

# Case Report: Acute Poisoning With Peganum Harmala, Esfand: A Rare Case Report



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## ABSTRACT

Peganum harmala, is a plant of the family Nitrariaceae with small seeds, traditionally used to induce abortion and menstruation. It also has pharmacological properties such as lowering blood glucose, as well as analgesic, anti-cancer, antibacterial and antifungal effects. The current report presents a rare case of a middle-aged female referring to Clinical Toxicology Service with the history of drinking a glass of boiled Esfand seeds, in order to reduce blood sugar, and complaining of nausea, abdominal pain, general weakness, dizziness, and several vomiting episodes.

## 1. Introduction

Esfand or Peganum harmala is traditionally used in the Middle East countries such as Turkey, Syria, Pakistan, Afghanistan, Morocco, Jordan, Azerbaijan, and Iran to protect from the evil eye. Its extract is also used to induce abortion and menstruation. Its consumption as an antiparasitic agent, especially as an anti-worm, was already a common practice.

A red agent is released from boiled Esfand, which is used in the carpet industry. According to studies, Pega-

num harmala has analgesic effects (central and peripheral) and can suppress the pain if used with naloxone, in which its mechanism of action is similar to opioids [1, 2]. A study also showed that high doses of Esfand can reduce spermatogenesis in mice [3]. This plant has  $\beta$ -carboline alkaloids with Monoamine Oxidase (MAO) inhibitory effects. One of these alkaloids is harmine.

Harmine is a neurotoxin and an endogenous ligand of benzodiazepine receptors that is believed to have strong correlation with essential tremor. By selective and reversible inhibition of MAO, harmine reduces the rate of monoamines destruction (neurotransmitters, hormones,

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and psychotropic substances), which in turn increases their effects. Research studies show that the simultaneous application of many kinds of hallucinogenic agents and harmine increases their effects [4, 5]. It also has cytotoxic effects on the HL60 and K562 cell lines, that both of which are strongly associated with leukemia [6, 7].

Harmine facilitates osteoblasts and chondrocytes differentiation, and prevents osteoclastogenesis. It is also proven that harmine plays a role in the proliferation of alpha and beta cells of pancreas; therefore, it can be used to treat diabetes. Harmine has anticholinesterase effects and prevents the breakdown of acetylcholine [8, 9]. Harmaline, harmalol, tetrahydroharmine, vasicine and vasicinone have bronchodilatory effects [10]. Alkaloids of Esfand can form dangerous, even deadly, fission agents in reaction with antihistamines, antidepressants, decongestants, and expectorant, and some stimulants. In case of continuous use, sudden discontinuation of MAOIS can lead to a withdrawal syndrome, taking 30 to 300 mg of alkaloids in Esfand can lead to manifestation of the following symptoms: agitation, bradycardia or tachycardia, blurred vision, hypotension, paresthesia, nausea, vomiting and hallucinations [11, 12].

## 2. Case presentation

A 58-year-old female, accompanied by her husband, referred to Clinical Toxicology Service, complaining of nausea and abdominal pain. One hour before the visit, she consumed a glass (250 mL) of concentrated boiled Esfand seeds to reduce her blood glucose. Her complaints were limited to general weakness, dizziness, imbalance when walking, several episodes of nonbilious vomiting, and abdominal pain in epigastrium that was irritated and not prickled. She was a known case of diabetes mellitus type 2, since 15 years ago and was under metformin (one 500 mg tablet every eight hours) and glibenclamide (5 mg every six hours) treatment and a diabetic diet, with no other complaints. However, the physician prescribed her insulin in order to control her blood glucose.

