

Management of Pleural Effusion in Six Cats

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Abstract

Six domestic cats that were presented to VCC, CVSc, Rajendranagar, from January to December 2023 with a history and signs of respiratory distress, cough, insomnolence, and weakness were considered for the study. Clinical examination revealed abdominal breathing, dyspnea, and dehydration. On auscultation low intensity respiratory and heart sounds were heard. Chest X-ray indicated a ground-glass appearance in the cranial lung lobe area, and ultrasound revealed anechoic areas in the thorax. Effusion was suspected, leading to ultrasound-guided thoracocentesis which relieved respiratory distress. CT scan was performed in some cases. Comprehensive diagnostics confirmed chylothorax in four cases and pleural effusion in two. The chylothorax cats were managed with rutin for 4 weeks whereas the cats with pleural effusion were managed with the antibiotic amoxicillin-clavulanate for 7 days. The cats were also treated with furosemide for 1 week. Following treatment 5 cats showed recovery from day 6 with improvement in dyspnea and cough, but one cat that was also positive for FIP collapsed after two weeks.

Keywords: Cat, pleural effusion, chylothorax, management

Introduction

Pleural effusion, characterized by an excessive accumulation of fluid within the pleural cavity, can result from multiple causes, such as increased hydrostatic pressure, decreased oncotic pressure, changes in capillary permeability, or lymphatic blockage (Murphy and Papasouliotis, 2011). In cats, pleural effusion commonly occurs due to conditions such as congestive heart failure, feline infectious peritonitis, pyothorax, neoplastic diseases, traumatic injury, and idiopathic chylothorax. Accurate diagnosis is achieved through cytological evaluation, radiography, echocardiography, and computed tomography for tailored prognosis and treatment. This paper describes management of pleural effusion in six cats.

Materials and Methods

Six cats of various breed, gender and age evaluated at the Veterinary Clinical Complex of the College of Veterinary Science, Rajendranagar with a history of respiratory distress were considered for the present study. Each underwent comprehensive physical and clinical examinations, which were followed by diagnostic imaging. Radiography was taken in right lateral and ventrodorsal views. Ultrasound was used to detect pericardial effusions and perform USG-guided

thoracocentesis to relieve fluid. The CT Scan was done to find out the etiology of the effusion. A complete blood picture and serum biochemistry analysis values were calculated. Further, a lateral flow test was also carried out to rule out FIP and FeLV. Thoracocentesis was conducted as per standard method (Gould, 2004). Effusion was collected using a sterile syringe and evaluated for physical, chemical and microscopic parameters. The effusion was also subjected for the Rivalta test (Fischer *et al.*, 2012). All cats were treated with furosemide. Cats with chylothorax (4) cats were managed with Rutin whereas cats with pleural effusion (2) were managed with the antibiotic amoxicillin-clavulanate.

Results and Discussion

Almost all the cats showed respiratory distress, dyspnoea, generalized weakness, inappetence, and weight loss. Two were also showing signs of pale to cyanotic buccal mucosa and reluctance to lie on its lateral side. These findings align with the report by Murphy and Papasouliotis (2011) who identified exercise intolerance, lethargy, weight loss, tachypnea, dyspnea, orthopnea, coughing, pyrexia, and cyanosis. Physical examination revealed increased respiratory effort, abdominal breathing, weight loss, and poor body condition. On auscultation low intensity and muffled heart sounds were observed. Haematobiochemical findings, (Table 1) didn't reveal any significant findings as opined by Davies and Forrester (1996). Lymphopenia

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(<1500/~1) was seen in 59 percent of cats. Lymphopenia was most commonly associated with chylothorax and

was present in 27 percent of cats with chylous effusion according to Davies and Forrester (1996).

Table 1. Haematobiochemistry in cats with pleural effusion		Table 2. Pleural fluid analysis	
Parameter	Mean values (n=6)	Parameter	Mean values (n=6)
Erythrocytes (10 ⁶ /μl)	9.8 (5.4–14.9)	Total Cholesterol (mg/dl)	141.00
Haematocrit (%)	40 (26–49 %)	Triglycerides (mg/dl)	160.00
Leukocytes (10 ³ / μl)	13.1 (7.9–21.0)	Cholesterol-Triglycerides ratio	0.88
ALT (U/L)	30.0 (16.0–68.0)	Albumin (gm/dl)	1.20
AP (U/L)	23.5 (5.0–49.0)	Globulin (gm/dl)	1.30
Bilirubin (mg/dl)	25.7 (18.81- 68.4)	Albumin-Globulin ratio	0.92
Triglycerides (mg/dl)	59.5 (26.46 - 276.066)	Total Protein (gm/dl)	2.50
Cholesterol (mg/dl)	150		
Total protein (g/dl)	7.4 (680 - 900)		
Urea (mg/dl)	55.8 (35.105 - 82.705)		
Albumin (g/dl)	34.9 (21.1–48.1)		
Creatinine (mg/dl)	2.81		
Glucose (mmol/l)	9.7 (6.1–11.2)		

