

Exotic Pet

P R A C T I C E

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FEATURE ARTICLE

Crop Disorders in Psittacines

Amy Beth Worell, DVM, ABVP—Avian Specialist

The crop, or *ingluvies*, is an anatomical dilatation of a bird's cervical esophagus that functions as a storage area for food before its passage into the proventriculus. Not all types of birds have crops, and in those birds that do possess a well-developed crop, such as psittacines, the crop can stretch tremendously to accommodate large volumes of food when the bird is young. As the bird develops and matures, the crop actually shrinks in size, and its volume capacity is greatly diminished.

Crop problems occur most frequently in young and neonatal psittacines, but they can occur in an aged bird. The potential causes of crop problems are numerous, and only the most common etiologies will be covered in this article. Crop problems in general are often referred to as *sour crop*, which is reflective of the sour smell accompanying the bacterial fermentation process on food remaining in the crop for prolonged periods of time.

Crop disorders are generally recognized as a situation in which the normal motility of the crop is altered. The altered crop motility results in either complete crop stasis or a noticeable slowdown of the normal emptying rate of the crop contents. The important concept to understand is that the changed crop motility can be either due to a primary problem with the crop or, as is often the case, due to a systemic problem that is reflected in part as an altered crop motility. Numerous factors can be involved in crop problems, rather than a localized cause involving only the crop itself.

Crop Disorders in Adult Psittacines

Primary crop disorders in adult psittacines are uncommon, but would include foreign bodies or tumors in the crop. In these situations, clinical presentation may involve a distended crop, regurgitation, and weight loss in situations of a chronic condition. Other disorders in adult psittacines that may result in a crop dysfunction include a variety of systemic diseases; as a factor of the clinical syndrome, a delay in crop emptying may occur. Often, the mechanism of the connection between the systemic disorder and the crop slowdown is unknown and cannot be demonstrated, even when a complete necropsy is performed. The connection does occur clinically, however.

Additional situations resulting in crop stasis in an adult bird include lead poisoning and microorganism overgrowth in the crop, such as with gram-negative bacteria, the yeast *Candida*, and the protozoa *Trichomonas gallinae*. The viral disease, commonly known as proventricular dilatation disease, can also affect adult birds, and among presenting clinical signs, crop stasis may be evident.

Crop Disorders in Young and Neonatal Psittacines

Crop slowdown in young psittacines during the hand-feeding process is not uncommon. The causes vary, but they are commonly related to management irregularities or infectious agents. With regard to management

issues, the frequent causes are as follows:

- Hand-fed food is offered at an inappropriate temperature (too hot or too cold).
- Food has an inappropriate fiber or protein content (excessively high).
- Extremely hot (frequently, microwaved) hand-fed food was previously fed, resulting in a delayed burn to the tender crop mucosa. (This burn may resolve on its own, may form a noticeable scab on the outer surface of the crop, or may rupture through the skin with the formation of a crop fistula.)
- Hand-fed food is offered at an inappropriate consistency (too thick or too thin).
- Overfeeding or overstretching of the crop occurs.

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Crop Disorders in Psittacines

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- Ambient humidity is suboptimum. (Low humidity can lead to fluid being withdrawn from the crop to meet the body's needs, resulting in a dehydrated chick.)
- Ambient temperature is improper. (Surrounding temperatures that are either too high or too low will result in a crop slowdown.)
- Bedding substrate is ingested, resulting in crop and/or intestinal tract impaction.
- Bacterial or fungal overgrowths, resulting in a slowed crop emptying. (These infections may be localized in the upper and/or lower intestinal tract or may result in a widespread septicemia infection. The microorganisms often appear when sanitation is not optimum. Thorough cleansing and disinfecting of feeding utensils, hand-feeders' hands, and feeding surfaces are important. Food should be prepared "fresh each time" and should be fed to the animal immediately after preparation.)

Management-related issues are not the only factors resulting in crop disorders in young psittacines. Polyomavirus infection is also causative of crop stasis. This viral condition is hallmarked by an acute or peracute onset in young birds, and it carries a high mortality rate. Clinical signs may include regurgitation and a delayed crop emptying time.

Treatment for Crop Disorders

As with any and all medical situations, identification and treatment of the underlying etiology is ideal. If the client declines diagnostic tests, supportive treatment and care should nevertheless be initiated.

In the adult bird, if the animal is stable enough, whole body radiographs, Gram's stains or cultures of the crop and cloaca, and blood work (including at least a complete blood count and serum chemistries) are recommended. Other diagnostic tests, such as blood lead levels and polyomavirus testing, may be indicated. The administration of antimicrobials and supportive care, including fluids if clinical dehydration is evident, may be necessary.

