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Case Report

Paediatrics Section

A Case of Camphor Toxicity in a Toddler: All on Skin is Not Safe

R RAMYA[1], N HARISH[2], S SUNDARI[3]

ABSTRACT

Paediatric population is very vulnerable to toxicities resulting from exposure to many traditional medicines, which are often used in our culture as treatments for various ailments. People are unaware of the untoward complications arising from the toxicity of these native medicines, especially camphor. Adding to the problem, parents often believe that native medicines, particularly when applied topically, are safe for children. Here, the author reported a previously healthy 2-year-old child who had multiple episodes of seizures after the mother applied topical camphor oil for five days to relieve the child's symptoms of nasal congestion. While there is no clear data on the concentration and duration of topical camphor exposure that causes toxicity in children, the case report highlighted the possibility that younger children may develop toxicity in a relatively short period of exposure. In this modern era of evidence-based medicine, it is important to raise awareness among the public, especially parents, that not everything applied to the skin is safe for children, as their anatomy differs from that of adults.

Keywords: Children, Inhalation, Seizures, Topical application

CASE REPORT

A 2-year-old child was brought to the Paediatrics Department by the mother with complaints of abnormal movements in both hands for two days and behavioural abnormality like irrelevant talking for one day. The mother also reported a history of cough and a runny nose for one week. There was no history of fever, vomiting, loose stools, ear discharge, head injury, previous seizure episodes, febrile seizures, previous hospitalisation, behavioural abnormalities in the past, or any history of drug intake. The mother did report a history of febrile seizures during her own childhood (once). The child's developmental milestones were all normal for their age, and there was no history of recent vaccination or travel.

Upon detailed history taking, the abnormal movements were suggestive of both generalised tonic-clonic seizures and focal seizures involving the hands, occurring 8 to 9 episodes per day. Each episode lasted for a few seconds to minutes, with no loss of consciousness and post-ictal confusion.

General examination and vital parameters were normal. Neurological examination revealed normal higher functions, tone, power, bulk, reflexes, and plantar responses. The spine and cranium appeared normal, and examinations of the respiratory, cardiovascular, gastrointestinal, and genitourinary systems were all normal. A provisional diagnosis of seizure disorder was made, and the child was treated with injection midazolam (0.1 mg/kg) and injection Sodium Valproate at a loading dose of 20 mg/kg followed by a maintenance dose of 15 mg/kg/day. No further seizure episodes were observed after administering injection Sodium Valproate. Other differential diagnoses such as neurocysticercosis, tuberculoma, dyselectrolytemia, tumour, and poisoning were ruled out based on detailed history and investigations.

All baseline investigations were conducted, including complete blood count, blood glucose, serum electrolytes, calcium and magnesium values, and peripheral smear, all of which were normal. MRI brain revealed no significant abnormalities, and Electroencephalography (EEG) and Electrocardiography (ECG) were also normal.

Upon further probing mother revealed the use of camphor oil topically applied to the chest three times a day for five days. The child remained stable and was discharged after 72 hours with oral sodium valproate. The child has been on monthly follow-up since discharge. Sodium valproate was stopped after three months, and the child continues to have follow-up visits once every three months without any further seizure episodes occurring.

DISCUSSION

Camphor is available either as a separate oil or as a part of many topical preparations and vaporised cold medications. Many cases of camphor-related toxicities have been reported in the paediatric population following oral ingestion, inhalation, dermal absorption, and administration of topical preparations as oral forms to children due to the ignorance and unawareness of parents [1].

After being absorbed into the body, it is oxygenated to campherol, following which it is conjugated with glucuronic acid in the liver to become a water-soluble compound and ultimately gets excreted in urine. Camphor is highly lipophilic because of its cyclic terpene structure, which facilitates its rapid absorption across the mucous membranes and large volume of distribution. Despite the numerous medicinal values of camphor described in past literature, there are insufficient studies on the beneficial effective dosage in the Paediatric age group without causing adverse events [2]. Very few cases of toxicity have been reported in children following prolonged dermal exposure to camphor [1,3-5].

