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CASE REPORT

Acute poisoning due to ingestion of Datura stramonium – a case report

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Abstract

Datura stramonium (DS) is a widespread annual plant, containing atropine, hyoscyamine, and scopolamine, which can produce poisoning with a severe anticholinergic syndrome. Teenagers ingest the roots, seeds or the entire plant to obtain its hallucinogenic and euphoric effects. We presented the case of a 22 year old male who was admitted to the Emergency Room in a coma after consuming Datura stramonium, 2 hours earlier. The patient presented with fever, tachycardia with right bundle branch block, and urinary retention. Rapid sequence induction and intubation was performed immediately, with sedation and assisted-control mechanical ventilation, after being transferred to the Intensive Care Unit. The patient received activated charcoal, in repeated doses, external and internal cooling was applied, and an infusion of neostigmine was started. The biological assessment revealed rhabdomyolysis and prevention of renal failure was initiated. After a proper neurological evaluation, 36 hours after using Datura stramonium, the patient was extubated and transferred to the Psychiatric ward for further assessment and care.

Keywords: Datura stramonium, anticholinergic syndrome, toxic delirium, coma

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Introduction

Datura stramonium (DS), also known as Jimson Weed, Locoweed, Angel's Trumpet, Thorn Apple, Devil's Trumpet is a hallucinogenic plant found in the urban and rural areas, along roadsides, in cornfields and pastures [1, 2-5]. The range of toxicity of Datura stramonium is highly variable and unpredictable. It occurs when ingested, smoked and absorbed topically, in particular through mucous membranes. Toxicity may vary between leaves, plants and from one season to another. The highest levels of toxins are found in the seeds approximating 0.1 mg of atropine per seed or 3-6 mg / 50-100 seeds (Fig. 1).

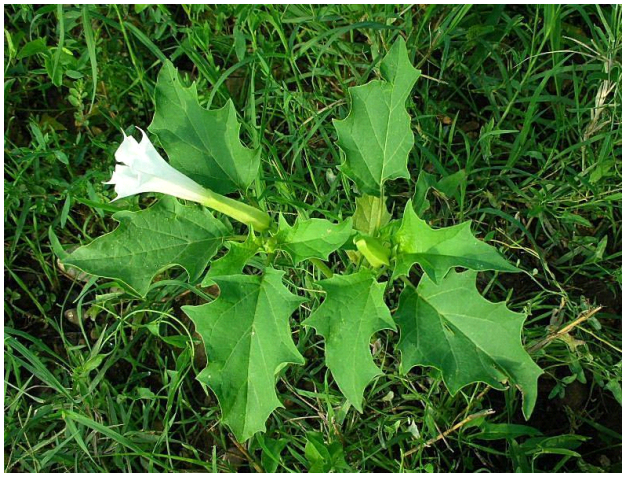

Fig. 1. Datura stramonium

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The classic anticholinergic poisoning occurs by consumption of the tropane alkaloid-containing plant [2]. Tropane alkaloids include hyoscyamine contained in leaves, roots, seeds; hyoscine, atropine (dl-hyoscyamine) and scopolamine (l-hyoscine) found in roots. They act as competitive antagonists to peripheral and central muscarinic acetylcholine receptors leading to a general paralysis of the parasympathetic innervated organs. Acute psychosis or delirium can occur due to its effect on the central nervous system as tertiary amines can inhibit CNS receptors [6]. Coma and seizures are rare findings but raise concerns of extreme gravity [7]. Teenagers with intentional ingestion of the plant represent most cases of Datura stramonium poisoning reported in the literature, as they seek for its hallucinogenic and euphoric effects.

Case report

A 22 year old male patient was brought to the Emergency Department by the ambulance services with a history of deliberate ingestion of Datura stramonium 2 hours before presentation.

At arrival in the Emergency Room the patient presented with Glasgow Coma Scale 7 points (eye opening response: 1; motor response: 5, verbal response: 1), mydriatic and areactive pupils and without clinical signs of meningeal irritation. He was agitated, with a body temperature of 38.0°C and dry skin and mucosa, with tachycardia (heart rate – 111 beats per minute), and a blood pressure of 135/61 mmHg. The electrocardiogram revealed sinus rhythm with right bundle branch block, without any changes of the ST segment or T wave. Ultrasound showed severe urinary retention. Rapid sequence intubation using propofol 120 mg and succinylcholine 70 mg was performed to prevent aspiration and was followed by mechanical ventilation in assisted-controlled mode, under continuous sedation with midazolam. After the gastric lavage that revealed Datura seeds, activated charcoal (Carbomix 75 g) was administered. A urinary catheter was inserted, and the toxicology screening was performed but did not show the presence of other substances. Blood tests showed rhabdomyolysis with creatine-kinase levels of 518 U/L. The blood pH was normal with a lactate level of 1.5 mmol/L, and normal values of serum electrolytes (sodium: 138 mmol/L, potassium 3.9 mmol/L) were recorded. Fluid balance was achieved using crystalloid solution and the CT scan excluded any cerebral lesions.

