

# What Is The Evidence?

## **Problem**

A 4-year-old neutered male Ragdoll cat weighing 6.4 kg (14.0 lb) was evaluated at the University of Georgia Small Animal Teaching Hospital for ongoing pleural effusion diagnosed as chylothorax at the referring facility 4 months previously. At the time of the initial diagnosis, the cat was evaluated by an internist who confirmed the diagnosis. Appropriate medical management was subsequently initiated, consisting of a low-fat diet, intermittent thoracocentesis, and rutin administration. When evaluated at the teaching hospital, the cat was receiving a diuretic (furosemide at an unknown dosage) prescribed for an earlier isolated instance of pulmonary edema following thoracocentesis, which had subsequently resolved and did not redevelop. Physical examination revealed a body condition score of 6 (mildly overweight) on a 9-point scale, tachypnea (60 breaths/min; reference limits, 20 to 40 breaths/min), muffled heart sounds, and lower than typical bronchovesicular sounds in the right ventral thoracic quadrant. All other physical examination findings were unremarkable. All results of serum biochemical analysis, CBC, and urinalysis were within reference limits. Results of serologic ELISAs for infection with FIV and FeLV and a test for antibody against heartworm were negative.

Three-view thoracic and abdominal radiographs were obtained, and the abnormalities identified consisted of considerable pleural effusion most prominent on the right side and a possible right cranial thoracic mass. Abdominal and thoracic ultrasonography were performed. The abdominal ultrasonogram was unremarkable, and the thoracic ultrasonogram revealed moderate pleural effusion and a cranial mediastinal mass. An ultrasound-guided fine-needle aspirate of the mass was obtained, and results of cytologic analysis were characteristic of a reactive lymph node. Samples of the pleural effusion were obtained via thoracocentesis and submitted for bacterial culture; no microorganisms were recovered. Biochemical analysis of the pleural fluid revealed a high triglycerides concentration (426 mg/dL; reference limits, 25 to 88 mg/dL), compared with the serum triglycerides concentration (54 mg/dL; reference limits, 25 to 88 mg/dL). Results of an echocardiogram were unremarkable. These findings were consistent with a diagnosis of chylothorax.

The owners were worried about their pet and were dedicated to its overall treatment and well-being. They expressed concern that medical management had been ineffective and that continued intermittent thoracocen-

tesis to palliate the clinical signs and the stress associated with that procedure would diminish its quality of life. The owners chose to focus on finding the best treatment option that would provide the greatest chance for long-term resolution of the problem. Surgical procedures performed at the teaching hospital for treatment of chylothorax in cats included thoracic-duct ligation alone and thoracic-duct ligation with concurrent pericardectomy. Cisterna chyli ablation and a second thoracic-duct ligation represented salvage procedures for failed thoracic-duct ligation–pericardectomy.

## **Formulation of the Clinical Question**

The pleural effusion was attributed to idiopathic chylothorax because the primary, definitive cause of the problem had not been identified. Initial medical or surgical management is appropriate in these circumstances. Often, medical management is attempted first because chylothorax may spontaneously resolve in cats. For the cat of this report, failure of medical management to resolve or palliate the clinical signs left surgical intervention as the only remaining option. For the supervising clinician, this meant selecting a surgical option that allowed for the best chance of long-term resolution. To the authors' knowledge, there are multiple methods for the surgical correction of this condition; however, no 1 method has been reported to be more effective than another.

## **Clinical Question**

In a cat with idiopathic chylothorax unresponsive to medical management, does surgical intervention with thoracic-duct ligation–pericardectomy offer any additional benefit for long-term resolution of chylothorax relative to thoracic-duct ligation alone?

## **Evidentiary Search Strategy**

An evidence-based approach to the problem was desired. However, within the confines of a busy clinical setting, an exhaustive literature search and review were prohibitive. Therefore, a concise and targeted bibliographic search was performed through the PubMed database for the most current literature on the clinical question. Search terms included the following: feline chylothorax, cat chylothorax, cat idiopathic chylothorax, and feline idiopathic chylothorax. This short yet efficient literature search revealed several pertinent articles.<sup>1–8</sup> Three were review articles,<sup>1–3</sup> 2 were single case reports,<sup>7,8</sup> 2 involved a retrospective case series study,<sup>4,6</sup> and 1 involved a prospective case series study.<sup>5</sup> Of those 8 studies, 6 had information in abstract form available for review.<sup>1,3–7</sup> Two had no information included in the PubMed citation.<sup>2,8</sup>

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## **Review of the Evidence**

The evidentiary merit of the identified articles was established by use of a simplified version of the evidence-based ranking system for scientific data established by the FDA, which has been used in another study.<sup>9</sup> This ranking system supports a science-based systematic evaluation of the strength of evidence regarding a particular topic. In accordance with the system, the strength of evidence for the types of studies cited in this report would be as follows, from greatest to least: prospective case series, retrospective case series, single case reports, and review articles. Results of systematic reviews would yield the most value; however, none were identified during the literature search.