There are no proper consensus guidelines regarding the toxic serum level of camphor for the Paediatric age group. However, many poison control centres across the world have given a serum level range from 15 mg to 30 mg/kg for referral to a medical facility. In 2006, a consensus on camphor poisoning, an evidence-based practice guideline for out-of-hospital management, was published by Manoguerra AS et al., This consensus included expert panel members from The American Association of Poison Control Centres (AAPCC), the American Academy of Clinical Toxicology (AACT), and the American College of Medical Toxicology (ACMT). They concluded that the dose for referral to an emergency department is 30 mg/kg. They also reported that the time to onset of effects following oral ingestion is rapid, with detectable serum concentration occurring within minutes, whereas the systemic effects following topical exposure were not documented if the product has been adequately removed [1].

The body surface area to weight ratio greatly varies between the Paediatric age group and adults. A substance that may not be causing any toxicity in adults may endanger the life of a child as they receive a comparatively higher amount in their system due to the difference in body surface area. In the present case, the seizures manifested only after five days of topical application, probably due to delayed absorption through the transcutaneous route. Apart from neurotoxicity, hepatotoxicity has also been reported in the literature following topical application of camphor [3].

An electronic toxicology reference system used by poison centres, named Poisindex, suggested a cut-off for referral to a medical center as 30 mg/kg for oral ingestion [6]. The manifestations following camphor exposure are mucous membrane irritation, nausea, vomiting, abdominal pain, seizures, hallucination, tremors, mental confusion, irritability, neuromuscular hyperactivity, myoclonus, headache, agitation, anxiety, and respiratory failure [1,7].

Though the author couldn't measure the serum levels of camphor as the facility was not available in our institution, other causes of seizure were ruled out in the present case. There is no antidote available for camphor poisoning to date. The high lipid solubility properties of camphor make haemodialysis or haemoperfusion ineffective in removing it. Hence, it is essential to create awareness in the community and among parents regarding the dangerous and dreadful complications of camphor toxicity in children, even following topical application or oral ingestion. Every treating physician should have a high suspicion of camphor toxicity whenever a child is brought to the emergency room with a history of afebrile seizure.

In a literature review conducted by Love JN et al., it was recommended that any children with exposure to camphor exceeding 500 mg should be observed in a healthcare facility as early as possible to prevent serious toxicities and mortality [8]. Future research and studies are required to identify the appropriate concentration-related systemic manifestations in children. Strict regulations must be emphasised by the concerned authorities regarding the availability of camphor-containing medicinal products, with written labels indicating the concentration and warning signs. It would also be beneficial to society if the strength of camphor does not exceed 11% in India, as set by the United States Food and Drug Administration (US-FDA) [9].

More commonly available non-prescribed commercial topical chest rubs, vapour sticks, anti-cold ointments, gels, and steam liquids contain camphor, which does not create changes in airway resistance but rather gives a subjective feeling of airway clearing and better breathing. This awareness should reach society as well as physicians [8,10]. The history of usage of any native medicines should always be inquired about, as they may contain camphor as one of the ingredients, as the tradition of using native medicines has become indigenous in our society. The suspicion of camphor intoxication is often identified by its characteristic aroma and odour in the breath of the child or vomitus. The present child did not have any smell of camphor on her body when she was brought to the emergency room. This case report also emphasises the importance of good history taking, which is an irreplaceable asset even in the modern era of medicine.

CONCLUSION(S)

Camphor-containing products are widely available in the community. The present case highlighted the life-threatening complications associated with camphor usage in children, even when applied topically. The topical application of camphor oil for the common cold may be a common practice in society, yet it is an under-recognised aetiology of seizures in young children. Efforts should be made to create awareness in the community regarding the untoward complications of camphor usage.

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PARTICULARS OF CONTRIBUTORS:
1. Associate Professor, Department of Paediatrics, Sree Balaji Medical College and Hospital, Chennai, Tamil Nadu, India.
2. Junior Resident, Department of Paediatrics, Sree Balaji Medical College and Hospital, Chennai, Tamil Nadu, India.
3. Professor and Head, Department of Paediatrics, Sree Balaji Medical College and Hospital, Chennai, Tamil Nadu, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. R Ramya,
No. 63, Gajalakshmi Street, Lakshmi Nagar East, Mudichur, Tambaram West, Chennai-600048, Tamil Nadu, India.
E-mail: ramyacaduceus@gmail.com

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