Transferred to the ICU, the patient was agitated, and the sedation was achieved with propofol and midazolam infusion. Because of the heavy sedation he was ventilated in an assisted-controlled mode, an assisted mode being considered unsafe at that moment. External cooling blankets were used together with antipyretics (metamizole and paracetamol) to lower body temperature. Neostigmine, 0.5 mg, was also administered in a slow perfusion. The dose of activated charcoal was repeated 12 hours after the ingestion.

Re-evaluation of blood tests revealed rising levels of creatine-kinase (1140 U/L). Because of technical problems, serum myoglobin levels and myoglobinuria were not assessed. Prevention of renal failure induced by acute rhabdomyolysis was performed with intravenous infusion of sodium bicarbonate, diuretics and an increased volume of crystalloids.

24 hours after the admission, propofol and midazolam infusions were stopped to evaluate the neurological status. The patient presented severe agitation, and therefore sedation was continued. After 36 hours he became calm and was extubated without any signs of respiratory or circulatory impairment.

He was transferred to the internal medicine unit and later to the psychiatric ward.

Discussion

Datura stramonium (DS), known as Jimson weed is a wild-growing herb. The entire plant especially the foliage and seeds, is toxic due to its content of tropane alkaloids. The contained atropine, L-hyoscyamine and L-scopolamine cause anticholinergic syndrome, which results from the inhibition of central and peripheral muscarinic neurotransmission [2, 6, 8].

Teenagers, especially those with a history of polysubstance abuse, voluntary ingest the plant seeking its hallucinogenic and euphoric effects, and represent most of the cases reported in the literature. Intoxication with Datura stramonium has also been described in children [2, 3]. Our case presented an intentional ingestion of DS seeds for its hallucinogenic effects, and similar to those reported by Diker et al. [9] was admitted with coma, the central element that carries a bad prognosis as is related to a higher morbidity [10].

Typical symptoms of DS poisoning are represented by dry skin and mucosa, flushing, mydriasis, sinus tachycardia, hyperpyrexia, decreased bowel activity, urinary retention, and neurological disorders with ataxia, impaired short-term memory, disorientation, confusion, hallucinations (visual and auditory), psychosis, agitated delirium, seizures, and coma. These symptoms resemble atropine intoxication [6]. Respiratory failure and cardiovascular collapse were reported in severe cases [2, 3]. In rare cases, rhabdomyolysis and fulminant hepatitis have also been described [11]. Datura stramonium toxicity usually occurs within 60 min after ingestion, and the clinical symptoms may persist up to

24 to 48 h, due to delayed gastric emptying. This delay caused by the anticholinergic effect results in a prolonged duration of action. Children have a unique susceptibility to atropine toxicity, as smaller amounts may cause profound central nervous system disturbances [12, 13].

Management is mainly supportive. It consists of gastric decontamination with activated charcoal administered by mouth or tube, sedation with benzodiazepines to control agitation, and the hyperpyrexia control (fluids administration and internal and external cooling methods) [6]. Gastric emptying and decontamination are necessary managing tools if they are initiated early. In our case, the ingestion was done 2 hours before admission, and the early gastric emptying and decontamination, with activated charcoal through a gastric tube proved to be safe and efficient, as long as the airway was already secured, and the maneuver was applied before the toxins were totally absorbed. Decreased gastrointestinal motility may have raised the efficacy of the activated charcoal.

Tachycardia is usually responsive to crystalloids [11].

The antidote for anticholinergic toxicity is physostigmine. It led to controversies, despite the recent reports of its safe use [14]. Relative contraindication of physostigmine is cardiac conduction defects (AV block) [15]. The patient presented with right bundle branch block, a cardiac conduction defect that has been proved to carry a reduced cardiovascular risk in healthy people [16]. The clinical background of our patient required its administration, in a reduced dose (0.5 mg), because of the severity of the neurological symptoms. Physostigmine is recommended in severe cases of agitation or psychosis, intractable seizures/coma or tachycardia/dysrhythmias with hemodynamic compromise [2, 6]. In our patient the administration of physostigmine resulted in no harm and ameliorated the neurological syndrome.

Sedation pauses and serial neurological monitoring allowed for an early extubation and prevention of complications related to intubation and mechanical ventilation.

Another particularity of the case was the rhabdomyolysis. Acute kidney injury is a frequent finding (10-50%), as a result of the direct toxicity of the alkaloids, and secondary to myoglobinuria that results from myocyte destruction, due to the severe agitation [17]. We prevented this complication by adequate fluid replacement, urine alkalinization, and diuretics.

Most of the cases described in the literature had a good prognosis after supportive treatment.

Despite its severity the favorable evolution of this patient was probably due to the quick diagnosis of the major anticholinergic syndrome and to the early and proper management applied. Fatalities due to Datura species poisoning are rare, but adverse effects are common [6].

We reported this case as the first published case of severe Datura stramonium voluntary intoxication in Romania, with coma and life-threatening manifestations and we reviewed the leading clues for its diagnostic and treatment.

In *conclusion*, every acute anticholinergic syndrome presenting with coma/seizures, in young people lacking other objective findings, can suggest poisoning with Datura stramonium, and early decontamination/ management should be initiated.

Conflict of interest

Nothing to declare

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