## **Decision and Outcome**

The report<sup>5</sup> of a prospective case series study was considered to have the most evidentiary merit and was therefore most influential in the decision-making process. The remaining (retrospective) case series reports,<sup>4,6</sup> case reports,<sup>7,8</sup> and review articles<sup>1-3</sup> were also evaluated and considered. Both retrospective case series reports concerned the use of thoracic-duct ligation as the primary surgical intervention, and the success rate for resolution of pleural fluid in affected cats was 20% (n = 15)<sup>4</sup> and 53% (19).<sup>6</sup> In the prospective case series report,<sup>5</sup> which was the most current report with the greatest evidentiary value, thoracic-duct ligation-pericardectomy was performed, and the success rate was 80% (n = 10).

Because of the limited quantity and quality of data available regarding surgical intervention in these cats with idiopathic chylothorax, the senior clinician was unable to glean any conclusive evidence of the superiority of thoracic-duct ligation alone versus with concurrent pericardectomy. However, the report of the prospective case series study,<sup>5</sup> which was the highest-ranking report in terms of evidentiary merit, indicated a considerably higher success rate for thoracic-duct ligation-pericardectomy than the report of the retrospective case series involving thoracic-duct ligation alone. The cat's owners were advised of this information and the attending surgeon's comfort with the 2 procedures, and they chose thoracic-duct ligation-pericardectomy. The procedure was performed without complication, and a thoracostomy tube was placed. A pericardial tissue sample was submitted for histologic assessment and an aerobic-anaerobic bacterial culture.

Immediately after surgery, the cat developed hypoventilation, which resolved after the effects of intraoperatively administered opioids were reversed with naloxone. No supplemental oxygen was necessary; however, the cat was maintained in an oxygen cage as needed on the basis of clinical signs and oxygen saturation. Evacuation of the thoracostomy tube, intrapleural infusion of bupivacaine (1.5 mg/kg [0.68 mg/lb]), and oral administration of buprenorphine (0.005 mg/kg [0.0023 mg/lb]) were performed every 6 hours. Additionally, meloxicam (0.1 mg/kg [0.045 mg/lb]) was administered SC every 24 hours. Approximately 50 mL of serosanguineous fluid was evacuated from the thoracic

cavity within the first 20 hours after surgery. However, no additional fluid was aspirated and the tube was removed approximately 40 hours after surgery. Histologic evaluation of pericardial tissue revealed changes consistent with chronic chylothorax, and no microorganisms were isolated. The cat was discharged from the hospital 48 hours after surgery.

Approximately 2 weeks after surgery, the cat was evaluated at the referring veterinary clinic for surgical site evaluation and suture removal. Thoracic radiographs obtained at that time revealed the accumulation of pleural fluid had resolved. The cat had no clinical signs of pleural effusion 11 months later.

The treatment of idiopathic chylothorax in cats can be challenging. Although an extensive review and careful critique of clinically relevant data regarding any subject are necessary to make informed treatment decisions, the present report provides an example of how the principles of evidence-based medicine, in a targeted approach, can be successfully applied to everyday clinical practice. The search of the PubMed database on the subject of idiopathic chylothorax in cats may have yielded few results, but the available information aided the supervising clinician, who used the available data as well as personal experience to recommend what was believed to be the most effective surgical treatment for the situation.

The literature search in this situation was truncated. A more thorough literature review would have included a broad bibliographic search through multiple online databases, the bibliographies of relevant book sections, and review articles. Furthermore, a literature review restricted to the abstracts of primary reports provides a limited understanding of the details provided in the complete manuscript. This is particularly pertinent when systematic reviews on the subject in question are unavailable, as was the situation for the cat reported here. The primary source of relevant information was acquired from several case series and case reports. In such instances, a full review of the complete manuscripts rather than abstracts alone may be most important. A careful critique could potentially offer additional information regarding individual outcomes and concurrent treatment (medical or surgical) that may be relevant to the situation at hand.

Additionally, it is important to consider that the search terms used excluded dog or canine. Although in the present situation the searched keywords provided adequate literature results specific to cats, this degree of species-specific literature regarding a disease process common to dogs and cats may not always be available. It is also feasible that all species represented within a report may not be designated within the title or associated key words, thereby excluding potentially valuable information. Therefore, future literature searches may warrant the inclusion of terms to include both dogs and cats, when applicable.

Regarding idiopathic chylothorax in cats, subjectively popular consensus at present tends to favor thoracic-duct ligation with or without concurrent pericardectomy as the primary method of surgical treatment. And whereas the brief literature review we performed may have suggested that thoracic-duct ligation-pericardectomy yields the greater likelihood of clinical resolution, a

more thorough and complete literature search on this topic is warranted to make any definitive conclusions. The literature search performed does not provide a sufficient quantity or quality of data to suggest any long-term success or superiority of any 1 surgical technique for the treatment of idiopathic chylothorax in cats. Interestingly, a recent and more thorough evidence-based evaluation of the available literature on this subject yielded similar conclusions.<sup>a</sup>

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