

Nutritional Assessment in a Cat with Congestive Heart Failure

Lisa M. Freeman, DVM, PhD, DACVN
Tufts University

Kara M. Burns, MS, MEd, LVT, VTS (Nutrition)
Academy of Veterinary Nutrition Technicians

Diet in Disease is a series developed by the World Small Animal Veterinary Association (WSAVA), the Academy of Veterinary Nutrition Technicians, and *Clinician's Brief*.



Gregg K. Takashima, DVM
*WSAVA Global Nutrition Committee
Series Editor*

BCS = body condition score
BUN = blood urea nitrogen
DCM = dilated cardiomyopathy



THE CASE

A 10-year-old neutered male domestic shorthaired cat was presented to the emergency room for tachypnea and dyspnea. The cat had previously been healthy, was up-to-date on vaccinations, lived indoors, and was the only animal in the household. On presentation, the cat had a heart rate of 240 bpm, respiratory rate of 68 breaths/minute, weak pulses, and body temperature of 99°F (37.2°C). Crackles, muffled heart sounds, and a cardiac gallop were auscultated. The cat's body weight was 5.3 kg, his BCS was 5/9, and he had normal muscle condition.

Furosemide was administered at 10 mg SC (1.9 mg/kg), and the cat was placed in an oxygen cage. When the cat was breathing more comfortably after a second dose of 10 mg furosemide SC, thoracic radiographs were taken and showed perihilar edema and mild pleural effusion.

Dietary History

The owner reported that the cat was fed varying flavors of a commercial cat food (1 pouch 2 times a day) for the past year. The diet history also showed that the cat received no treats, table food, supplements, dental chews, or other foods. A review of the cat food revealed that it was manufactured by a small company and had the following nutritional adequacy statement: "[Brand X] was formulated to meet the nutritional levels established by the Association of American Feed Control Officials (AAFCO) Cat Food Nutrient Profiles for all life stages." Ingredients listed were "organs (liver, lung, and kidney from beef, pork, and lamb); water sufficient for processing; lamb; starch; potato; calcium."

Hypertrophic cardiomyopathy was suspected, but an echocardiogram performed the next day showed a dilated, hypocontractile left ventricle and a markedly enlarged left atrium (ie, dilated cardiomyopathy [DCM]). Although most current cases of DCM appear to be taurine-independent, the combination of DCM and the cat's diet made taurine deficiency a possible factor.

DIAGNOSIS: DILATED CARDIOMYOPATHY

Further Testing

Plasma and whole blood samples were submitted for determination of taurine concentrations, and cardiac medications and taurine supplementation were initiated. The cat's diet was analyzed for selected nutrients, and results obtained 2 weeks later showed that the diet was deficient in taurine, as well as in calcium, phosphorus, manganese, potassium, zinc, and thiamine. Plasma (14 nmol/mL; range, 80-120 nmol/mL) and whole blood (67 nmol/mL; range, 300-600 nmol/mL) taurine concentrations were both below the reference range.

Treatment & Follow Up

The cat was discharged from the hospital after 3 days with pimobendan (1.25 mg PO twice a day), furosemide (6.25 mg PO once a day), clopidogrel (18.75 mg PO once a day), and taurine (250 mg PO twice a day, using an independently tested brand to ensure good quality control¹). Instructions to feed a specific good-quality, low-sodium diet (canned and dry) were provided to the owner, as were the reasoning behind the recommendation and more objective ways to select a good-quality diet.

The veterinary team followed up with the owner after discharge to ensure the cat was tolerating the medications and diet and to allow the owner to ask questions regarding the ongoing treatment protocol. The cat was presented for re-evaluation 10 days later. BUN, creatinine, and electrolytes were within normal limits, systolic blood pressure was 150 mm Hg, and the cat was reported to be eating well and breathing normally. An echocardiogram performed 8 weeks later showed improved ventricular size and function; normal size and function returned by 6 months. Cardiac medications were discontinued after 6 months, but the owner continued to feed the good-quality cat food recommended by the veterinarian. The taurine supplement was discontinued after 1 year.

Conclusion

This case illustrates the importance of a nutritional assessment of every patient at every visit. The nutritional assessment is a team approach and should evaluate the patient's body weight, BCS, muscle condition score, and diet history. Forms and tips to make this important assessment quick

and efficient can be found on the WSAVA Nutrition Toolkit website (see **Resources**). Dietary history can help identify a diet that is contributing to the underlying disease (as in this case), nutritionally unbalanced, or not optimized for an animal's life stage or medical conditions.

ASK YOURSELF ...

QUESTION 1

Based on the AAFCO nutritional adequacy statement, which of the following is true regarding the diet the cat was eating at the time of diagnosis?

- A. It has undergone AAFCO feeding trials.
- B. It is formulated to meet only the nutritional requirements of growing kittens.
- C. It is formulated to meet only the nutritional requirements of adult cats.
- D. It is formulated to meet the nutritional requirements of kittens and adult cats.

