Strychnine

History

- This poisonous alkaloid was discovered in seeds from the tree species *Strychnos nux-vomica* and *Strychnos ignatii*.
- Use of strychnine as a rodenticide began in Germany in the 16th century for pest control.
- Strychnine is now the most common poisoning in dogs worldwide.
- Strychnine sulfate is a bitter, white, water-insoluble powder.
- 0.5-1% strychnine sulfate bait may be purchased over the counter in the United States and Canada for use in rodent burrows.
- Strychnine degrades quickly in the environment, with 90% of strychnine degrading in the soil within 40 days.
- A 2% liquid formulation of strychnine is also available in Canada.
- The Fish and Wildlife Division of Alberta Sustainable Resource Development is licensed to use strychnine to control wolf, coyote, and black bear populations.

Species sensitivity

- Fish, aquatic invertebrates, birds, and mammals are susceptible to strychnine poisoning.
- The toxic dose of strychnine for a dog is 0.5-1.2 mg/kg body weight.
- Secondary poisoning of scavengers consuming strychnine-poisoned rodents is possible.

Mechanism of action

- Strychnine is rapidly absorbed and metabolized by the body with a wide tissue distribution.
- Strychnine causes uncontrollable excitation of neurons in the spinal cord and the brain by antagonizing the inhibitory neurotransmitter glycine.
- Excitation of the central nervous system leads to uncontrollable muscle contractions and convulsions.

Clinical signs

- Poisoned animals will show clinical signs of toxicity 10 minutes to 2 hours after ingestion of strychnine.
- Vomiting is not a consistent feature of strychnine poisoning.
- Initially, animals display anxious behaviour, rapid breathing, and drooling, followed by difficulty walking and muscle stiffness. Seizures begin with extension of the limbs and an arched back.
- Animals will often display a ‘sardonic grin’ due to spasm of the facial muscles and jaw.
- Seizures may be intermittent initially, and stimulation from noise, light, or touch may induce a seizure episode.
- The animal remains conscious during the early stages of toxicity.
- As more strychnine is absorbed, seizures become more severe and prolonged, and the animal’s body temperature rises.
- Breathing is impaired due to spasm of the diaphragm and respiratory muscles.
- Untreated animals suffocate to death in 1-2 hours.
Diagnosis

- Laboratory analysis of stomach contents or vomit is the most reliable method to detect strychnine.
- There are no specific findings on post mortem.

Treatment

- The prognosis guarded to poor.
- Frequently, animals die before presentation to a veterinarian, due to the rapid onset of toxicity.
- If treated early, complete recovery is possible in 1-2 days.
- Treatment consists of sedation to control seizures, flushing of the stomach to remove undigested toxin, and administration of activated charcoal to prevent further gastrointestinal absorption. Sensory stimulation is kept to a minimum, and the patient is supported with IV fluids, muscle relaxants, and oxygen/ventilation.

References

