

## A Prospective Study on Toxic Plants in Iran (a Case Serie)

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### Abstract

**Objectives:** Plantar poisoning is not unusual in Iran. Toxic plants are different according to geographic distribution. There are different toxic plants in Iran like Datura Stramonium (DS), Cannabis, Atropa belladonna and mushroom, Nerium oleander and Albizzia julibrissin.

Its importance is not only for the knowledge of different plants and their distribution, but also for the knowledge of which part of plant has toxic effect.

**Methods:** This study is a case series on all patients admitted to Imam Reza Hospital, Mashhad, Iran, with acute plantar poisoning between 2010 and 2012. We observed their symptoms, signs, routine laboratory test results and treatment used to control their symptoms. We confirmed the plant by characteristic picture, clinical signs, and finally by consultation with professors of plantar and agricultural university.

**Results:** There were 41 patients that included in our study. Children were poisoned more commonly than teenagers and poisoning in adults was rare. All of the children ingested the plant accidentally. But two adults used them for euphoria effect. The most common poisonous plants in our study repeatedly were Datura Stramonium (DS), Cannabis, Atropa belladonna and mushroom, Albizzia julibrissin and Nerium oleander.

**Conclusion:** Our study showed most of plantar poisoned population in our country are children. We suggest decreasing accessibility to the toxic plants in order to decrease the incidence of its poisoning.

**Keywords:** Toxic Plant, Poisoning, Iran

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### Introduction

Five to ten percent of all human exposures reported to poison centers involve plants. Probably because plants are so accessible and attractive to people, young children are the most victims of this poisoning. Regard to indoor plants, the incidence of plant exposures has increased dramatically in different countries. Most of patient's refer to emergency toxicology department as being ingestion, had minor to moderate symptom, and necessitated a healthcare visit. Severe symptoms are rare. The major groups of plants elements are Glycosides, Alkaloids, Terpenes, Proteins, and phenylpropanoids: the fact is that plants contain multiple xenobiotics that work independently or in concert. Additionally, different plant families may contain similar xenobiotics. In some times, xenobiotics can not identify and are grouped in the section

Unidentified Toxins. Since our knowledge about plant toxicity is poor relative to other poisons, animal research is included to provide a more comprehensive foundation for comparison with human experiences.

Comparison of the species in question with pictures or descriptions from a field helps to identify or exclude the identity of the plant. Laboratory analysis is generally not timely enough to be useful. One of them is Datura Stramonium (D. Stramonium) is a weed of the family Solanaceae, or nightshade family. The plant is originally from Asia, but it is found in the West Indies, North America (Figure 1). The major toxic elements are tropane belladonnaalkaloids. It is known with various names across the world such as Angel's trumpet, Devil's weed Jamestown weed, Stinkweed, Datura, Devil's cucumber and Hell's Bells. The clinical signs



appear within 1 to 5 hours after ingestion. However, the exact timing of ingestion is often difficult to determine. Most cases of acute D. Stramonium poisoning occurred among young and adults after voluntary usage of the plant for its hallucinogenic and euphoric effects. This poisoning presents with symptoms and signs of anticholinergic syndrome. This syndrome results from the inhibition of central and peripheral muscarinic neurotransmission. Sinus tachycardia is common and does not require treatment for a stable patient. Agitated or hallucinating patients often respond to reassurance [1]. In severe cases, benzodiazepines are the drugs of choice. No effective methods exist for changing distribution or elimination of tropane alkaloids [1]. Treatment largely includes control of anticholinergic toxicity usually by supportive care. Activated charcoal is most useful in the first hour after ingestion. Specific antidote for tropane alkaloid toxicity is physostigmine salicylate, a reversible acetylcholinesterase inhibitor capable of directly antagonizing CNS manifestations of anticholinergic toxicity [2]. Role of physostigmine has been controversial in the management of D. Stramonium poisoning. Potential adverse effects (seizures, respiratory depression, asystole) secondary to acetylcholine accumulation may influence this role. These include seizures, muscle weakness, bradycardia, lacrimation, salivation, bronchorrhea, diarrhea, and asthma exacerbation [3]. Another toxic plant is *Atropa belladonna* that it is known as *Shabizak* in Iran.

The Italians call it 'Bella. In writing so 'Bella Donna' and 'Bella Dona' are all ways of writing 'beautiful lady' Contains tropane alkaloids, notably hyoscyne (also called scopolamine), hyoscyamine and atropine [4]. It has at least five other toxic elements.

The enticing berries are slightly sweet. Symptoms may be slow to appear but some times last for some days. Symptoms of poisoning are dryness in the mouth, thirst, difficult swallowing and speaking, blurred vision, vomiting, excessive stimulation of the heart, drowsiness, slurred speech, hallucinations, confusion, disorientation, delirium, and agitation. Coma and convulsions often precede death. There is a report of subdural hematoma [5].



