Jatropha curcas poisoning in pediatric patients, Mauritius
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Citation

Abstract
Background: Jatropha curcas (Physic nut; Hindi - Jungle Erandi) is commonly known with the name of pignon d'Inde in Mauritius. It is planted in Mauritius just because of one common myth that it keeps all the bad evils away from the house. Though all parts of the plant are poisonous, but its seeds are claimed to be highly poisonous. Breakthrough of pignon d'Inde poisoning occurred in the year 2003, where total of 11 cases were admitted on the same day with gastrointestinal symptoms in one of the biggest hospital in Mauritius.

Aim: In this article, we have tried to discuss the details related to the pignon d'Inde poisoning, clinical manifestations and its management.

Methods: Five year data of pignon d'Inde poisoning was collected between 2002 till 2006 admitted in the pediatric unit of flacq hospital, Mauritius. In the year 2003, where total of 11 cases of pignon d'Inde poisonings were reported, 7 children came on the same day with gastrointestinal manifestations.

Results: All the children were treated symptomatically. They were kept under observation for 24 hours and were discharged thereafter.

Conclusion: Though most children who ingest Jatropha curcus seeds do not suffer much harm; however, health care providers must recognize, assess, and manage the exposures causing serious injuries and initiate the appropriate management to minimize the serious consequences that could endanger the lives of the patients. The main objective of this article is to make the practitioners and general population aware of the potential dangers of pignon d'Inde seeds so as to minimize the accidental pediatric poisoning emergencies and financial burden on the community.

INTRODUCTION
Jatropha curcas (Physic nut; Hindi - Jungle Erandi) is common plant found all over the world. In Mauritius it is well recognized as pignon d'Inde. The other common names are physic nut tree, purging nut tree, Barbados nut tree, Barbados nut, physic nut, poison nut, purging nut. Though the plant grows in wastelands, it is cultivated mainly for hedges.

In Mauritius it is being planted mainly for some prevailing superstitions. Main being the myth, that if it is planted in the backyard of the house, all the evil spirits would stay away. Traditional practitioners commonly use it for many medical conditions. Despite of its medicinal uses this plant has got poisonous properties as well. Though all parts of the plant are poisonous, seeds have the highest concentration of the toxin and are highly poisonous. The poisonous property of the plant is mainly due to presence of toxalbumin called curcin and cyanic acid, related to ricinoleic acid. Mortality is rare. However in spite of its ubiquity and propensity to cause many adverse effects on accidental consumption; not much literature is available. Every year minimum 2 cases of pignon d'Inde poisoning are reported but breakthrough occurred in the year 2003, where out of 11 total cases of pignon d'Inde poisonings 7 children were admitted on the same day with gastrointestinal symptoms in Flacq hospital,
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one of the biggest hospital in Mauritius. In this article of ours, we have tried to enlighten the details related to the pignon d'Inde poisoning, clinical manifestations and its management.

MATERIAL AND METHODS

This original study was done by collecting five years data from 2002 till 2006 of pignon d'Inde poisoning admitted in the pediatric unit of Flacq Hospital, Mauritius. Every year minimum 2 cases of of pignon d'Inde poisonings are reported but in the year 2003, where total of 11 cases of pignon d'Inde poisonings were reported 7 children came on the same day with gastrointestinal symptoms. Since 2002 till 2006, all pignon d'Inde poisonings were accidental and age group ranged between 2-12 yrs (Table-1)

Table 1: Data showing pignon d'Inde poisonings

<table>
<thead>
<tr>
<th>Year of study</th>
<th>Age group (Years) range</th>
<th>Pignon d'Inde poisoning</th>
<th>Cases of poisoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>10-11</td>
<td>3</td>
<td>Accidental</td>
</tr>
<tr>
<td>2003</td>
<td>4-8</td>
<td>11</td>
<td>-de-</td>
</tr>
<tr>
<td>2004</td>
<td>2-4</td>
<td>2</td>
<td>-de-</td>
</tr>
<tr>
<td>2005</td>
<td>2-12</td>
<td>4</td>
<td>-de-</td>
</tr>
<tr>
<td>2006</td>
<td>3-35</td>
<td>4</td>
<td>-de-</td>
</tr>
</tbody>
</table>

In the year 2003, a total of eleven pignon d'Inde poisoning (Jatropha curcas) cases were reported to be admitted in the pediatric unit of Flacq hospital in Mauritius. Out of these eleven school children, seven were admitted on the same day i.e 4th January 2003 following consumption of pignon d'Inde seeds (Jatropha curcas) with complaints of severe vomiting, loose stools and abdominal pain. The reason for consumption was the attractive shapes of nuts of the plant. Affected children were of the age group 4-8 yrs with male: female ratio being 4:3. Significantly all the cases were from the lower socio-economical group. The number of seeds consumed were 1- 4 (median 2). Vomiting and abdominal pain were the predominant symptoms and present in all the children. Three of the patients had diarrhea as well. The lag time before onset of symptoms varied between 30 minutes to 2 hours. The vital signs in all patients were within normal limits for the age group. Average recovery time was 5-6 hours. All the children were treated symptomatically with intravenous fluids, antispasmodics and antiemetics. Within 24 hours, all of them recovered. They were kept for another 24hr observation and were discharged afterwards.