Physical examination revealed the patient's vital signs: blood pressure: 140/80 mm Hg, pulse rate: 120 beats/min, respiratory rate: 21 breaths/min, pulse oximetry (O<sub>2</sub>Sat): 96%, the Glasgow coma scale: 14/15, Blood Sugar (BS) glucometry: 250 mg/dL, body temperature: 37.5°C. The patient had warm skin that her extremities were agitated with dermal stimulation. The pupils were miotic with decreased light reflex. She had no neck stiffness, oral mucosa was normal, the lungs were normal, but the patient had tachycardia, the abdomen was soft and lacked tenderness. The organs were

normal with no lateral symptoms, the tendon reflex were normal and symmetric. The patient was admitted to the poisoning department after gastric lavage with 3 liters of normal saline solution and administration of activated charcoal 70 g/kg.

Of the clinical laboratory tests, the following measures were remarkable: WBC: 25000/m<sup>3</sup> with 63% polymorphs, RBC cholinesterase level >6.5 Unit, serum cholinesterase level <25% normal, HbA1C >8, ALT:123 Unit, AST:195, ALK PH:62, PT:14, PTT:36, AMYLASE:175, LIPASE:78, BS:250 mg/dL, k<sup>+</sup>:3 mEq, Ca<sup>+</sup>:7.5 mEq, Mg<sup>+</sup>:3 mEq, Na:145 mEq, LDH:770 Unit, CPK: 8000/Unit. In addition, the patient had no pathological symptoms and viral biomarkers were also negative.

In toxicological profiling, the tests were negative for opioids and psychotropic substances, and organophosphates and carbamate toxins. Arterial blood gas analysis revealed the following results: pH: 3.7, PCO<sub>2</sub>:60 mm Hg, HCO<sub>3</sub>:25 mEq/L. The patient was monitored and her agitation and tachycardia were controlled with oxygen therapy and administration of midazolam. Activated charcoal was also prescribed for 4 extra doses as 35 g daily plus sorbitol, followed by oral administration of ondansetron. After 2 days of hospital stay and requesting oncology and psychiatry counseling to convince the patient to use insulin, instead of any traditional non-scientific treatment and supportive therapies, the patient was discharged in good condition. She was advised to refer to the poisoning clinic. The patient was free of specific complications caused by poisoning in follow-ups.

Discussion: *Peganum harmala*, commonly called "Esfand", rooted in traditional medicine is still used by many people. Oral administration of 30-300 mg Esfand may lead to the toxic effects such as nausea, vomiting, abdominal pain, agitation, bradycardia or tachycardia, blurred vision, hypotension, paresthesia, and delusion. The half-life of harmala alkaloids in blood is 1-3 hours. In most studies conducted on animal models or sole description of subjective or objective signs of the plant, no certain laboratory finding was reported in humans [5-8].

The treatment of this poisoning is also neglected in most studies [9-11]. Furthermore, in the absence of a history or not mentioning the name of the consumed substance, it is very difficult to detect this particular poisoning. Because of bilateral miosis and higher prevalence of opioids in the region, the first clinical suspicion of such patients is poisoning with opioids or simultaneous poisoning with opioids and psychotropic substances such as methamphetamine or clonidine, particularly, because

addicts use it for substance withdrawal purposes. On the other hand, consumption of insecticides and herbal pesticides is high in Iran and poisoning with such compounds should also be considered by clinicians. Therefore, it seems that taking a precise history from patient or his/her companions as well as accurate examination of the patient are of great importance. Overall, the importance of such measures in clinical practices should be noted and repeated for learners.

### 3. Conclusion

The presented case was a prominent example of the importance of obtaining a precise history from a patient or his companions in order to prevent additional diagnostic and therapeutic measures, as well as imposing unnecessary costs to the patients.

### Ethical Considerations

#### Compliance with ethical guidelines

All information obtained from patients Will remain confidential.

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#### Conflict of interest

The authors certify that they have no affiliation with or involvement in any organization or entity with any financial interest, or non-financial interest in the subject matter or materials dismissed in this manuscript. All authors meet the four criteria of authorship contribution based on the recommendations of the international committee of medical journal editors.

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