Cade oil poisoning in pediatrics: about 12 cases

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Abstract

Traditional therapy is a practice that is attracting more and more people, thus reinforcing the crisis of confidence between patient and treatment.

In this context, we propose to study the Tunisian recourse to the use of a type of tar "cade oil" advised sometimes by charlatans by habits and beliefs.

The diagnoses retained in these patients in association with tar poisoning were acute dehydration and febrile gastroenteritis. No specific treatment or antidote for tar was administered. The evolution was favorable for ten patients and fatal for two children.

The use of cade oil is currently rapidly growing. Its irrational use leads to serious, even fatal adverse events as noted in the literature and observed in our study. Preventive measures are required, including awareness-raising action: information and communication, Scientific action

Health action Regulatory action Legal action

Keywords: Cade oil; Poisoning; Epidemiology; Emergency; Outcomes.

INTRODUCTION

One of the changes observed in recent decades in medical practice in Tunisia is the emergence of conduct not justified by science dictated sometimes by charlatans, sometimes by habits rooted in certain ethnic groups.

Grouped in the box of traditional therapy according to its members, and quackery according to science, these practices are attracting more and more people who prefer it to conventional treatments based on chemicals, thus reinforcing the crisis of confidence between patient and medical treatment which continues to grow (1).

Traditional therapy, as a solution to physical, mental or social health problems, is deepening more and more in Tunisian culture.

The danger is that these practices are shared between ancestral knowledge of medicinal herbs and quackery using methods and preparations to have potions and potentially toxic products.

One of the practices more and more observed in Tunisia is that of parental use of "cade oil" commonly called "camel soaps" "tars" or "القطران" to treat their children

It is not uncommon to receive patients who are victims of these practices in hospital. It is in this

the context that we propose to study is the Tunisian recourse to the use of a type of tar "cade oil" advised sometimes by charlatans by inherited habits and beliefs. We report the observations of patients suffering from tar poisoning, collected in the pediatrics, emergency, and pediatric resuscitation departments of the CHU Hédi-Chaker Hospital in Sfax during the period from January 2011 to December 2018. It is a retrospective study and the data was collected and analyzed from the hospitalization records of the patients.

CASES' PRESENTATIONS

Over a 7-year study period, 12 cases were collected at a frequency of 1 to 2 cases each year. The average age was 14 months 20 days with a minimum age of one month and a maximum of 4 years. The distribution of patients by sex was 9 boys and 3 girls, a sex ratio of 3. Three children were of urban origin, or ¼. The remaining 9 patients were from rural areas of Sfax governorate in 5 cases. The socio-economic level was average for all patients.

Two modes of administration have been observed: Inhalation and the transcutaneous route. These two modes in combination were observed in 4 children. Scarification followed by cutaneous application of tar was present in only one case. According to the parents, they used tar to regulate transit and for antipyretic purposes for all of the patients. An analgesic goal has been reported in only one patient. The treatment time was on average 22:43 minutes with extremes of 4 hours to 3 days. Six patients consulted the emergency room within 24 hours.

A chart of gastroenteritis including diarrhea, vomiting, and fever was the reason for consultation in the most frequent emergency room (6 patients).

Neurological manifestations were present in 9 patients (such as

drowsiness, nystagmus, axial hypotonia, asthenia, and listlessness).

Signs of dehydration (tachycardia, dry mucous membranes, depressed fontanelles, skin fold) were present in 7 patients.

Signs of impaired respiratory mechanics (snoring groans, crackling signs of respiratory struggles) have been described in 5 patients.

The tar was applied in several places for the same patient. The parents applied tar to the ear lobule, all around the nostrils, the forehead, the chest, and all 4 limbs. Scarification lesions in the trunk and the 4 limbs have been described in one patient.

For biological abnormalities, biological inflammatory syndrome (in 7 patients), as well as metabolic acidosis (in 5 patients), were noted. Amino acid chromatography (CAA) was done for a single patient and was normal.

The chest X-ray was done in all the patients and was normal in 10 patients.

Only one patient presented with a pulmonary focus and another presented with bronchial syndrome. The brain scan was performed on 3 patients.

A medium abundance subarachnoid hemorrhage was observed in one patient.

In another patient, a hypo-dense appearance of the caudate nuclei and the lenticular nuclei was noted and for the third patient, the CT scan was normal. Brain MRI was done for a single patient, showing the presence of Lactates in spectrometry with an appearance suggestive of a toxic or metabolic origin.
The diagnoses retained by these patients in association with tar poisoning are detailed in Table 1.