In the young bird, the diagnostics you are able to perform will once again often be dictated by client preferences. Depending on the age of the bird, minimally offered diagnostics should be Gram's stains and/or cultures of the crop and cloaca. Other diagnostics may vary with the age of the bird and specific situation. For example, diagnostics offered and performed on a 3-day-old bird would vary from the options offered to the owner of an 8-week-old bird.

Potential treatments for crop stasis in young birds include the administration of oral antifungal agents, the administration of either injectable or oral antibiotics, an increase in the ambient humidity, fluid administration via a variety of routes, and introducing a warmed environment. Removal of crop contents can be considered. Options for this procedure include aspiration of the crop contents through a variety of types of feeding tubes or turning the bird upside down and expressing the crop contents out through the oral cavity. In the latter method, aspiration is a possibility, and in the first method damage to the crop mucosa through suction can occur. Depending on the situation, intermittent addition of fluid to the crop contents may be helpful in slowly allowing the crop contents to empty. A crop bra, which can be constructed from a variety of materials, can be placed on the bird for cases in which a distended stretched crop is suspected. As with many situations, the individual presentation must be dealt with on an individual basis.

Suggested Reading

1. Altman RB, Clubb SL, Dorrestein GM, et al: *Avian Medicine and Surgery*. Philadelphia, WB Saunders, 1997.

ROUNDTABLE

Handling Anorexia in Snakes When the Client Has Limited Finances

Q. Define "normal" versus "abnormal" anorexia in snakes.

Dr Morrisey: Many snakes may not eat during their breeding season or cycle. Gravid females typically do not eat simply because of the large amount of coelomic space that the eggs or young require. Additionally, hibernating snakes will not eat during the hibernation period. Any other anorexia should be considered abnormal. Husbandry problems are the most common causes of anorexia.

Dr Suedmeyer: I don't believe there is such a thing as normal anorexia. The term should not be used. Most snakes can go for long periods of time without eating, but this should not be confused with anorexia, which is a term used for a medical condition. True anorexia as a term should be reserved for

those snakes that lose condition, have demonstrable medical conditions leading to or including anorexia, or have consistent lethargy unrelated to seasonal changes (ie, preparation for hibernation).

Q. When does "anorexia" in a pet that normally goes a while without eating become a problem that requires medical intervention?

Dr Morrisey: If a snake is eating on a regular basis, then skipping one or two meals may be normal; however, skipping more than two meals may indicate a problem, and I would recommend veterinary consultation.

Dr Suedmeyer: When a documented problem exists. Signs of improper husbandry (temperatures outside ambient range, etc) or loss of body reserves that progress to neoplasia, infections, heavy parasitism, hepatic lipidosis, or catabolism of muscle tissue indicate that the anorexia might have a true underlying medical etiology.

Dr Worell: This question does not have a simple answer. If the snake is active but anorexic, I am less concerned than if the snake is

anorexic and listless. I do not have a time period for these ideas. If the snake is listless AND anorexic, medical attention is warranted.

Q. If money is not a concern, what is your normal "workup"?

Dr Morrisey: A thorough examination of the husbandry and a complete physical examination are very important and do not cost more than the office visit. Depending on the situation, blood work, radiographs, and fecal examination may be in order. Other diagnostic tests that may need to be performed are enemas, laparoscopy, contrast films, and cloacal washes.

Dr Suedmeyer: History, physical examination, clinical chemistry, and complete blood count interpretation; fecal examination for internal parasites; gastric lavage or endoscopic biopsy if the clinical history does not elucidate the cause.

Dr Worell: A workup for an anorexic snake might include a complete reptile blood panel, a fecal flush (usually a fecal sample is not available because the snake is anorexic), and radiographs.

Q. If money is a concern, describe your approach.

Dr Morrisey: I would rarely approach this problem with the attitude of "If I could only do one test, what would I do?"; however, as previously mentioned, the most important part of the approach is the history and physical examination. The next step would depend on the results of the history and examination, but may include force-feeding and treatment with appetite stimulants (metronidazole, 100 mg/kg PO) or prophylactic deworming. Any husbandry changes should be made in addition.



WHAT'S YOUR DIAGNOSIS ???

