

## Intoxication by *Jatropha Curcas* in Twenty-Six Children: A Series Case Study

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Received: March 12, 2016; Published: April 18, 2016

### Abstract

*Jatropha curcas* belongs to the Euphorbiaceae family. Intoxication by this plant is rare and concern essentially children. We report the intoxication of twenty-six children of 3 to 18 years old by *Jatropha curcas* plant. They have ingested 2 to 8 seeds each. All of the children presented with repeated vomiting and abdominal pain. Thirteen of them (50%) were lethargic at admittance. Diarrhoea was noted in twelve (46%) of them and two children of 3 and 4 years old presented signs of dehydration. Myosis was observed in fifteen (58%) patients. All of the patients received intravenous fluid, antispasmodic and proton pump inhibitor. An improvement of the symptom was observed and all of the children were discharged 24 to 48 hours after admittance.

**Keywords:** *Jatropha curcas*; intoxication; children; vomiting; abdominal pain; dehydration

### Introduction

*Jatropha curcas* belongs to the Euphorbiaceae family. It grows in tropical climates. Previously grown as ornamental plant, it is presently being cultivated for biofuel production [1]. It contains two toxalbumins, curcin and ricin, which are responsible of its toxicity (2). There are few cases of *Jatropha curcas* poisoning in the literature. We present a prospective case series of *Jatropha curcas* intoxication in twenty-six children and we review the symptoms and the management strategies through literature.

### Case Series

Twenty-six children of 3 to 18 years old with male predominance (sex-ratio of 3) were brought to the emergency department. They were from the same village and they have ingested the seeds of a plant identified by parents to be *Jatropha curcas*. No children were mentally retarded. They were attracted by the shape and the taste of the fruits and have ingested 2 to 8 seeds each.

The first symptoms appeared within 15 to 30 minutes after ingestion, starting with repeated vomiting, followed rapidly by colicky abdominal pain. Thirteen children were found lethargic at admittance. Twelve patients presented watery stool without blood or mucus. Signs of dehydration were observed in two children of 3 and 4 years old among them. Tachycardia was noted in three children with dehydration signs. Myosis was noted in fifteen patients and it persisted after twenty-four hours in two children. Central nervous system examination disclosed no pathologic findings except the transient lethargy state of some patients. Vital signs and the rest of systemic examination were unremarkable. The table 1 resumes the main clinical features presented by children. Laboratory investigations were performed only in lethargic children and did not show abnormalities except a slight leucocytosis in four children. None of the patients had deranged electrocardiograph.

All of the patients received intravenous fluids followed by orally rehydration salts. Antispasmodic (phloroglucinol) and intravenous omeprazole was administered according to the weight of the child. No digestive decontamination was performed. An improvement of the symptoms was observed within 8 to 12 hours after admittance. Twenty-four children were discharged the day after the recovery of oral intake. The two children with dehydration were kept under observation for forty-eight hours before being discharged.

**Citation:** Falihery Rakotomavo., et al. "Intoxication by *Jatropha Curcas* in Twenty-Six Children: A Series Case Study". *EC Paediatrics* 2.2 (2016): 116-119.

Symptoms/signs	Number (n = 26)	Percentage (%)
Nausea	26	100
Vomiting	26	100
Abdominal pain	26	100
Burning sensation of the throat	26	100
Hyper salivation	26	100
Headache	26	100
Dizziness	15	58
Myosis	15	58
Lethargy	13	50
Diarrhoea	12	46
Dehydration	2	8

**Table 1:** Clinical features.

## Discussion

*Jatropha curcas* grows in tropical climates. Previously grown as ornamental plants or for soap or candle making, today it is cultivated for biodiesel production [2,3]. Intoxication by this plant is rare but there is a likelihood of an increase of its incidence with the increase of *Jatropha* cultivation for biodiesel. The reported cases are mainly paediatric (school aged children) and are essentially due to children curiosity because the shape and the colour of the seeds are attractive [1,2].



**Figure 1:** *Jatropha curcas* and its fruit.

Though all parts of the plant are poisonous, the seeds have the highest concentration of the toxin. The toxicity of the plant is mainly due to the presence of two toxalbumins: ricin and curcin, which have been shown to produce severe gastrointestinal irritation and have also cardiotoxic, haemolytic, hepatocellular and renal effects [4-6].

The onset of symptoms is rapid, occurring in the first hour after the ingestion. The symptoms are primarily gastrointestinal including vomiting, abdominal pain, burning sensation of the throat, with diarrhoea as the main symptom [2,3,7]. Signs of dehydration should be checked systematically particularly in young children because vomiting and diarrhoea can lead to cardiovascular collapse [2]. Only twelve patients (46%) presented with diarrhea in our case series. Singhal *et al.* observed that the presence of diarrhoea is not obligatory in *Jatropha curcas* poisoning [1]. All over reports have been associated with lethargy, which is likely due to direct effect of *Jatropha* seeds [1]. Koltin *et al.* reported myosis in their case report [8]. For us, fifteen children presented with myosis and it persisted more than twenty-four hours in two of them. The explanation of this phenomenon is actually not clear.

Diagnostic workup during *Jatropha curcas* poisoning is not specific. Some cases of leucocytosis with neutropenia and transient elevation of hepatic enzymes (AST, ASL, PAL) are reported [1,4].

There seem to be no direct dose-response relationship between the number of seeds ingested and symptoms severity [1,4]. The rapid onset of vomiting and diarrhoea could be a protective factor by reducing the toxic effect of the plant on hastening its elimination. The age could be a confounding factor, as younger patients can have more severe manifestations with the same dose [1]. For our cases, two children of 3 and 4 years old presented signs of dehydration.

There is no antidote available. Treatment is essentially symptomatic. Oral rehydration salts or intravenous fluids with electrolytes replacement are the main component of the management, particularly in case of dehydration [2,3,6]. Some authors recommend a gastrointestinal decontamination by gastric lavage or activated charcoal administration, if the patient arrives in the first hours after ingestion [1,2]. However it is unknown whether or not including emesis or administration of charcoal would have any additive effect. Most of the time, gastrointestinal decontamination is not justified because the patients were already vomiting and had diarrhoea [6]. No gastric lavage has been performed in our cases because children arrived three hours after ingestion. Alkalinisation of the urine may promote the elimination of the toxalbumins [6]. For severe gastritis, antacids with histamine-2 receptor blocker or proton pump inhibitor may be started. Antispasmodic like phloroglucinol could be given to stop the colicky abdominal pain. Specific therapy may be indicated for haemorrhagic gastrointestinal damage, skeletal muscle or gastrointestinal spasms and haemoglobinuria [1,2]. Signs of central nervous system depression should be observed and assisted ventilation should be initiated if necessary. Minimal observation of up to eight hours is advised after substantial exposure to toxalbumin and till the patient is able to take oral food well.

Patient outcome is generally favourable within twenty-four hours like in our case. In some severe cases, the gastrointestinal symptoms can last up to seventy-two hours. Diarrhoea can be potentially severe, necessitating continuous intravenous rehydration [6]. No permanent aftereffect and no human death by this plant have not been reported [2]. However, studies have shown the seeds component to be toxic and lethal in mice, rats, chicken, calves, sheep and goats [3].

## Conclusion

There is a likelihood of an increase in the incidence of *Jatropha curcas* poisoning with the increase of its cultivation. Parents, caretakers and children should be taught the danger of ingesting unfamiliar plant material. Early fluid and electrolyte replacement can prevent serious organ injuries.

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**Volume 2 Issue 2 April 2016**

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