Table 1: Diagnosed syndromes

diagnoses retained	Number of patients
Acute dehydration stage 1	**2** patients
Acute dehydration stage 2	**2** patients
Acute dehydration stage 3	**2** patients
Febrile gastroenteritis	**4** patients
Asthma attack	**1** patient
Febrile gastroenteritis+ altered state of consciousness	**1** patient

All patients received intravenous hydration. Antibiotic therapy was given to 4 patients due to the presence of an infectious focus and a biological inflammatory syndrome. No specific treatment or antidote for tar was administered. The evolution was favorable for 10 patients who were put out. Two patients had an enameled course of complications such as hemodynamic instability and a state of epilepticus and died.

DISCUSSION

Tar is defined by its method of preparation. They are obtained from fuels brought to high temperatures. Hence there are several types of fuel such as plants (pine, cedar, cade, ...), coal, or shale.

The tars are divided into 3 groups:

• wood tars (pine tar, cedar oil, cade oil, etc.).

• fossiliferous tars (coal tar).

• sedimentary tars (shale combustion for example ...)

When combustion takes place at high temperatures, several gases are produced with a dark, insoluble liquid that overcomes water. This is what is known as tar, it has a brown color, a high density, and a strong aromatic odor (2). The stars differ from each other by their compositions, their methods of production, and their degree of purity [2]. In our study, we are going to focus on cade tar, the essential and main composition of which is cade oils with other compositions that are being researched. This

product is widely used by parents in pediatric settings as part of traditional medicine.

Figure 1: Commercialized Cade

This type of tar is produced locally by herbalists and sold in several commercial spaces, especially in downtown Sfax (Sfax medina, rue SIDI BELHSAN).

Cade oil, which is the basis of the composition of cade tar, is a viscous liquid extracted from the wood of the juniper oxycèdre "Juniperus oxycedrus". (Figure 2)

It is a liquid rich in aromatic molecules, dark brown in color [3,4] (Table 2).

Table 2: Physical characteristics [3-4]

Features	Specifications
Appearance	Oily Liquid
Color	Dark brown
smell	Smoke
Boiling point	184 ° C at 760 mmHg
Solubility in water	Very slightly soluble
Solubility in ethanol	Partially soluble

Our cade tar, which we are going to talk about, is blackish in color and has an intense smell.

Its clientele appears to be very diverse and includes all levels of the population, whether rural or urban. Consumers are found especially in traditional and conservative cultural circles, loyal to folk medicine, and all those who cannot access modern care which agrees with our series, 3/4 of the patients were of rural origin

Figure 2: Juniperus oxycedrus branch [1]

The chemical composition of cade oil is a bit complex. Indeed, it is a complex resin, having in its composition several substances. This complexity is partly due to its composition and partly to its extraction protocol [5].

It is a product of heterogeneous composition. Its formula is variable, depending on the raw materials, regions, climates, and extraction processes.

The characteristic constituents are cadinene (which is a hydrocarbon) and cadinol (which is an alcohol).

Cade oil also contains:

- cyclic and polycyclic hydrocarbons: benzene, toluene, naphthalene, methyl-naphthalenes, and phenanthrene.

- phenols including guaiacol, cresol, and resorcinol [4].

From these components follow the clinical features and the objectives of the use of this type of tar. Cade oil was widely used in human medicine.

Cade tar is considered an external remedy, it has several therapeutic actions:

- it has long been used to treat scabies in sheep and goats. [4-6]

- in cosmetology, cade tar is used in shampoo for dandruff care, scaly conditions, itchy scalp, and milk crusts [4]

- it is also considered as a treatment applied against psoriasis. [7]

- in veterinary medicine, until the 19th century, cade tar was used as a treatment against ringworms and eczema of animals. It has also been used to heal cracks in horses' hooves. [6-8]

- currently, it is used in the treatment of parasitic infections, by application every 48 hours in sick areas. Cade tar, especially thanks to its major constituent, cade oil, acts quickly and effectively in the treatment of rebellious dermatoses and various scaly conditions. It seems to affect ulcers and torpid lesions ["static" lesions] by applying a light film of oil. [8-9-10]. the association of cade oil with olive oil [0.25 to 0.5 g of cade oil in a spoon of olive oil] could be effective as an anthelmintic against intestinal worms. Diluted cade oil would cure chronic rhinitis and coryzas. [10]

- this oil would also have a repellent effect against various insects, which would be beneficial to humans since there are several diseases transmitted via them. This action could in particular be taken advantage of in the pricking of hens as well as in the treatment of plants to protect them against various animal aggressions. [8]

In various ancient beliefs and traditions, it was believed that cade oil could help ward off illnesses, depressing emotions, negative thoughts, and also harmful spirits [13].

