

Accidental Ingestion of Eucalyptus Oil (EO) -Induced Seizures - A Case Report

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ABSTRACT:

Eucalyptus oil is an aromatic essential oil, used as an over the counter cure for common cold and cough in every household. It is a plant derivative and is generally considered safe, however potential side effects including epileptogenic properties have been observed. It is a uncommon entity and infrequent cause of symptomatic seizures.

This is a rare case report of accidental ingestion of eucalyptus oil in a 3year old boy, who presented with seizures and features of shock. The child was received in the ED and stabilized with anti-epileptics ,thereafter symptomatically treated and supportive care was provided along with follow up.

The knowledge and awareness of eucalyptus oil-induced seizures among healthcare professionals (HCP) is low and this case report would help prevent unnecessary investigations and long-term anti-epileptic drug therapy.

Keywords: camphor, essential oils, eucalyptus oil, seizure

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INTRODUCTION

Eucalyptus oil is an essential oil derived from the leaves of Eucalyptus trees (Eucalyptus globulus) of the Myrtaceae family. It is commonly used for the common cold, rhinitis and abdominal pain owing to its decongestant and analgesic properties [1]. However, some adverse effects occur due to its use in children, along with its beneficial effects.

Poisoning can occur in various forms including topical, ingestion and inhalation of eucalyptus oil [2]. It can present with various clinical features such as epigastric pain, vomiting, lethargy and neurological manifestations, seizures as mainly reported [3].

Here, we report a case of a child who accidentally ingested eucalyptus oil and presented with seizures and shock, thereby throwing more light on the epileptogenic properties of these commonly used over the counter medications.

CASE PRESENTATION

A 3year old boy, who was a developmentally normal child, presented to the emergency department with generalized tonic clonic seizures that lasted for approximately ten minutes along with features of peripheral circulatory failure.

The child's airway was stabilized and shock was corrected with a single intravenous fluid bolus. The seizure was managed with antiepileptic drugs.

Thereafter, child was in postictal state and responded to vocal commands. He was afebrile with stable vitals without any respiratory compromise. On probing the history, the seizure occurred twenty minutes after accidental ingestion of eucalyptus oil (approximately 5 ml) at his residence. Following ingestion, parents attempted to induce vomiting in the child. Child had no history of seizures in the past. There was no family history of seizures. The child was born from a non-consanguineous marriage. The birth and developmental histories were uneventful. MRI brain with epilepsy protocol was performed and found to be normal. [Fig 1]

On laboratory evaluation - hemogram, serum electrolytes, liver function tests, blood urea, serum creatinine, coagulation profile were performed and revealed anemia with decreased blood indices and other parameters were normal for age. The laboratory findings are tabulated in the table given below [Table 1] [4]. Electroencephalogram (EEG) was performed and revealed no abnormality. EEG image is attached below [Fig 2].The hospital stay was uneventful, with no further episodes of seizures or altered sensorium. Neurologist opinion was obtained and advised oral levetiracetam at 20mg/kg/day twice a day. During follow-up, levetiracetam was tapered and stopped over a period of four days, due to the normal neurological status of the child.

TABLE 1: LABORATORY PARAMETERS RESULTS [4]

PARAMETER	OBSERVED VALUE	REFERENCE NORMAL VALUE
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Hemoglobin	9.1	11.5 – 14.5 grams%
Total White Blood Cell Count	8,200	4,000-12,000 cells/millimeter ³
Red Blood Cell Count	4.7	4-5.5 millions /millimeter ³
Packed Cell Volume	29	33-43%
Mean Corpuscular Volume	62	76-90 ficoliter
Mean Corpuscular Hemoglobin	19	25 – 31%
Mean Corpuscular Hemoglobin Concentration	31	32-36 grams/dl
Platelet Count	2.4	1.5-4 lakhs/ millimeter ³
CRP (C-Reactive Protein)	< 5.0	< 5.0 mg/dl -> Negative , > 5.0 mg/dl -> Positive
Prothrombin Time	15.5	Control – 16.4 sec
INR Ratio	0.94	0.9 – 1.1
APTT Test	< 20	Control – 34 sec
Blood Urea	17	10-40 mg/dl
Serum Creatinine	0.6	0.6-1.2 mg/dl
Aspartate Aminotransferase	13	5-45 U/L
Alanine Aminotransferase	38	20-60 U/L
Serum Sodium	138	135-145 mmol/Liter
Serum Potassium	4.4	3.5-4.5 mmol/Liter
Serum Chloride	105	98-106 mmol/L

