Rare disease

Juniper tar (cade oil) poisoning in new born after a cutaneous application

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Summary

Juniper tar (cade oil) is distilled from the branches and wood of *Juniperus oxycedrus*. It contains etheric oils, triterpene and phenols, used for many purposes in folk medicine. The authors report a case of a previously healthy new born treated with a topical application of *Juniperus oxycedrus* for atopic dermatitis. The poisoning caused convulsions, collapsus, acute pulmonary oedema, renal failure and hepatotoxicity. The newborn survived after supportive and symptomatic treatment, and discharged in a good condition on the eleventh day of hospitalisation in intensive care unit.

BACKGROUND

We report the case of a severe systemic toxicity after local administration of cade oil in a new born. This clinical case shows that the using of products may expose at risk of poisoning confirming that the skin of new born can absorb various molecules with serious accidents.

CASE PRESENTATION

A 30-day old healthy baby, born following a normal delivery was treated by topical application based on juniper tar for atopic dermatitis lesions on the face and in the folds of the neck and forearms (grandmother advice). The application was thick and extensive. Half an hour later, the newborn presented respiratory distress, hypotonia and convulsions with no fever. On physical examination, the baby was lethargic, hypotonic and dyspneic with signs of respiratory struggle. Pulse oxymetry was 50%. The cardiovascular examination revealed tachycardia (160 beats/min). The blood pressure was not measurable. The pleuropulmonary examination found diffuse crackles. The skin of his face and folds were covered by fresh cade oil: a blackish brown liquid with a characteristic odour rapidly eliminated after washing.

INVESTIGATIONS

Chest radiography showed bilateral images evoking an acute pulmonary oedema. The electrocardiography showed no abnormalities. The biological investigations revealed, objective renal failure (urea=16.6 mmol/l, creatinine=177 µmol/l), metabolic acidosis (pH=7, 28; HCO₃=16 mmol/l and a PCO₂ to 32 mm Hg). The liver function test results were alanine transaminase (ALT) 79 IU/l, aspartate aminotransferase (AST) 66 IU/l and lactate dehydrogenase (LDH) 329 IU/l. All other laboratory tests

were normal excluding neonatal infection (C-reactive protein=5 µg/ml, normal white blood cell count at 10000 cells/ml, negative blood and cerebrospinal fluid culture,

Figure 1 Juniperus tar (cade oil).

Figure 2 Tree of *Juniperus oxycedrus*.

and normal CT) and the other metabolic disorders (amino-acid chromatography). Toxicological analyses (searching phenol) and dosage of methaemoglobinemia were not performed because they were not available.

DIFFERENTIAL DIAGNOSIS

Decompensation of a neonatal metabolic disorder or a congenital heart or renal disease.

TREATMENT

The treatment was mainly based on the rapid and thorough skin decontamination by soap and water to reduce skin absorption of oil. In addition, the symptomatic treatment based on mechanical ventilation, correction of haemodynamic, acid-basics disorders, administration of anticonvulsants and diuretics was performed.

OUTCOME AND FOLLOW-UP

The evolution was favourable with gradual recovery of spontaneous breathing to the third day. All the laboratory tests normalised within a week, except renal function which required 3 weeks to normalise without sequelae.

The follow-up after 6 months was remarkable, and the neurological and psychomotor developments were normal within the first year eliminating the other chronic diseases such as the metabolic disorders in newborn then confirming the toxicological origin of this presentation.

DISCUSSION

Juniper tar (cade oil) is one of the essential oils which are mostly used in Moroccan traditional medicine (figure 1).

It is obtained by dry distillation from the branches of *Juniperus oxycedrus*, which is a Mediterranean kind (figure 2). This oil contains etheric oils, a trierpene (raisin cadinene) and phenols (guaiaicol and cresol derivatives).¹ In pharmacological and biological studies, cade oil has been reported to have keratolytic, antipruritic and antimicrobial activities in vitro. Extracts of the leaves, raisin and fruit of the *Juniperus oxycedrus* have been widely employed in human and veterinary dermatology to treat chronic eczema and other skin diseases. Its antiseptic and antiparasitic properties are universally known and attributed to phenols.

Phenol is the most toxic component and responsible for the majority of systemic symptoms observed in our case. Its absorption is rapid and its metabolism is mainly hepatic. Systemic toxicity is multi visceral and explained by the formation of cytotoxic metabolites (semi-quinone radicals), when the amount ingested absorbed exceeds the capacity of hepatic conjugation.

Koruk *et al*² reported of a previously healthy man who ingested a spoonful of extract of *Juniperus oxycedrus*. The poisoning caused fever, severe hypotension, renal failure, hepatotoxicity and severe cutaneous burns on the face.

Phenol causes severe hypotension; hypothermia, tachypnea and tachycardia which were observed in our case. The acute pulmonary oedema (OAP) has been also reported by Rahman,³ in fact, an infant of 4 months presented OAP and vascular collapse following an administration error of cade oil by intra rectal to treat seborrheic dermatitis, the outcome was favourable after spending 3 days in intensive care unit (ICU).

Renal and liver toxicities are the well-known features of phenol toxicity. Hashimoto *et al.*⁴ observed elevations in aminotransferases (AST 10 450 IU/l, ALT 8 990 IU/l), LDH (15 580 IU/l) and creatine kinase (170 IU/l) levels after 24 h of ingestion of approximately 70 ml of a 50% cresol solution, in an initially asymptomatic 26-year-old female. It was observed that the hepatic enzyme levels had returned to a baseline within 3 months. In our patient, hepatic enzymes showed only mild elevation and returned to normal levels on the fifth day.

We also have observed acute renal failure in our patient. Koruk *et al.*² reported the presence of renal failure (urea=114 mg/dl, serum creatinine=4.7 mg/dl) in a man who ingested a spoonful of extract of *Juniperus oxycedrus* in order to cure his nephrolithiasis.

Wu *et al.*⁵ reported that in a 44-year-old man, an acute renal failure, mild gastrointestinal corrosive injury and pneumonia occurred following an intentional ingestion of 150 g of cresol.

Our patient's clinical features were similar to those reported in the literature following phenol exposure. Methaemoglobinemia, deep vein thrombosis and haemolytic anaemia are also reported following exposure to phenol but not observed in our case.

All the reported cases in the literature were either by intentional ingestion or topical application. The severity of poisoning is variable ranging from a benign symptom to fatal poisonings.⁶ Skin decontamination and symptomatic treatment well-conducted in ICU may improve the prognosis of this type of poisoning. Haemodialysis does not refine the phenol; it is only indicated in anuric renal failure. In our case, renal failure has gradually recovered without recourse to haemodialysis. Finally, the N' acetylcysteine may be used to neutralise hepatic reactive metabolites.

Learning points

- *Juniperus oxycedrus* (cade oil) contains phenol which has life-threatening effects: corrosive, cardiac, haemolytic, pulmonary and renal.
- The following case is of interest as it presents some features of this intoxication rarely described in the newborn in the literature.
- Our case is particular by the route of administration. The high capacity of cutaneous absorption explains probably the rapid onset of severe symptoms.
- This case once again confirms that the skin of newborn can absorb various molecules with serious accidents.
- Phenol toxicity should be considered in patients with multi-organ symptoms in countries where folk medicine is popular.

Competing interests None.

Patient consent Obtained.

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