffee mixed with water (figs 1, 2).

Samples taken 12 hours after onset of symptoms, were subsequently positive for nicotine and cotinine (the major metabolite of nicotine) showing a serum nicotine of 89 µg/l, serum cotinine of 1430 µg/l, urine nicotine of 1120 µg/l, and a urine cotinine of 6960 µg/l confirming the diagnosis of acute nicotine poisoning. The finding of nicotine or cotinine in urine is very common due to the widespread use of tobacco in the environment and is not usually noteworthy, but the high concentration noted in our patient lead to quantification of these substances in both urine and serum.

Discussion

This is the first case report of acute nicotine poisoning secondary to dermal absorption from a traditional remedy. Nicotine poisoning has been most frequently described in children due to consumption of tobacco products (cigarette ends or nicotine replacement chewing gum).1 Poisoning secondary to dermal absorption of nicotine has been described following accidental application of nicotine patches.2 Of more relevance to our case is the report of nicotine toxicity from a traditional remedy. Nicotine poisoning should be considered in cases where traditional remedies have been applied topically. Parents should be educated about the dangers of using seemingly innocuous substances in traditional remedies and health care professionals should be aware of the toxicity of nicotine when taken both orally and absorbed dermally. Accurate history taking is critical in making the diagnosis of poisoning and can be inaccurate if taken via a third party. Treatment for nicotine poisoning is supportive but atropine can be effective in reversing muscarinic effects such as symptomatic bradycardia, hypotension or excessive respiratory secretions.


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Out of the mouths of babes and sucklings

In June 2001, our cover contained an image of an artwork now hanging in the Royal College of Paediatrics and Child Health’s council chamber, showing children rollerskating (fig 1). Dr Anthony Cohn, a Watford (UK) paediatrician, told us that his son had remarked how dangerous it was that no child in the painting was wearing a helmet. Eager to subscribe to the current passion for hearing the patient’s voice, we politely asked Dr Cohn if his son would like to write us a short note of his views.

With our usual close attention to detail, we had failed to note that Gavriel Cohn was aged 4. Dr Cohn responded that, consequently, a short note would be somewhat overambitious; his co-drawing skills, he told us, were subjectively meaningful but objectively abstract (fig 2).

However, Dr Cohn kindly passed on his son’s opinion that the reasons for helmet use were: in case you break your head and;
• then the doctor will have to come
• you can’t see anymore
• you will have to go to hospital for a long time
• you will be died (sic)

We are grateful to Cohn and Cohn for their contribution and are impressed by the second author’s belief in the reliability of his general practitioner’s probable response to a request for a home visit.

Our referee expressed concern about the perceived prolonged length of stay in Watford General Hospital. The editorial board were alarmed about the stated likely outcomes so wondered whether our ethical position demanded that we advise the hospital’s medical director to mount an audit of such patients. However, Cohn and Cohn also pointed out that a US report in 1996 identified 76 000 injuries and 36 deaths from the activity illustrated1 so we withdrew our suggestion on the grounds that the second author (and probably his senior colleague) were at least as safe in Watford as in California.