Shawn Messonnier, DVM

A 5-year-old intact female African hedgehog (*Atelerix albiventris*) weighing 232 g was evaluated for anorexia of 1 week's duration. The owner had tried force-feeding the hedgehog with Pedialyte (Ross Products, Abbott Laboratories, Kansas City, Mo) and Nutrical supplement (Evsco, Buena, NJ). Weight loss was also noted by the owner. Attempts to handle the patient were unsuccessful because it would roll into a ball and thump when touched.

Questions

1. How would you evaluate this animal?
2. What diagnostic testing would you recommend?

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Handling Anorexia in Snakes When the Client Has Limited Finances

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Dr Suedmeyer: Correct or change the current husbandry practices (ie, increase the temperature to the high end of the ambient range of the snake, replace lighting elements, present prey items in a different manner—live versus dead food, color changes, rats versus mice, etc). Prophylactically medicate with metronidazole (120 mg/kg PO once) to resolve underlying anaerobic infections and protozoal infections and, in some snakes, to promote appetite, which may be secondary sequelae to treating with metronidazole.

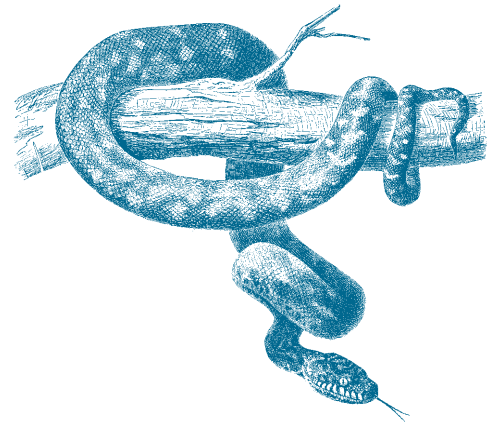
Dr Worell: Because money seems to always be a concern with snake owners, I discuss environment and recommend changes as deemed appropriate by the owners' responses, offering either broad-spectrum antibiotics and/or vitamin injections and deworming with metronidazole (Flagyl) and fenbendazole (Panacur).

Q. What is your normal treatment for the snake with "normal" anorexia?

Dr Morrissey: If the anorexia is for normal reasons, then no treatment is necessary. If there appears to be no reason for the anorexia, then supportive care such as force-feeding and administering appetite stimulants may be beneficial.

Dr Suedmeyer: Sometimes, just a mild change in husbandry practices will induce the snake to eat. The following alterations may induce eating: discontinuing handling, feeding live prey items, presenting prey items in a different manner (ie, color change), changing lighting elements to ensure proper wavelength intensity, or exposing the snake to direct sunlight for several hours.

Dr Worell: I recommend environment changes as needed, a 2- to 3-week course of a broad-spectrum injectable antibiotic, two types of vitamin injections (a multivitamin with A and D₃, and a mixture of vitamin B complex and vitamin C), and deworming with Flagyl and



Panacur. This is repeated, as are the vitamin injections, at a 2-week interval. Sometimes tube feeding of the snake is offered and performed.

Q. If the owner can't afford testing, how do you handle an anorectic snake?

Dr Morrissey: A thorough history and physical examination are paramount to understanding the cause of the anorexia. Supportive care of the anorexia may be the only thing to offer clients in this situation.

Dr Suedmeyer: By recommending the changes above. I will also encourage the owner to release the animal, if it is a native species.

What's Your Diagnosis ???

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Answers

- Most, if not all, hedgehogs will not allow a physical examination when awake. Therefore, this patient was anesthetized in an induction chamber with isoflurane, and anesthesia was maintained via face mask at 2%.
- Diagnostic testing included blood testing, urinalysis, fecal examination for parasites, and whole body radiographs. A physical examination revealed that this animal had a thin body condition and dental tartar, though it seemed normal on abdominal palpation and thoracic auscultation.

Due to these findings and a limited budget by the owner, blood was drawn from the cranial vena cava while the hedgehog was anesthetized. Upon completion of the phlebotomy, the hedgehog was awakened. Trimethoprim-sulfa (30 mg PO q12h) was dispensed pending blood analysis.

Blood analysis revealed the following abnormalities: blood urea nitrogen (BUN), 169 mg/dL; WBC, 30,300 with a mature neutrophilia, lymphocytosis, and monocytosis; all other values were within normal limits.

What is your diagnosis?

The diagnosis is probably renal disease/failure, based on

clinical signs and elevated BUN. A urinalysis would have been helpful to rule out prerenal azotemia. The patient died the next morning.

In a personal communication with Cathy Johnson-Delaney, DVM regarding elevated BUN levels in hedgehogs, I was told, "We have seen renal disease, but an elevated BUN can occur during liver disease as well. However, there is another interesting phenomenon in animals who can go torporous and hibernate. We've seen it in both hedgehogs and prairie dogs when cooled—they can build up tremendous BUNs while creatinine levels stay low.

