

Poisoning by *Coriaria myrtifolia* Linnaeus: a new case report and review of the literature

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Received 14 March 2005; revised 14 June 2005; accepted 15 June 2005

Available online 12 September 2005

Abstract

Coriaria myrtifolia should be recognized as one of the most neurotoxic plants in western Mediterranean area. This shrub produces a toxin, coriamyrtin, that is present in high concentrations in the berries. Ingestion of few fruits similar to blackberries may induce digestive and neurological manifestations including seizures, coma and apnea. The authors present a new case report that took place in the French Catalonia: an 8 year-old boy developed vomiting and generalized recurrent convulsions after ingestion of *C. myrtifolia* berries. He needed repeated diazepam administrations and was managed in the hospital. He recovered after one day of benzodiazepine treatment. In order to evaluate the consequences of *C. myrtifolia* poisoning, 83 cases of the literature were analyzed: the cases occurred in three countries (Spain, France and Morocco); the mean delay of the symptom development was 150 min; the neurological disturbances were the most frequent signs and 11 patients died (6 children, 5 adults) mainly in old reports.

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Keywords: *Coriaria myrtifolia*; Plant poisoning; Neurotoxic berry

1. Introduction

Coriaria myrtifolia L. is a shrub that grows in the Western Mediterranean area. That geographical location explains that cases of poisoning caused by *C. myrtifolia* have been reported mainly in France, Spain, and Morocco (Bruneton, 1999). There are no English-language reports on this type of plant poisoning in the literature. Both the leaves and berries of *C. myrtifolia* are known to be neurotoxic. Ingestion can cause seizures and even life-threatening status epilepticus (Bruneton, 1999; Girre, 2001). The authors present a case of poisoning by *C. myrtifolia* in a child and review the literature from the 18th century up to the present time.

2. Case report

A previously healthy 8-year-old boy ingested an unknown quantity of black berries from a plant growing wild in the region around Perpignan, France (Pyrénées Orientales department, near the Spanish border). One half hour after ingesting the fruit, the child began to vomit dark material and presented a drunken-like state. The child was taken to a general practitioner who called the Poison Control Center in Marseille. Since, the plant species involved had not been identified at that time and given the severity of the symptoms, the child was hospitalized. On the way to the hospital, he developed hypotonia, lost consciousness, and went into generalized convulsion with eyes rolling back. In the mean time, a pharmacist formally identified the plant as the neurotoxic species *C. myrtifolia*. Examination upon arrival at the emergency room demonstrated disturbance of consciousness with facial twitching. The pupils were

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symmetric and reactive. Hemodynamic status was good and cardiopulmonary auscultation and electrocardiogram were normal. Treatment consisted of administration of 10 mg of diazepam by the intrarectal route and placement of a venous line to maintain hydration. Facial twitching persisted. Two hours after admission the child presented another bout of vomiting followed by generalized seizure that abated after re-administering diazepam via the intrarectal route. Treatment using oral clonazepam at a dose of 9.1 mg/kg/day was then started. The next morning the child's symptoms had resolved and clinical findings were normal. He was discharged home the second day.

3. Discussion

C. myrtifolia is a 2- to 3-m-high shrub growing in the western Mediterranean area. It is common in some areas, for example Catalonia (Arcas Cruz and Fos Escrivà, 1986; Bruneton, 1999; Carod-Artal, 2003). Although *C. myrtifolia* is the only indigenous coriariacean species in Europe, potentially toxic exotic species have been introduced including *Coriaria terminalis* Hemsl. and *Coriaria japonica* Gray (Bruneton, 1999; Merck Index, 2001). The plant has a bushy aspect and grows in patches and hedges along paths and in dry woods. The species often reappears spontaneously after wild fires (Escribano-Bailon et al., 2002). It is known by several different common names depending on the country and region (Table 1). The leaves are opposite, entire, lanceolate, acute, short petiolate, and prominently 3-veined. They resemble the leaves of the myrtle (*Myrtus communis* L.), whence the species name *myrtifolia* (Girre, 2001). Shrubs bear fruit from June to September. The berries are first green then dark red. They are formed by five achenes imbricated in a star shape and covered by sepals that are fleshy, black and shiny. The fruit resembles a blackberry (*Rubus fruticosus* L.) and has an acrid sweet taste that explains why they are eaten by children and sometimes by adults (Figs. 1 and 2).

The stems and leaves of *C. myrtifolia* contain tannin and are used for tanning leather. All parts of the plant contain a

sesquiterpene lactone analogue of picrotoxin called coriamyrtin (Bruneton, 1999; Merck Index, 2001). This neurotoxin is present in other species of the genus including representants in Asia (Kariyone and Sato, 1930; Okuda and Yoshida, 1964; Chang et al., 1996) and in the New World (Reyes et al., 1998). It is a neurotoxic substance presenting pharmacological effects similar to those of other neurotoxic plant alkaloids such as anisatine from the Japanese star anise (*Illicium anisatum* L.) (Minodier et al., 2003) or oenanthotoxin from the Hemlock water-dropwort (*Oenanthus crocata* L.) (Girre, 2001). All these neurotoxins are close-related with the artemisinin of *Artemisia annua* (qinghaosu) which is an effective antimalarial sesquiterpene lactone.