A cat that was found to be positive for Rivalta test and Rapid immunochromatographic lateral flow test for FIP. Fluid collected by thoracocentesis revealed Straw/yellow/ milky white/blood-tinged colored fluid (Fig 1) with volume ranging from 50 ml to 300ml. Results of pleural fluid analysis are given in Table 2. True chyle is characterized by triglyceride

levels greater than serum and cholesterol levels are the same or less than serum. According to this in 4 cases, the fluid was confirmed as chyle. Cytology revealed small mature lymphocytes admixed with occasional Granulomas, seen against plenty of RBC's background (Murphy and Papasouliotis, 2011).



Fig. 1. Thoracocentesis in a chylothorax cat

Blood tinged sero sanguinous fluid

Chyle collected from cats

Radiography revealed loss of lung detail, increased opacity in both the cranial and caudal lobes of the lungs, and fluid obscuring the heart silhouette (Fig 2). The accumulation of excess fluid resulted in the dorsal displacement of both the heart. This is in accordance with (Murphy and Papasouliotis, 2011).

The right parasternal Ultrasound examination revealed an isoechoic structure representing the liver, with the poorly visible diaphragm located above it and notably, an anechoic space was identified cranial to the diaphragm, suggestive of effusion (Fig 3). Free

fluid appears as anechoic regions (displaying as black on ultrasound) and tends to accumulate in dependent areas, forming triangular shapes surrounded by adjacent organs (Boysen and Lisciandro 2013). CT scan revealed the presence of moderate bilateral pleural effusion

accompanied by collapse-consolidation changes in both cranial lung lobes (right greater than left). Further observations revealed lateral and anterior basal segment consolidation in right lower lobe and lingula of left lung (Fig 4).

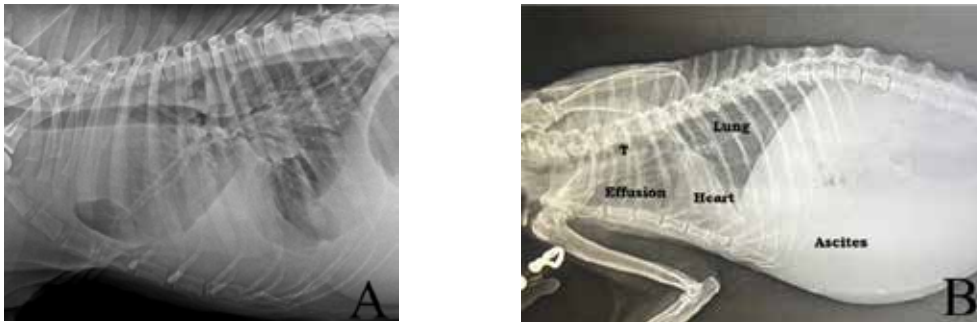


Fig. 2. Lateral thorax X-ray of cat diagnosed with chylothorax showing radio-opaque appearance of cranial thorax suggestive of effusion.



Fig. 3. USG image of chylothorax in cat showing anechoic space in the thoracic area



Fig. 4. CT scan image of chylothorax in cat showing collapse and consolidation changes in right lung lobe

Chylothorax, a condition where chyle accumulates in the pleural space, originates in the intestinal lymphatic system. When chyle production outpaces clearance, increased lymphatic pressure can lead to chylothorax (Davies and Forrester 1996). The treatment of the cat's effusions started with weekly thoracocentesis, where draining a significant amount of pleural fluid helped alleviate the animal's breathing difficulties. Immediate thoracocentesis is recommended to address the sudden increase in oxygen demand as

mentioned by Gould (2004). Oxygen supplementation was given to all the cats. Rutin was given orally at a dose of 50 mg/kg every 8 hours to reduce chyle and fluid leakage. Known for its effectiveness in treating lymphedema in humans, rutin is a bioflavonoid with potential benefits for chylothorax in cats. Rutin achieve full resolution of their effusion within two months of starting treatment (Gould, 2004). Clinical improvement was observed in all the cats except one which was also positive for FIP.

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