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HOW I ...

Collect Blood From Iguanas

Terry W. Campbell, DVM, PhD

Blood samples from green iguanas (*Iguana iguana*) are usually obtained from the caudal (tail) vein, which lies just below the caudal vertebrae. A ventral midline approach can be used to access this vein; however, this lizard does not like being placed on its back or

having its tail lifted for the procedure. Although the iguana can be hung vertically on a cage door, for example, to provide a horizontal approach to the ventral tail, I find that taking blood from a lateral approach works much better. With the iguana sitting on a table, the

caudal vein can be approached from the lateral aspect of the tail, with the needle directed perpendicular to the line created by the musculature on the tail. (This is similar to bleeding fish from the caudal peduncle using the lateral line.) By directing the needle through this linear structure on the lateral aspect of the tail, the needle enters the caudal vein just below the caudal vertebrae as the needle passes into the midline of the tail.

FROM THE LITERATURE

Clostridia in the Blood of Lizards

Shawn Messonnier, DVM

Fifty-eight blood cultures were made from 28 lizards of 8 various species. Bacterial growth was obtained in 51 (88%) of the cultures. More than one *Clostridium* species was present in 70% of cultures. The 4 most common species were *Clostridium sordellii*, *Clostridium innocuum*, *Clostridium perfringens*, and *Clostridium difficile*. Two possibilities exist for the positive blood cultures: spores imbedded in the folds of the skin and scales at the venipuncture site, or the possibility that clostridia are normally present in the blood of lizards without causing disease. Therefore, the incidence of blood cultures taken from the tail of lizards should be taken with caution.

Hanel R, Heard D, Ellis G, et al: Isolation of *Clostridium* spp. from the blood of captive lizards: Real or pseudobacteremia? *Bull Assoc Rept Amphib Vet* 9:4-8, 1999.

Editor's Note: Most of the blood culture isolates from lizards in this study were anaerobes, rather than the aerobes usually cultured in dogs and cats. This study showed that blood cultures taken from apparently healthy lizards often contained various clostridia species. Blood cultures are not normally performed on reptiles, but this study advises caution in the interpretation if the blood is drawn from the tail. Future studies can be done to determine whether clostridia normally inhabit the blood of healthy lizards or if they may reside in the skin folds. Careful preparation of the skin and culture bottle can decrease the chance of bacterial contamination.



What's Your Diagnosis ???

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When warmed, they get active again, BUN comes down to normal within 48 hours. We've had BUNs higher than that, only to become normal. I don't diagnose renal disease until I've checked a urine sample and taken a look at the sediment and the specific gravity. Hedgehogs' urine parameters have been running essentially like any carnivore. We've seen renal cells sloughed in renal disease. I'm not sure if I've recognized casts. If the patient is older and obese, renal disease occurs particularly (at least we

see far more of it) if they have been on a kitten food or cat food diet. We don't see the renal or urinary tract problems if they are on insectivore diets.

"Most hedgehogs (African variety) aren't their healthiest at normal US room temperatures of 68°F to 70°F. I keep my hedgehog's area at 82°F to 85°F; she has an undertank/nest heater plus a radiant heat unit above. You'd be surprised at the difference in activity, body shape, etc. Where she sleeps is a toasty 90°F inside the nest. According to Nigel Reeve, the African hedgehogs begin shutting down below 65°F to 70°F—so we're keeping

them physiologically borderline, kind of like reptiles. We've been seeing similar problems up here with prairie dogs, and the light cycle plays a role with them. Obesity, plus cool evening home temps, plus Seattle's famous winter darkness, and these guys all present half dead with BUNs up in the 300s. So far, only one has died (of other causes) months after we reversed the hibernation, and the kidneys histologically were fine."

Client Teaching Guide

Turtle

CARE SHEET

Terry W. Campbell, DVM, PhD

Basic Care of Aquatic Freshwater Turtles

✓ The Captive Environment

Although most owners keep their pet aquatic turtles in a glass aquarium, a variety of captive habitats, such as plastic containers to outdoor ponds, can be used. The captive habitat should be easy to clean and should allow for easy maintenance of clean water. Frequently changing the water is the easiest method for maintaining clean water for aquatic turtles. For example, a 12-inch turtle in a 10-gal aquarium may require three complete water changes a week. Because they do not breathe with gills like fish, chlorinated water can be used. Standard aquarium filters can be used to provide additional support for water quality maintenance.