**Figure 1.** *Nigella Sativa* is an Annual Flowering Plant, native to southwest Asia.

here is disagreement over what constitutes a fatal amount. The root is considered to have the highest concentration of the toxins; the berries are usually the cause of accidental poisoning because they look so nice especially for children. Cannabis is another famous toxic plant, a plant of the genus *Cannabis*; a coarse bushy annual with palmate leaves and clusters of small green flowers [6]; yields tough fibers and narcotic drugs. A strong-smelling plant from whose dried leaves a number of euphoriant and hallucinogenic drugs are prepared [7]. Mushroom Toxicity is other poisoning. The diversity of mushroom species is evident in our restaurant menus, and our environment. All reported deaths occurred in adults. Hallucinogens and gastrointestinal (GI) toxins were the most common exposures. Because mushroom species vary widely with regard to the toxins they contain, and because identifying them with certainty is difficult, a clinical system of classification is more useful than a taxonomic system. *Pleurocybella porrigens* with capability of Central nervous system toxicity [8] and *Amanita phalloides* that it can induce liver toxicity as organ damage is the most toxic mushroom in Iran. *Albisia julibrissin* is known as *Gol abrisham* can induce decreased level of consciousness [9]. *Nerium oleander* is other small tree that is toxic in all its parts. Oleander is one of the most poisonous grown garden plants. The characteristic leaves are thick and leathery, dark-green, narrow lanceolate, 4–20 cm long and 1–3cm broad. The flowers grow in clusters; their colors are white, pink to red. Toxic elements known as "cardiac glycosides" can be toxic when ingested.

Fluid and electrolyte repletion and treatment of organic compromise are essential. Regard to substantial fluid loss due to vomiting and diarrhea, Intravenous 0.9% sodium chloride solution or ringer lactate and electrolytes usually are necessary. Bedside glucometry is necessary for all plantar or mushroom poisoning. Dextrose repletion may be necessary especially in mushroom poisoning, because of hepatic failure, or glycogen depletion. Activated charcoal adsorbs the risual toxin in gastrointestinal tract and improves survival.” Emesis, lavage, and catharsis are not necessary unless the patient is seen within the first hours after the ingestion, because the toxin usually induces emesis and catharsis. Although the clinical presentation often is delayed, 1 g/kg body weight of activated charcoal should be given orally and repeated every 2 to 4 hours (if the patient is not vomiting). Agitation should be controlled by titrating intravenous benzodiazepines to sedation. In most agitated patients, the risks of gastric lavage outweigh the potential

### Material and Method

In a cross sectional study we studied prospectively all patients admitted with acute plantar poisoning to Imam Reza Hospital from Aug 2009 to August 2012. Clinical symptoms and signs of patients with special attention to identify the kind of plant were assessed. We also looked for the results of laboratory tests (e.g. blood glucose, Serum urea, creatinine and electrolytes) conducted in the first hour of admission. Admission electrocardiograms were also assessed for conduction delays or arrhythmias. Subjects who were poisoned by unknown poisonous agent or those with abnormal test results were excluded from the study. Treatment options used for the control of symptoms were gathered from the charts. Data were analyzed using SPSS 11 software. All toxic plants check via characteristic picture according to internet information and recheck by agricultural professor of Firdausi university of Mashhad.

### Results

A total of 41 patients with mean age of 21 years (3-38 years) were included in the study. Twenty

one patients were children under 15 years old. Male to female ratio was 56 %. However, in adults patients acute D. Stramonium poisoning were occurred exclusively in men. The kinds of plantar poisoning were different. The prevalence of poisoning respectively Datura Stramonium 14 cases, Cannabis 6 cases, Atropa belladonna 4 cases, Albisia julibrissin 3 cases, Mushroom Toxicity 3 cases, Nerium oleander one case and unknown plants are 10 cases.

The incidence of symptoms and signs in the first 6 hours in patients with acute D. Stramonium poisoning was as below: The most common finding was the constellation of anticholinergic syndrome. Sinus tachycardia, skin dryness, flushing, blurred vision and drowsiness were the most common symptoms and signs. The other symptoms and signs are ranked in (Table-1) Hallucination which is the usual purpose of misuse of D. Stramonium by different routs was reported in only 21% of our patients. The most dangerous symptoms of hyperpyrexia and ataxia were not common (15%) findings in our patients. None of our patients had serious CNS effects of the plant, such as seizure or coma.

Electrocardiography of 94% of patients at presentation showed sinus tachycardia. Otherwise ECGs were normal. Treatment of intoxicated patients was mostly supportive. Sixteen out of nineteen patients were discharged from the hospital with total improvement of symptoms after use of a single dose of benzodiazepine in the first 24 hour of admission. None of our patients required the treatment with cholinergic agents such as physostigmine. Acute Datura Stramonium poisoning in East of Iran. Two of three patients who had history of mushroom poisoning died. Only one of them discharged after 28 days admission. Albisia julibrissin poisoning involves three patients (3, 4 and 3.5 years old).

### Discussion

Some articles reported the teenagers as the most prevalent age group for poisoning with Datura Stramonium. Intentional misuse by teenagers who eat seeds, drink tea and or smoke cigarettes made of D. Stramonium has been reported by many authors (Wiebe et al, 2008). However, our study showed a different distribution of age. Acute plantar poisoning in East of Iran is more common

in children. It is nearly rare in adults. The change in pattern of senile distribution seems to be related to the route of poisoning in our region that is mostly accidental. For example in our country D. Stramonium or cannabis are not known for its euphoric effect between teenagers or young people. Apart from the difference in the purpose of ingestion, the incidence of clinical symptoms and signs is similar to other articles in the literature, our patients rarely developed to seizure or deep coma and did not show these serious neurologic complications during their hospital stay. Treatment protocol in our study was using parenteral benzodiazepine for control of irritability, with goal of mild sedation and it was effective as shown in the previous studies. Unfortunately mushroom poisoning patients had very poor prognosis.

### Conclusion

It seems necessary to confirm this data by a prospective cohort with specific attention to the dose of ingestion and its relation to the type and duration of symptoms or signs. The decision to proceed with gastrointestinal decontamination should be individualized. Early gastric emptying should be considered for large ingestions of an initially asymptomatic patient or in an intubated patient regardless of the time of ingestion.

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### Conflict of Interests

None declared.

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