BULB TOXICOSIS

Elizabeth Van Winkle, AS, BS, CVT
ASPCA Animal Poison Control Center
Urbana, Illinois

Dogs that like to chew and dig in the garden can unearth potentially harmful bulbs that, if ingested, can cause serious clinical signs.

A 3-year-old Labrador mix is presented to the clinic after his owner caught him digging up ornamental bulbs that she had just planted in the garden. The owner became concerned when the dog started vomiting and the vomitus contained pieces of bulbs.

Ornamental bulbs can be a problem for pets year-round, but in the fall, when gardeners tend to plant bulbs for spring blooming, the opportunities for exposure to large quantities of bulbs increase. Curious dogs may be tempted to get into a bag of unplanted bulbs or to dig up fresh plantings. Fertilizers such as bone or blood meal can also attract dogs to bulb gardens.[1]

Although most of the common culprits in bulb toxicosis are planted in the fall for spring blooming, not all plants that cause toxicosis bloom in the spring. The autumn crocus (*Colchicum autumnale*), which is sometimes confused with members of the spring-blooming *Crocus* spp,[2] and gladiolas (*Gladiolus* spp), which bloom in the summer, are toxic when ingested. Lilies bloom in the summer and may be planted in the spring or fall. "True" lilies (*Lilium* spp) are highly toxic to cats[a]; many other toxic plants, including several that are not commonly known as lilies, belong to the lily family (Liliaceae). Daylilies, which are members of the lily family but not in the genus *Lilium*, can produce signs of bulb toxicosis when ingested. Daylilies (genus *Hemorocallis*) do not grow from true bulbs but rather from rhizomes (bulb-like roots). Either genus of lily can cause acute renal failure in cats. In dogs, signs can range from gastrointestinal problems to central nervous system depression.

[a]For more information about cats and lily toxicosis, see "Beautiful Lilies — A Potential Cat-Astrophe," which appeared on page 236 of the April 2002 issue.

MECHANISM OF ACTION

Ornamental bulbs contain a variety of chemicals that can cause clinical signs of toxicosis. Alkaloids, one of the most common types of toxic chemicals, are often concentrated in ornamental bulbs. *Narcissus* and *Amaryllis* spp may contain several alkaloids such as lycorine, galanthamine, and tazettine. Daffodils, which belong to the genus *Narcissus*, contain at least 15 different alkaloids. *Tulipa* (tulip) spp contain compounds known as tulipalin A and B and tuliposide A that may act as contact irritants or allergens.[3] *Colchicum* spp contain numerous tropolone alkaloids that can inhibit cell division.[4] This can cause multiorgan failure, including cardiovascular, renal, and liver failure.[1–4] Clinical signs may include vomiting, diarrhea, central nervous system depression, and paresis.

CLINICAL SIGNS

Signs of ingestion of ornamental bulbs can range from mild gastrointestinal (GI) upset to other, more serious signs, including cardiac arrhythmias, seizures, and death.[1–4] The toxins in bulbous plants are more concentrated in the bulbs; therefore, ingestion of the bulb can cause more significant clinical signs than ingestion of foliage.[2] Depending on the size of the animal, there may also be a potential for foreign body obstruction.

If an animal ingests *Crocus*, *Hyacinthus* (hyacinth), *Galanthus* (snowdrop), or *Tulipa* bulbs, clinical signs are usually limited to mild or moderate GI upset. Most of these patients can be monitored at home by their owners as

Toxicology Brief is contributed by veterinary technicians at the American Society for the Prevention of Cruelty to Animals–Animal Poison Control Center, 1717 S. Philo Rd., Suite 36, Urbana, IL 61802; hotline: 888-4ANI-HELP (888-426-4435) or 900-443-0000 (a $50 consultation fee is charged to the caller's telephone bill); email: sharont@napcc.aspca.org (for nonemergency information only); Web site: **www.apcc.aspca.org**.