The habitat should include a haul-out area made of a flat rock for basking. An incandescent 75- to 150-W light bulb with a reflector can be used to provide the basking heat; a ceramic overhead heater would be better, however, because it does not give off constant light. The temperature gradient should range from 75°F to 85°F, with the higher temperature being in the basking area. A full-spectrum light should also be provided over the basking area. This may aid in vitamin D metabolism. It is important to remember that the full-spectrum bulbs should be kept within 2 feet above the basking area. Also, they lose their UV spectrum after several months' use and should be replaced at least every 6 months. The water temperature should also be kept within this range, which may require a submersible tank heater.

✓ Diet

Aquatic freshwater turtles should be fed a variety of foods. Commercially prepared pelleted diets for aquatic turtles or fish are best fed after soaking to soften. A variety of insects (such as mealworms, crickets, and waxworms) can also be provided. Earthworms are a good source of food. Feeder fish, such as guppies, goldfish, and minnows are also recommended. Liver and other organ meats can be fed occasionally; however, do not feed raw hamburger or other muscle meat. In addition to the animal products, a variety of dark green leafy vegetables, such as kale, endive, bok choy, and duckweed, should also be provided. Remember that a varied diet is best, and these turtles should not be fed a steady diet of just one or two types of food.

CASE REPORT

Hypovitaminosis E in Australian Grass Parakeets

Terry W. Campbell, DVM, PhD

Twelve juvenile and adult grass parakeets (*Neophema* sp) were presented with incoordination. The birds exhibited torticollis and abnormal head and body movements. Some of the birds appeared unusually erect and would only move backward. Others were reluctant to walk and just stood in a "star gazing" posture. The birds were housed either as pairs or in groups in a breeding aviary. All of the grass parakeets in the aviary were affected. The birds were fed a diet of ground dog food and a seed mixture that was soaked in cod-liver oil. There were no recent changes in the aviary, which also housed many budgerigars (*Melopsittacus undulatus*) and a variety of finches and softbills. Four of the birds were euthanized using a carbon dioxide chamber for pathologic evaluation.

Histopathologic examination revealed cerebellar demyelination and muscular dystrophy of the skeletal and cardiac muscles in all 4 birds. These findings are indicative of hypovitaminosis E. Evaluation of the ground dog food revealed a high content of rancid fat. It was

discovered that the dog food was purchased in large bags that were stored in an area in the attic of the garage.

Vitamin E is a fat-soluble vitamin and depletion of the body stores occurs slowly, especially in adults. Young birds are more susceptible to hypovitaminosis E. Hypovitaminosis E can result in birds that are fed diets high in polyunsaturated fats or those containing rancid fat. Cod-liver oil is often used as a supplement for vitamins A and D. It also contains high levels of polyunsaturated fat and is low in vitamin E content. Dry dog food contains antioxidants to preserve the fats; however, large amounts of rancid fat can collect if the dog food is stored for a long period of time in a warm place. Rancid fats destroy vitamin E. Vitamin E also deteriorates readily in ground feeds.

Therefore, the cause of the apparent hypovitaminosis E in these birds was likely associated with the ingestion of rancid fats in the dog food diet. Supplementation with cod-liver oil also could be a contributing factor. The muscular

dystrophy seen in these birds may be reversed by vitamin E supplementation. However, the encephalomalacia (cerebellar demyelination) does not reverse with vitamin E supplementation. The pathologist said, "Once you are demyelinated, you remain demyelinated." Therefore, the birds were euthanized, and the client was advised to improve his storage of the dog food if he wishes to continue feeding it to the birds. He was also advised against the use of cod-liver oil supplementation.

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A client brings in a 2-year-old female guinea pig (*Cavia porcellus*) that is acting ill. You suspect the illness might be due to a contaminated water bottle. Which potentially pathogenic organism is most often associated with contaminated water bottles of guinea pigs?

- A. *Pasteurella*
- B. *Salmonella*
- C. *Clostridium*
- D. *Bordetella*
- E. *Pseudomonas*

(E.) *Pseudomonas aeruginosa* often inhabits water bottles and can be pathogenic to guinea pigs. Regular (twice daily) water changes and good sanitation are important. Regular water changes will also allow early detection of clogged sipper tubes, a common problem that results as the pet spits food into the sipper tube.

Readers: We welcome your questions, practice tips, and case reports. Please submit any materials to Susan Sibiski, 526 Cole Ln, Baltimore, MD 21220; ssibiski@home.com.



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