Most cases of intoxication by *C. myrtifolia* have occurred after the fruit was mistaken for an edible berry. As a general rule ingestion of 5 berries or fewer, i.e. 2–3 for children, is considered as sufficient to cause neurological signs and to require hospitalization (Nisse and Mathieu--Nolf, 2002). A few cases of accidental ingestion have been reported under various circumstances, i.e. infusion after confusing leaves with other species (Poyen et al., 1970), indirect intoxication after eating snails picked up on the plant (Poyen et al., 1970), drinking the milk of a goat that had been grazing on the plant (Girre, 2001), and eating honey contaminated by *Coriaria arborea* Linds nectar in New Zealand (Bruneton, 1999). Intoxication has also occurred as a result of fraudulent use of leaves instead of senna (*Cassia senna* L.) widely used as a laxative in some countries (Jouglard, 1977; Gastaldo et al., 1987; Bruneton, 1999; Skalli et al., 2002). Criminal intoxication have been reported with *C. myrtifolia* in Morocco (Skalli et al., 2002) and with a similar species *Coriaria sinica* Maxim in China (Zhang and Huang, 1988).

To improve understanding of the clinical presentation of poisoning by *C. myrtifolia*, we studied 83 documented cases involving ingestion of either berries ($n=80$) or leaves

Table 1

Common names of *Coriaria myrtifolia* in English and in the three countries, where poisonings are observed

France	Spain	Morocco	English
Redoul	Roldón	Arouz	Myrtle-leaved coriaria
Sumac de Montpellier	Garapalo	Azrez	Currier's sumach
Sumac de Provence	Hierba zapatera	Redoûl	Redoul sumach
Corroyère	Emborrachacabras	Arwâz	
Herbe aux tanneurs	Reor		



Fig. 1. Fruits of *Coriaria myrtifolia* near the city of Nice (photography J. Arditti).



Fig. 2. The bushy aspect of the shrub *Coriaria myrtifolia* with some fruits looking like blackberries (photography J. Arditti).

($n=3$) described in medical reviews (Rimbaud et al., 1943; Obach and Plans, 1949; Poyen et al., 1970; Lefebvre et al., 1972; Jouglard et al., 1973; Vilaseca et al., 1975; Jouglard, 1977; Cahen et al., 1978; Garcia Martin et al., 1983; Alonso Castell et al., 1997; Skalli et al., 2002). All cases occurred in three countries, i.e. Spain ($n=56$), France ($n=24$), and Morocco ($n=3$). Most patients were children ($n=58$). Based on 27 symptomatic cases in which the interval between ingestion and onset of manifestations was specified, the mean delay was 150 min (range, 10–360 min). The most common toxic effects were digestive signs (63% of the 83 patients) including abdominal pain and more rarely vomiting of dark material, and neurological signs including convulsions (31%), mydriasis (22%), drowsiness and obtundation (14%), hyperreflexia (13%), hypertonia and muscle cramping (12%), malaise and lypothimia (11%), coma (10%), disorientation (10%), trismus and opisthotonos (7%), severe headache (6%), dizziness (4%) and agitation (4%). Cardiovascular signs are much less severe than neurological manifestations. General manifestations included hypothermia (4%) and respiratory disorders such as apnea (7%). A noteworthy finding in one Spanish series (Garcia Martin et al., 1983) was that 12 of 25 children remained asymptomatic after confirmed ingestion of *C. myrtifolia*. Management of *C. myrtifolia* poisoning has been focused mainly on inducing vomiting mechanically in cases of recent ingestion and use of symptomatic treatment including benzodiazepine to control convulsions if necessary. Because of the risk for recurrent seizure as observed in our patient, in-hospital surveillance is mandatory for at least 24 h. Eleven of the 83 cases reviewed were

fatal (6 children and 5 adults). Except for a 4-year-old Moroccan girl who died quickly at home after ingesting berries (Skalli et al., 2002), all fatal outcomes were in old reports during periods when therapeutic facilities were limited. In the other 72 cases, including all recent cases in Europe, outcome was favorable.

Along with the oleander (*Nerium oleander* L.), the yew (*Taxus baccata* L.), the deadly nightshade (*Atropa belladonna* L.), the water hemlock (*Cicuta virosa* L.) and the hemlock water-dropwort (*O. crocata* L.), *C. myrtifolia* should be considered as one of the most toxic species in the western Mediterranean region. Despite the high-risk of poisoning, *C. myrtifolia* with its limited geographical distribution is almost never included in English-language poisonous plant informational databases. (<http://chppm-www.apgea.army.mil/ento/plntndx.htm>, <http://www.ansci.cornell.edu/plants/alphalist.html>, <http://vm.cfsan.fda.gov>, http://www.ppri.usu.edu/Poisonous_Plants.htm).

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