long as signs remain mild and self-limiting.[1,2]

Ingestion of such plants as *Cyclamen* spp, *Gladiolus* spp, *Iris* spp, *Narcissus* spp (daffodils, jonquils, paperwhites), or *Arisaema triphyllum* (jack-in-the-pulpit) may cause severe vomiting and diarrhea.[1,2] Even small amounts of the iris rhizome can cause significant GI irritation, including ulceration of the stomach and small intestine.[2] Signs of *Narcissus* ingestion can include hypothermia and GI ulceration.[1] Death has been reported in cattle that ingested *Narcissus* spp.[3]

The jack-in-the-pulpit belongs to the Araceae family, which includes *Philodendron* and *Dieffenbachia* spp. Members of this family, also known as the Arum family, contain insoluble calcium oxalate crystals, which can cause mechanical damage to the oral mucous membranes, esophagus, and stomach. Clinical signs can include hypersalivation, oral irritation, swelling, pain, vomiting, and diarrhea. If there is significant swelling of the pharynx, respiratory problems can arise.[2]

C. autumnale should not be confused with the spring-blooming crocus. The autumn crocus blooms in the fall, and ingestion of the bulbs can cause much more serious problems. The first sign is usually diarrhea, which is sometimes bloody, followed by abdominal pain, vomiting, depression, and drooling. The animal may become weak and ataxic and may collapse 24 to 72 hours after exposure.[1–4]

Like the daylily, the lily of the valley (*Convallaria majalis*) grows from a rhizome. Ingestion of this or any other part of the plant can cause severe cardiotoxic signs similar to digitalis toxicity. Lily of the valley has been found to contain at least 15 cardiac glycosides, which can cause bradycardia and other cardiac arrhythmias, including complete heart block and asystole. Seizures, coma, and death may occur.[1–4] Signs may be more significant in very young or very old animals or those with renal or hepatic insufficiency.

TREATMENT

Treatment of a pet that has ingested ornamental bulbs depends on the status of the animal, the type of plant, and the amount of plant material ingested. If the animal is asymptomatic, decontamination with emetics or activated charcoal is recommended. Treatment is usually symptomatic and supportive. If GI signs are present, antiemetics may be indicated, along with GI protectants such as sucralfate and famotidine.[1,2] If the owner has indicated that the bulbs belong to a group that may cause more serious problems, treatment may include hospitalization, intravenous fluids, and other medication as needed. The animal may need to be closely monitored for any renal or hepatic damage and for electrolyte and fluid imbalances. Seizures and other severe signs such as cardiac arrhythmias should be treated with the appropriate medications. Treatment may be necessary for several days.[1,2]

THE ROLE OF THE TECHNICIAN

Client education is an important part of a technician's job. Dog owners need to understand that their pets may be attracted to freshly planted bulbs, even when they do not bother the plants during other times of the year.[b] Identifying the particular bulb or bulbs is also very important because knowing the species of plant ingested can help in determining what clinical signs to expect and what treatment is necessary. Clients with tenacious diggers and chewers may want to avoid planting certain bulb species in their gardens. Fences may be useful in keeping pets away from certain bulbs and plants. In addition, it can be suggested to owners to plant bulbs in wire cages to prevent some animals from digging them up.

[b]For more information about establishing clinic plant references for staff and clients, see "Potentially Toxic Garden Plants," which appeared on page 356 of the May 2005 issue.

REFERENCES

1. ASPCA Animal Poison Control Center Case Database: Unpublished data, Urbana, IL, 1998–2005.
2. Lieske CL: Spring-blooming bulbs: A year-round problem. *Vet Med* 97(8): 580–588, 2002.
3. Spoerke DG, Smolinske SC: *Toxicity of Houseplants*, Boca Raton, FL, CRC Press, 1990.
4. Burrows GE, Tyrl RJ: *Toxic Plants of North America*. Ames, Iowa State University Press, 2001.

VT