

Datura Stramonium Poisoning in Farm Animals

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Introduction

Datura stramonium, is commonly called Thorn Apple, Jimson Weed, Angel's Trumpet, is a wild growing plant that is entirely toxic. It is an annual weed that grows 75 to 90 cm tall, with an erect, stout stem and spreading branches near the top, unpleasant-smelling, alternating leaves that are unevenly or sharply toothed and glabrous, a funnel-shaped corolla and hard, prickly fruit with a whitish or purplish colour. The fruits ripen in autumn and split open to reveal numerous wrinkled, black seeds (Cooper and Johnson, 1998). All parts of the plant are poisonous, especially the seeds, which accumulate higher amounts of toxic compounds (Williams and Scott, 1984).



Toxic principles

All parts of the plant contain a variety of alkaloids including atropine, hyoscyamine, and scopolamine having hallucinogenic and anticholinergic effects (Yilmaz *et. al.*, 2013 and Tranca *et. al.*, 2017). The highest levels of toxins are found in the seeds approximating 0.1 mg of atropine per seed or 36 mg / 50-100 seeds.

Animals affected

- ❖ Herbivores are usually much more resistant than carnivores.
- ❖ Cat, dog and birds are sensitive, horses are less while cattle, sheep, goats, pigs and rabbits are comparatively resistant.

- ❖ Rabbits are quite resistant to diet of this, since an atropinase enzyme present in the liver rapidly hydrolysis and inactivates it's.

Mechanism of toxicity

Alkaloids (toxic principles) 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 (Krenzelok *et. al.*, 2010). Coma and seizures are rare findings but raise concerns of extreme gravity (Vanderhoff *et. al.*, 1992).

In extremely high and non - therapeutic doses can also block the nicotinic receptors at the autonomic ganglia and the motor end plate of skeletal muscles.

Clinical Signs

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 anti-cholinergic effect results in a prolonged duration of action. 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 (Krenzelok *et. al.*, 2010).
- ❖ Respiratory failure and cardiovascular collapse were reported in severe cases and death from asphyxia within minutes to hours (Kurzbaum *et. al.*, 2001, Arouko *et. al.*, 2003).
- ❖ The affected animals give an appearance as red as a beet, dry as a bone, mad as a wet hen and crazy as a newborn calf.

In rare cases, rhabdomyolysis and fulminant hepatitis has also been reported (Ertekin *et. al.*, 2005).

Postmortum findings

- ❖ Presence of plant material in the stomach or fore stomachs.
- ❖ Haemorrhages on the gastric and intestinal mucosae, meninges etc.
- ❖ Severe gastroenteritis.
- ❖ Generalized congestion and oedema of lungs.

Diagnosis

- ❖ Based on the history.
- ❖ Based on clinical Signs.
- ❖ PM lesions: reveals presence of obnoxious material/plant in the stomach/rumen.
- ❖ Lab diagnosis: detection of suspected materials containing atropine like alkaloids in urine or tissues.

Treatment

- ❖ There is no specific treatment for the poisoning.
- ❖ Management is mainly supportive care and observation.
- ❖ Remove the animals from source of denunciation / poison.
- ❖ Especially, within the first hour of ingestion, gastric lavage and activated charcoal were critical and recommended.
- ❖ Physostigmine is recommended in severe cases of agitation patient.
- ❖ Artificial respiration may be quite helpful.
- ❖ Pentobarbitone, tranquilizers, sedatives etc. may be used to control CNS excitement and convulsions.
- ❖ Saline purgatives may be given and useful in increase GIT movement (Wax et. al., 2011).

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