Chylous Effusion in a Cat

Jennifer L. Scruggs, DVM, PhD, Michael M. Fry, DVM, MS, DACVP (Clinical Pathology), & Sophy A. Jesty, DVM, DACVIM (Cardiology, Large Animal)
University of Tennessee

An 11-year-old, castrated, domestic short-haired cat was presented for respiratory distress.

History

The patient was presented to the primary veterinarian in acute respiratory distress. Pleural effusion was noted on imaging, and 220 mL of opaque, milky white fluid (with small lymphocytes on cytology and 3.5 g/dL total protein) was removed via left-side thoracentesis. The top differentials were pyothorax or chylous effusion. The cat was referred to a specialist for further evaluation of suspected chylothorax.

The patient had mild neutrophilia on CBC, tested negative for FIV/FeLV, and was euthyroid.

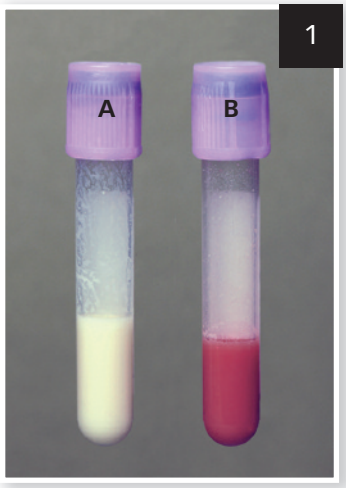
Examination & Diagnostics

On referral two days later, the patient exhibited moderate tachypnea and dyspnea. Auscultation revealed muffled lung sounds, moderate tachycardia, soft heart murmur, and irregular cardiac rhythm. Pleural effusion was confirmed on radiographs, and milky white fluid (250 mL) was removed via an additional thoracentesis (**Figure 1**).

Laboratory Analysis

CBC results showed mild neutrophilia, FIV/FeLV testing was negative, and thyroxine levels were within normal limits. Fluid analysis found markedly higher triglyceride concentration in pleural fluid as compared with serum (see **Table**). On microscopic evaluation, small lymphocytes predominated and lower numbers of vacuolated macrophages and nondegenerate neutrophils were present. The background was light blue to gray and finely vacuolated (**Figures 2** & **3**).

On microscopic evaluation, small lymphocytes predominated.



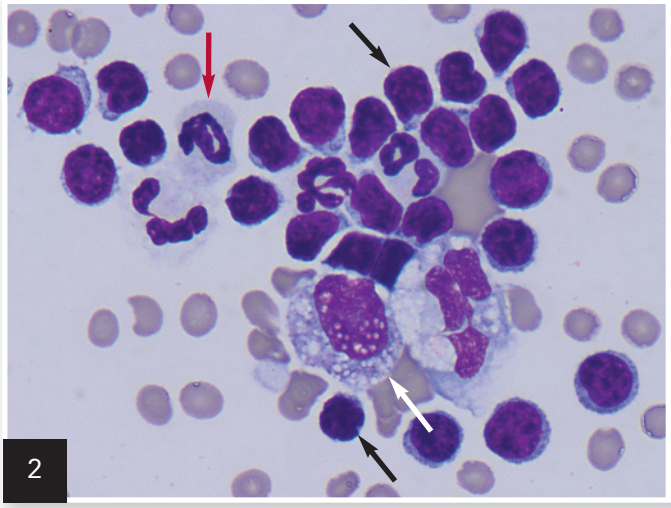
1

Milky white, opaque fluid (A), similar to that obtained from the patient. Vial B contains chyle and evidence of concurrent hemorrhaging.

Table **Effusion Fluid Analysis***

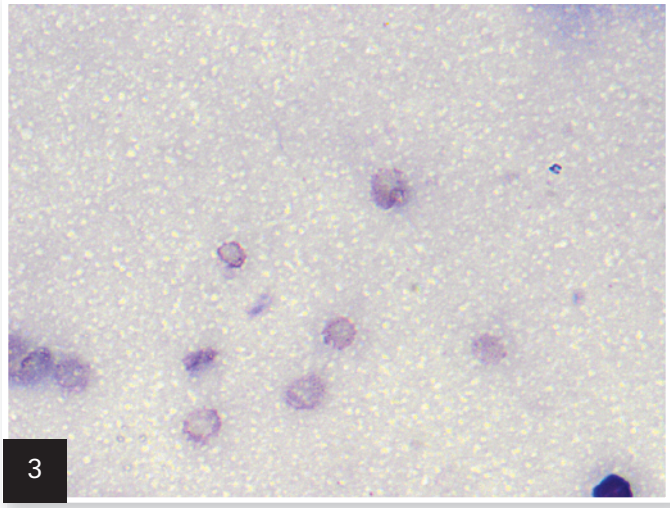
Parameter	*Result*
Color	White, opaque
Protein (g/dL)	3.7
RBCs (per µL)	7000
TNC count (per µL)	5150
Triglycerides, pleural fluid (mg/dL)	1350
Triglycerides, serum (mg/dL)	70