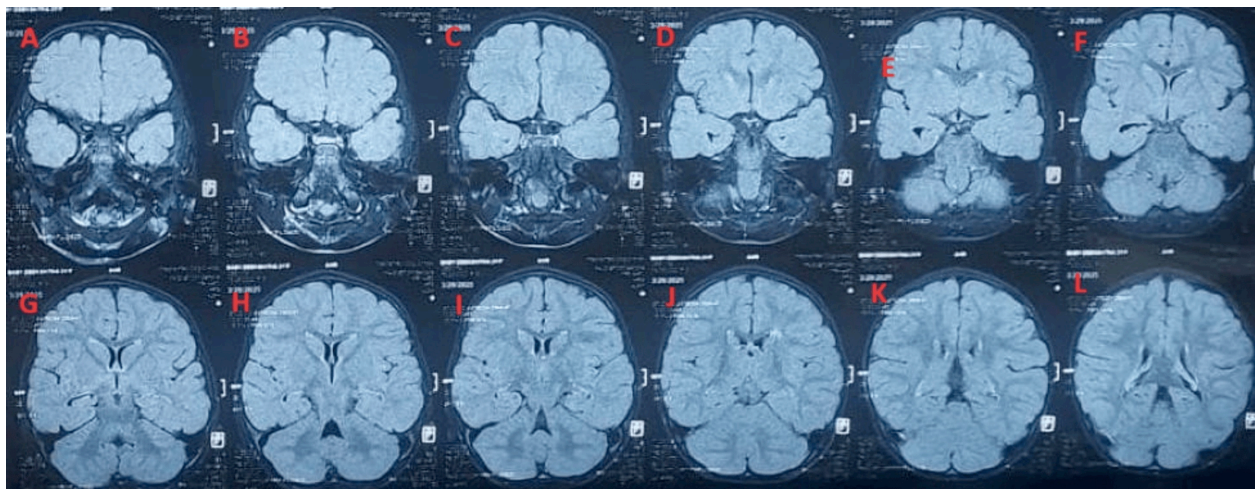


FIGURE 1: MRI Brain with epilepsy protocol - coronal views (A-F) and axial views (G-L)

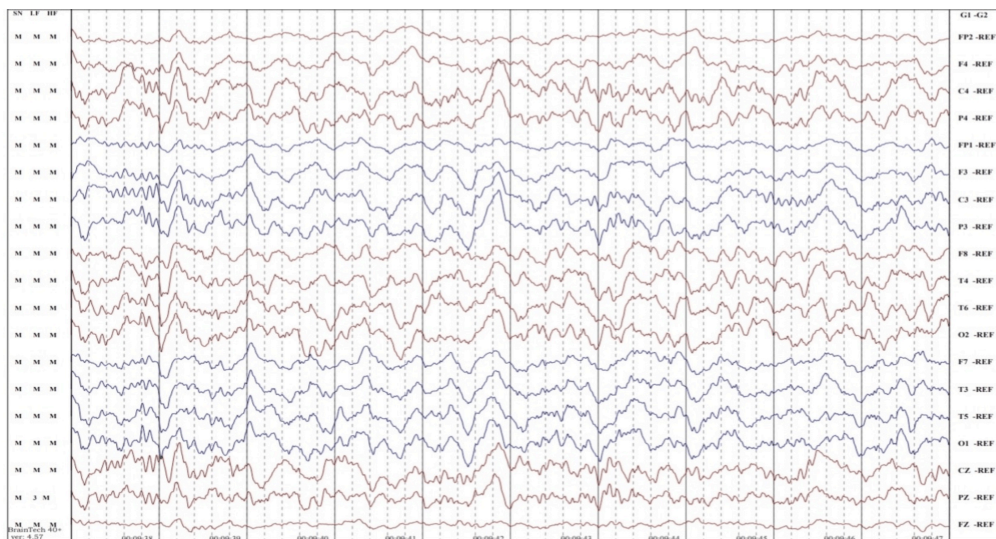


FIGURE 2: Electroencephalogram image

DISCUSSION

Eucalyptus oil is derived from the leaves of Eucalyptus trees, which belong to Myrtaceae family. The main constituent is eucalyptol also known as cineole [1][5]. Remaining components include beta-terpinyl acetate, fenchone and alpha-terpinolene [6].

Adverse effects can occur with excessive, inadvertent, or even standard dosages. Eucalyptus oil are available in various preparations with varying concentrations [7], making it difficult to determine the therapeutic dosage of eucalyptus oil. Poisoning can occur through various methods including topical exposure, ingestion and inhalation. The time duration between exposure to the toxin and development of complications is approximately a few minutes to 4 hours [8].

The clinical effects of camphorated oil are gastrointestinal irritation (burning sensation in the mouth and throat, nausea, vomiting and epigastric pain) and a wide spectrum of CNS symptoms that range from mild confusion to seizures and transient coma can also occur [9].

Eucalyptus oil may contain camphor, a cineole fraction of camphor laurel, which is epileptogenic due to its centrally stimulating properties. The exact mechanism of epileptogenesis remains unclear [10]. Some studies have shown that it creates an imbalance between Gamma-Amino Butyric Acid [GABA] and glutamate, making an excitogenic state (due to the lowering of the seizure threshold). Furthermore, loss of the sodium potassium gradient in the tissue leads to elevated cellular hyperexcitability, which is epileptogenic in rat models [11]. This potential for causing epilepsy is dose dependent [12]. Inhalation has a faster mode of action than ingestion because the constituents reach the brain directly and stimulate neurons [13].

There is no specific antidote and treatment is primarily supportive. Prompt recognition and treatment are essential.

There is a notable deficiency in dosage instructions, safety and warnings on the packaging of commercially available eucalyptus oil. Caregivers may not disclose this history and possibility that the treating doctors may neglect the history as many healthcare professionals have insufficient knowledge on the epileptogenic potential of these essential oils. This results in false branding as idiopathic seizures, thereby leads to recommendation of anti-epileptic drugs for long term [14]. All health care workers should take responsibility to counsel caregivers with whom they have first line contact regarding the potential health hazards of these home remedies [15]. The permissible limits for the contents in these home care remedies should be strictly regulated [16].

CONCLUSIONS

This is a rare and unexplored entity which results in hospitalization and investigation. Knowledge about

eucalyptus oil-induced seizures should be shared among healthcare professionals and the general population to prevent the occurrence of such episodes.

The relationship between the eucalyptus oil and seizures needs to be investigated. Enhanced community awareness programs are essential. Standardized labeling including the potential side effects of commonly used household related medications sold over the counter should be made mandatory. Parental advice and education regarding the proper storage of essential oils and medications are needed to prevent such cases in the future.

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