Grandmothers were very familiar with cade oil [13]. In our study, for example, grandmothers were prescribers of cade oil in 5 of the 12 cases collected.

Cade tar toxicity: The toxicity of any composition is first determined by the relative toxicities of its various constituents. But interactions, either of synergy or antagonism should not be overlooked [11]

Cade oil has in its composition various classes of substances with proven toxicity [9-11] (Table 3). The Phenols and sesquiterpene alcohol toxicity which is an important component of cade oil has different toxic effects such as [9-11]: irritating the mucous membranes and respiratory tract; has a lethal dose from 0.043g / kg. toxic to all cells; corrosive to the skin and mucous membranes; renal involvement and necrosis of the liver; eye irritation; hemorrhage of the pleura and pericardium; splenomegaly; methemoglobinemia. In our series, the observed neurological signs are apathy, asthenia, and clouding.

Table 3: Cade oil toxicity [9-11]

Hydrocarbons	Toxic effect
Cadinene	- hepatocellular necrosis. - dilation of the bile ducts. - disruption of liver enzymes.
Benzene	carcinogenic and very toxic aromatic hydrocarbon. -causes respiratory disorders. -paralysis. -anemia
Toluene	toxic of the central nervous system. - chronic exposure causes neurological disorders, mental confusion, memory loss, and headaches. - responsible for hematological damage
Naphthalene	lesions of the respiratory system. - formation of tumors of the upper respiratory tract.

One patient had epilepsy and one had a change in consciousness in another.

These neurological signs were caused according to the above tables by the various components of cade oil such as hydrocarbons.

The respiratory signs and hemodynamic signs found have been linked to causative diseases. However, these deductions are always limited, since the blood tests for these materials were not carried out on the one hand, on the other hand,

the symptoms can be correlated with the initial disease.

In this context, we can report from the literature two cases of poisoning with Cade oil: - a 40-day-old newborn who was treated by skin application with Cade oil, for seborrheic dermatitis, manifested an hour and a half later, a convulsion accompanied by a hypotonic coma and dyspnea. [12]; - a 30-year-old woman who, after having drunk half a glass of cade oil, to treat headache, had epi gastralgia associated with headache, low blood pressure, and respiratory distress. [12]

this intoxication is so unknown that no cases of such poisoning have been found in the literature.

Cade tar is known, above all, for dermatological conditions. For this, the most recognized and recommended mode of administration by herbalists is the skin mode.

Indeed, the application of cade oil on the skin has no immediate effect, even at a high concentration, only heat is felt at the time of application.

But it has a particular way of acting, these properties do not appear at the time of application. After a certain time after application, the penetration of the active ingredient into the seed coat becomes possible [7].

In our series, dermal application was the most frequent mode of administration, associated with inhalation by application of cade tar all around the nostrils. As the response time was relatively short and the contact surface area was limited, the clinical signs associated with tar poisoning were absent.

On the other hand, only one case had a wide cutaneous application including the trunk and the 4 limbs on lesions of scarification, with a rather prolonged time of assumption of responsibility (24 hours). The clinical picture was severely severe with a fatal outcome. We can deduct from these observations that several factors determine the severity of the clinical picture, we cite above all: the extent of the application, the presence or absence of scarifications, and the treatment time.

CONCLUSION

The application of cade tar was formerly rarely seen but it is still encountered especially in rural areas, where old beliefs and quackery dominate. From these observations, we were able to extract some epidemiological, clinical, and progressive characteristics of tar poisoning which were in most cases of favorable evolution but sometimes the evolution was fatal. From this work, we can pay attention to the education of parents and the awareness of practices whose results we do not know. Parents should be made aware of the dangers involved by using products and applications of which the components are unknown, or the components are being researched. These means of education must be present in district hospitals, educational establishments, and the media, which must play an important role in raising awareness of these habits to prevent health risks or even human catastrophes.

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