Case #127

NAME Educational Activities Committee

Case provided by:

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ITEM # 5094

A 32-year-old male is found deceased near a hiking trail about 12 hours after last being seen. A friend reported the decedent had been foraging for wild edible plants earlier in the day. The stomach contents have a “musty” odor and contain green plant fragments. Toxicological analysis of gastric contents reveals the presence of coniine and γ-coniceine.

What plant was ingested?

A. Jimson Weed
B. Oleander
C. Poison Hemlock
D. Foxglove

Answer...

C. Poison Hemlock (CORRECT ANSWER, 78.28% of responses)

Poison Hemlock (*Conium maculatum*) is a highly toxic plant in the Apiaceae family (the same family as parsley, carrot, and fennel), native to Europe and North Africa but now found throughout North America and other parts of the world. Every part of the plant is poisonous.

1. **Identification:** Poison Hemlock is a tall, erect biennial plant that can grow 2 to 10 feet high, with smooth, hollow stems that are distinctive for their purple or reddish spots or streaks. Its finely divided, fern-like leaves resemble parsley and emit a foul, mousy odor when crushed. The plant produces small white flowers arranged in umbrella-shaped clusters, which bloom from late spring through summer. The plant, to an untrained eye, resembles a plant called Queen Anne's lace.

2. **Route of Administration:** The primary route of administration is ingestion. However, small amounts of the alkaloids may be absorbed by rubbing eyes or touching mouth after contact with plants. The LD_{50} in humans is not established, but the plant is highly toxic.

3. **Mechanism of Action:** Poison Hemlock works by interfering with the nervous system through toxic alkaloids, primarily coniine and γ-coniceine, which act as nicotinic receptor antagonists. Nicotinic receptors are a family of ligand-gated ion channels that are activated by the neurotransmitter acetylcholine. These receptors mediate fast excitatory neurotransmission at the neuromuscular junction and at autonomic ganglia. Antagonists, like the Poison Hemlock alkaloids, block the binding of acetylcholine to nicotinic receptors, and inhibits the receptor's effects.

4. **Symptoms:** Nausea, vomiting, salivation, bronchorrhea, hypertension, tachycardia, agitation, ataxia, confusion and muscle fasciculations may be seen in the first 15-60 minutes after ingestion. Delayed symptoms include lethargy, diarrhea, apnea, bradycardia, hypotension, weakness, and muscle paralysis.

Picture Source: Poison hemlock (Conium maculatum) | Pesticide Safety Education Program

C. Poison Hemlock

- In the presented case, the detection of coniine and γ-coniceine in the gastric contents, combined with the history of foraging for wild plants, supports Poison Hemlock ingestion as the cause of death.

- Symptoms of intoxication typically appear within 15 minutes to several hours after ingestion and may progress rapidly to fatal respiratory paralysis.

- Diagnostic challenges in such cases include the close resemblance of Poison Hemlock to edible species such as wild carrot or parsley, and the limited availability of targeted toxicology testing for plant alkaloids in many laboratories.

- Given the history and circumstances, this death would likely be classified as accidental.

Other responses…

A. Jimson Weed (*Datura stramonium*) (8.37% of responses)

Jimson Weed is a member of the nightshade family. Although all parts of the plant are poisonous, the leaves and seeds contain the highest concentration of **atropine, hyoscyamine**, and **scopolamine**.

Symptoms of jimson weed toxicity usually occur within 30 to 60 minutes after ingestion. Initial symptoms include hallucinations, dry mucous membranes, thirst, dilated pupils, blurred vision, and difficulty speaking and swallowing. Subsequent effects may include tachycardia, urinary retention, and ileus. Rarely, late symptoms may include hyperthermia, respiratory arrest, and episodes of seizure. Slowing of gastrointestinal motility may prolong elimination of the toxin, thus causing symptoms to persist for 24 to 48 hours.

Picture Source: Jimsonweed | CALS

B. Oleander (*Nerium oleander*) (7.24% of responses)

Oleander is an ornamental shrub or small, densely branched tree, 1 to 10 meters tall in the Dogbane family Apocynaceae. All parts of oleander contain cardiac glycosides (**digitoxigenin, neriin, oleandrin, oleondroside**) that exert a digitoxin-like effect.

Clinical presentation of poisoning include severe gastroenteritis, diarrhea, abdominal pain, sweating, and weakness are the usual symptoms. These signs appear within a few hours after eating the leaves. Cardiac irregularities are common, often characterized by increased heart rate. However, a slower heart rate is often detected in the later stages.

Picture Source: Oleander - American College of Veterinary Pharmacists

D. Foxglove (*Digitalis purpurea*) (6.11% of responses)

Foxglove is an attractive biennial or short-lived perennial plant with bell-shaped flowers growing 1 to 2 meters tall. All parts of the plant contain cardiac glycosides, including **digoxin and digitoxin**.

Due to its low therapeutic index, overdoses occur frequently and can be life-threatening. Intoxication manifests itself in symptoms such as nausea, vomiting, dizziness, visual disturbance, alterations of consciousness and bradycardia with AV block. In rare cases, life-threatening tachyarrhythmias, hyperkalaemia, convulsions and coma occur. Cardiac arrest is a result of asystole and ventricular fibrillation can be fatal.

Picture Source: Explore Cornell - Home Gardening - Flower Growing Guides - Growing Guide

As a plant matures, its appearance can change significantly across several characteristics. Example characteristics include size and height, color, leaf shape and size, stem structure and branching, flowering, and root structure.

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Poison Hemlock (Conium maculatum) : USDA ARS