MOST ACCURATE ANSWER: D

Although the nutritional adequacy statement implies that the food was nutritionally complete and balanced for kittens and adult cats, clinicians were concerned that the small company may not have adequate nutritional knowledge or quality control, and the ingredients in the ingredient list appeared insufficient for a complete and balanced diet (ie, no vitamins were listed and calcium was the only mineral included).

QUESTION 2

Which of the following is true about evaluating a cat or dog for taurine deficiency?

- A. Only plasma taurine concentrations should be measured.
- B. Only whole blood taurine concentrations should be measured.
- C. Both plasma and whole blood concentrations should be measured.
- D. Neither plasma nor whole blood concentration is a good indicator of taurine status, so endomyocardial biopsy is required for a diagnosis.

MOST ACCURATE ANSWER: C

BCS = body condition score

Both plasma and whole blood samples should be measured for taurine concentrations; plasma is a better indicator of short-term nutritional status, whereas whole blood taurine concentrations are a better indicator of long-term status. Although taurine supplementation can be empirically initiated without measuring taurine status, it is ideal to assess taurine status first so an owner does not have to give additional supplements if unnecessary.

QUESTION 3

What do most owners use to select their pet's diet?²

- A. The veterinary healthcare team's recommendation
- B. The ingredient list
- C. The label says it is appropriate for the pet's life stage and breed.
- D. Price

MOST ACCURATE ANSWER: B

The veterinary healthcare team can play a more important role in ensuring appropriate diet selection by performing a nutritional assessment and making a specific nutritional recommendation for every patient at every visit.

QUESTION 4

Which of the following would be a red flag on a diet history for potential nutritional problems?

- A. A homemade diet (cooked or raw)
- B. A commercial raw or vegetarian diet, or a commercial diet made by a small company
- C. Use of dietary supplements or large quantities of treats, snacks, or table food
- D. All of the above

MOST ACCURATE ANSWER: D

Patients eating any of these diets are at risk for important nutritional deficiencies and excesses, and a thorough nutritional assessment is indicated. ■

RESOURCES

- ▶ ConsumerLab website: consumerlab.com
- ▶ Tufts HeartSmart website: tufts.edu/vet/heartsmart
 - Includes information on heart disease for pet owners, including nutrition (eg, low-sodium diets for dogs and cats, treats, omega-3 fatty acid supplements)
- ▶ Tufts Veterinary Nutrition website: tufts.edu/vet/nutrition
 - Provides list of FAQs about pet food, home-cooked diets, and feeding tubes, as well as trusted links and other resources
- ▶ US Pharmacopeial Convention Verified Dietary Supplements: usp.org/usp-verification-services/usp-verified-dietary-supplements
- ▶ WSAVA Global Nutrition Committee Nutrition Toolkit: wsava.org/nutrition-toolkit
 - Tools for veterinarians and owners, such as tips for selecting a pet food and BCS charts, muscle condition score charts, and diet history forms

References

1. Bragg RR, Freeman LM, Fascetti AJ, Yu Z. Composition, disintegrative properties, and labeling compliance of commercially available taurine and carnitine dietary products. *JAVMA*. 2009;234(2):209-213.
2. Freeman LM, Janecko N, Weese JS. Nutritional and microbial analysis of bully sticks and survey of opinions about pet treats. *Can Vet J*. 2013;54(1):50-54.

Suggested Reading

- Freeman LM. Cachexia and sarcopenia: emerging syndromes of importance in dogs and cats. *JVIM*. 2012;26(1):3-17.
- Freeman LM, Rush JE. Nutritional management of cardiac disease. In: Ettinger SJ, Feldman EC, eds. *Textbook of Veterinary Internal Medicine*. 7th ed. St Louis, MO: Elsevier; 2010:579-583 (New edition in press).
- Freeman LM, Rush JE. Nutritional management of cardiovascular diseases. In: Fascetti AJ, Delaney SJ, eds. *Applied Veterinary Clinical Nutrition*. West Sussex, UK: Wiley-Blackwell; 2012: 301-328.
- Pion PD, Kittleson MD, Rogers QR, Morris JG. Myocardial failure in cats associated with low plasma taurine: a reversible cardiomyopathy. *Science*. 1987;237(4816):764-768.
- Wortinger A, Burns KM. Cardiac. In: Wortinger A, Burns KM, eds. *Nutrition and Disease Management for Veterinary Technicians and Nurses*. 2nd ed. Ames, IA: Wiley-Blackwell; 2015.

The Right Dose for Every Condition, Every Patient, Every Time

Accuracy, Engineered by Companion®

Meet the Future of Laser Therapy

The NEW feature-rich Companion CTX combines advanced features with re-designed approaches to dosing that give you an unmatched level of versatility and control over your treatments. Featuring 0.5 to 15 watts of therapeutic power and three different dosing solutions, the CTX is the perfect platform for the new, intermediate, and expert therapy laser user.

Visit LiteCureInfo.com/CTXLaser to schedule your in-office demonstration today.

CompanionAnimalHealth.com

1.877.627.3858 | info@companiontherapy.com



COMPANION
ANIMAL HEALTH™
LiteCure, LLC