DISCUSSION

Jatropha curcas is common plant found all over the world. Jatropha curcas originates from Central America. From the Caribbean, this plant was probably distributed to various other countries in Africa and Asia by Portuguese via the Cape Verde Islands and Guinea Bissau in15th - 16th century. Today it is cultivated in almost all tropical and subtropical countries as protection hedges around gardens and fields, since it is not browsed by cattle.(

In Mauritius it is commonly known with the name of pignon d'Inde. It is used for many medicinal purposes. In spite of its ubiquity and propensity to cause many adverse effects on accidental consumption; not much information about this plant is available in leading toxicology and forensic medicine books (2, 3, 4).

Jatropha curcas L is a bush or small tree (up to 5 m height) and belongs to the euphorbia family. The genus Jatropha contains approximately 170 known species. It grows well with more than 600 mm of rainfall per year, and it withstands long drought periods.

The leaves of Jatropha curcas L are lobed, green and smooth. The flowers are small, yellow and are mostly hidden by the leaves. The stem is thick, green, glabrous becoming woody at the base. The fruit is ovoid, oblong and contains 3 lobes with each lobe containing a seed. The fruit looks attractive (Figure – 1) and closely resembles cashew fruit though it bears no relationship to the latter. The genus name Jatropha derives from the Greek jatrós (doctor), trophé (food), which implies medicinal uses.

Figure 1: Showing ripe Jatropha fruits and seeds

Jatropha is an ornamental plant naturalised in many tropical areas. The roots, stems, leaves seeds and fruits of the plant have been widely used in traditional folk medicine in many parts of Africa (5).

In Homeopathy, it is used for cold sweats, colic, cramps, diarrhoea etc. The yellow oil (also called Hell oil) is extracted from the seeds and is used for many medical
gastrointestinal manifestations in the pediatric age group and all were presented with the Jatropha poisoning victims reported so far have been in ingestion of the seeds. Depression and circulatory collapse abdominal pain is experienced about a half hour after the consumption vomiting and diarrhoea set in. Acute seeds include vomiting, diarrhoea, abdominal pain, and poisonous though all parts of the plant are poisonous, seeds have the highest concentration of ricin and thus highly cardiotoxic and hemolytic effects. Though all parts of the plant are poisonous, seeds can be mixed up to 50% and used for tractors and oil engines. Jatropha curcus poisoning in pediatric patients, Mauritius.

Jatropha curcas poisoning in pediatric patients, Mauritius. The combination of vomiting, diarrhea and miosis resembles the clinical presentation of organophosphate poisoning. This fact warrants the consideration of Jatropha ingestion in the differential diagnosis of organophosphate ingestion.

Human deaths by this plant have not been reported so far though animal deaths can occur. A systemic study by Abd-Aguye et al. had clearly demonstrated the toxic effects of seeds when the extract of the dried seeds was administered intraperitoneally into mice. Post-mortem studies in this case showed widespread haemorrhages involving the colon, lungs as well as infarction of the liver. In another study by Adam et al. eleven Nubian goats were fed with Jatropha curcas seeds and fatal consequences were seen within 2 to 21 days. Their Post-mortem examination revealed haemorrhage in the rumen, reticulum, kidney, spleen and heart, catarhal or haemorrhagic enteritis, congestion and oedema of the lung and excessive fluid in serous cavities. The toxic dose is not known. Eating large quantities of any raw part, may cause slow damage to kidneys. Though it is commonly believed that roasting process detoxifies the seeds, but catastrophes have been reported even after eating roasted seeds.

Treatment is essentially symptomatic and supportive. In all cases of ingestion or suspected ingestion, if possible induce emesis within 1-2 hours of ingestion with Ipecac Syrup or perform gastric lavage with activated charcoal and a cathartic to hasten elimination. There is no specific antidote for it. Specific therapy may be indicated for haemorrhagic gastrointestinal damage, skeletal muscle and gastrointestinal spasm, excessive salivary secretions and haemoglobinuria. After substantial exposures to toxalbumin containing plants, minimum observation period of up to 8 hours is advised. Give IV fluids and electrolyte as necessary to restore and maintain fluid and electrolyte balance. Monitor renal function and alkalinate urine to minimize effects of haemoglobinuria. Treat hemorrhagic gastro-intestinal damage as for organophosphate poisoning. Consider the diagnosis of organophosphate ingestion. This fact warrants the consideration of Jatropha ingestion in the differential diagnosis of organophosphate ingestion.

CONCLUSION

It is interesting and at the same time surprising also that despite of the extensive medicinal uses of Jatropha curcus, it is planted in Mauritius just because of one common myth that it keeps all the bad evils away from the house. Therefore it is necessary to educate the general population regarding the myth and should also be told about beneficial as well as
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the adverse effects of this plant. So that they can use the
different parts of the plants for various medical conditions
and also cultivate it for the production of biodiesel. In
general, accidental pediatric poisoning must be recognized
as a global public health problem with significant
opportunities for prevention. Though most children who
ingest Jatropha curcus seeds do not suffer much harm;
however, health care providers must recognize, assess, and
manage those exposures that are most likely to cause serious
injuries and initiate appropriate management to minimize the
serious consequences that could endanger the lives of the
patients. The very purpose of this article is to make the
practitioners and general population aware of the potential
toxicological dangers that children may come across, and
this would certainly reduce accidental pediatric poisoning
emergencies and financial burden on the community.
Simultaneously the older children should be taught in
schools to avoid experimentation with unfamiliar plant
substances and household chemicals (13).

LIMITATION OF THE STUDY

However it is important to clarify here that in our study we
only included the data of Pignon d’Inde poisoning from one
hospital. There are many other big hospitals in Mauritius
whose data were not reported. Thus the exact picture of the
incidence, prevalence and mortality rate of this poisoning in
Mauritius can not be told.

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