*Chylous effusions typically have higher TNC counts than do transudates (which usually have TNC counts <1000/µL) and are distinguished from most exudates by predominance of small lymphocytes (Figure 2) and high concentration of triglycerides relative to serum or plasma. Protein concentration was obtained via refractometer.



2

Many small lymphocytes (black arrows), fewer neutrophils (red arrow), and rare vacuolated macrophages (white arrow) were present on cytospin preparation. Erythrocytes were noted in the background. (1000× original magnification)



3

Direct smear of the fluid. Fine, faint lipid vacuolation (caused by high triglyceride content) in the background is lost during centrifugation. (1000× original magnification)

Ask Yourself

1. What biochemical test can help distinguish chyle from purulent material?
2. What conditions can cause chylous effusion?
3. What other testing may be warranted?
4. What might interfere with refractometry measurement of protein concentration in the fluid?

TNC = total nucleated cell

MORE ▶

Diagnosis

Chylous effusion secondary to left-sided heart disease

Neutrophilia and lymphopenia were consistent with a stress (corticosteroid) response. Accumulation of lymphocyte-rich fluid in the pleural space may have also contributed to lymphopenia. In one study, lymphopenia was the most common abnormality noted on routine CBC in cats with chylous effusion.[1] In this patient, microscopic and biochemical fluid characteristics were more consistent with chyle than purulent material, despite the presence of inflammatory cells. Chylous effusions often have an inflammatory component. Chyle alone can be an irritant, and the number of neutrophils and macrophages tends to increase with the chronicity of the effusion and (probably) with the frequency of thoracentesis.[2] A triglyceride concentration significantly higher in pleural fluid than in a paired serum or plasma sample strongly supports a diagnosis of chylous effusion.[3]

Additional Results

An ECG revealed marked hypertrophy of the left ventricle and severe left atrial dilation most consistent with hypertrophic cardiomyopathy; atrial premature complexes were also noted, suggesting that the chylous effusion was a manifestation of left-sided congestive heart failure. Cats can develop pleural effusion with left- and right-sided heart failure, as the visceral pleural lymphatics drain into the pulmonary venous circulation.[4] In cases of left-sided heart failure, high pressure in the pulmonary venous system can restrict normal thoracic lymphatic drainage.

Chylous Effusions

Dietary lipids are repackaged by intestinal epithelium or epithelia into triglyceride-rich chylomicrons. Their large size prevents local uptake by capillaries, and the lipid-rich structures enter the lymphatic system instead. Chylomicron-enriched lymph eventually enters the thoracic duct, which anastomoses with the venous system via lymphaticovenous junction(s) cranial to the heart.[5] The high chylomicron content imparts the characteristic opaque, milky white appearance to the fluid, although concurrent hemorrhage can result in pink-tinged effusion (**Figure 2**); hyporexia or anorexia may result in less opaque fluid with lower triglyceride content. The abundant lipid content of chylous effusions can interfere with light refraction, often rendering refractometric assessment of protein content falsely high.[6]

Most feline cases are idiopathic.[1] When a cause can be identified, there is usually direct disruption of or interference with the thoracic duct or an increase in local venous pressure, impairing adequate lymph drainage or flow. Trauma-induced thoracic duct rupture and mediastinal masses (ie, lymphoma, thymoma, granuloma) reportedly cause chylous effusions.[7-10] In addition, heart disease, dirofilariasis, lung lobe torsion, and thrombosis or ligation of the cranial vena cava have been associated with chylous effusions.[11-16] ■ cb

See **Aids & Resources**, back page, for references & suggested reading.

Did You Answer?

1. Comparison of triglyceride concentration in fluid and serum or plasma
2. Thoracic duct trauma, heart disease (left or right sided), other causes of increased lymphatic pressure or permeability; however, cause is seldom identified
3. Echocardiogram, ECG, culture and sensitivity testing of fluid, and heartworm testing
4. High lipid content of fluid