Chylos Pleural and Peritoneal Effusion in a Cat with Feline Immunodeficiency Virus ; Diagnosis by Lipoprotein Electrophoresis

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SUMMARY

A five-year-old spayed shorthair cat was evaluated for chylos effusion in the thorax and abdomen. Thoracic and abdominal radiographs revealed large volumes of pleural and peritoneal fluid within a ground glass appearance and obscuration of the abdominal structures. Ultrasonographic examination confirmed the presence of pleural and peritoneal effusion. The diagnosis of chylothorax was confirmed by serum and pleural fluid cholesterol : triglyceride ratios (a ratio of less than 1 ; 120/3403 mg/dL in pleural fluid and 147/570 mg/dL in serum) and lipoprotein electrophoresis with a great increase in proportion of chylomicron to 17.7%. The test for heartworm antigen was negative. The cat was tested for antibodies to FIV and FeLV antigens and was found to be FIV-positive.

There have been many publications describing the effects of feline immunodeficiency virus (FIV) on cats. However to the present authors’ knowledge this is the first report of chylous pleural and peritoneal effusion in a cat with FIV. The aim of the present paper is to describe the clinical signs, diagnosis by lipoprotein electrophoresis and serum lipid studies and therapy.

Keywords : Chylous effusion - Lipoprotein Electrophoresis - FIV - Cat.

Introduction

Chyle is the term that resembles lymphatic fluid arising from the intestine [5]. Chylos effusion is the accumulation of lymph in the thoracic (chylothorax) and/or abdominal cavity (chyloperitonium), respectively.

Underlying causes of chylos effusion may include cardiac disease, mediastinal masses, heartworm disease, trauma, granulomas, congenital thoracic duct abnormalities, biliary cirrhosis, Vitamin E deficiency and diffuse lymphatic disease (lymphangietasia, lymphosarcoma) [2, 4, 5, 6].

Chyloperitonium is an uncommon condition in contrast to chylothorax in cats [4, 6]. However, there are cases with a diagnosis of idiopathic chylos effusion in which a cause is not identified [2, 3]. There have been many publications describing the effects of feline immunodeficiency virus (FIV) on cats. However to the present authors’ knowledge this is the first report of a cat with chylos pleural and peritoneal effusion associated with FIV.

History

A 5- year old spayed female shorthair cat was referred to the University of Ankara, Faculty of Veterinary Department of Internal Medicine for evaluation of inappetance, depression and weakness. According to the owner the cat was predominantly roaming outdoor and had been living with another cat that had died three months ago with unknown cause. Additionally no previous medical condition was reported and vaccination status was unknown.

Clinical examination and laboratory tests

On referral the cat was thin, dehydrated and febrile (rectal temperature : 39.7°C). During the consultation dyspnoea, tachypnoea, respiratory distress and severe abdominal distension were detected (Fig. 1). On thoracic auscultation, bronchovesicular sounds were increased dorsally ; cardiac rhythm was normal with no murmur. Thoracic and abdominal radiographs revealed large volumes of pleural and peritoneal fluid within a ground glass appearance and obscuration of the abdominal structures. Ultrasonographic examination confirmed the presence of pleural (Fig. 2) and peritoneal effusion (Fig. 3). Electrocardiography was unremarkable and the test for heartworm antigen was negative. Thoracic radiography and abdominal ultrasonography performed after fluid removal did not show any abnormality.

RÉSUMÉ

Epanchements péritonéal et pleural chyleux chez un chat FIV positif : Diagnostic par électrophorèse des lipoprotéines. Par M.K. BÖRKÜ, K. URAL, M.Ç. KARAKURUM, E. UZLU et A. BUMIN.

Un chat européen castré âgé de 5 ans a été suivi pour épanchement chyleux thoraco-abdominal. Les radiographies thoraciques et abdominales ont révélé d’importants volumes de liquide transudé dans les cavités pleurale et péritonéale ainsi qu’un obscurcissement des structures abdominales, ce qui a été confirmé par l’examen échographique. Le diagnostic de chylotéorax a été confirmé par les rapports cholestérol/triglycérides dans le sérum et dans le liquide pleural inférieurs à 1 (120/3403mg/dL dans le liquide pleural et 147/570 mg/dL dans le sérum). La recherche antigénique de filaires cardiaques et du virus FeLV s’est révélée négative. La recherche d’anticoagulant anti-FIV était positive.

Les publications décrivant les effets du virus FIV chez le chat sont nombreuses. Cependant, à la connaissance des auteurs, il s’agit de la première description d’épanchements pleural et abdominal chez un chat FIV positif. Le but de cet article est d’en rapporter les symptômes, le diagnostic par électrophorèse des lipoprotéines et l’étude des lipides sériques ainsi que le traitement.

The cat was tested for antibodies to FIV and FeLV antigens by using a commercial test kit (Speed Duo-FeLV-FIV, Bio Veto Test-Diagnostic Veterinaire, Maya Tkn.Chz.Ltd.Sti, Ankara, Turkey) and found to be FIV-positive.

Complete blood count (CBC) abnormalities included a marked leucocytosis (White Blood Cell $36.3 \times 10^3 \, \mu\text{L}$ and macrocytic-hypochromic anaemia (Red blood cell $4.9 \times 10^6$, Mean corpuscular volume $69 \, \text{fL}$, Mean corpuscular haemoglobin concentration $22.5 \, \text{g/dL}$). Bacteriologic cultures from the peritoneal fluid were negative. Thoracocentesis yielded $125 \, \text{ml}$ of milky fluid. The diagnosis of chylothorax was confirmed by serum and pleural fluid cholesterol:triglyceride ratios (a ratio of less than 1 ; $120/3403 \, \text{mg/dL}$ in pleural fluid and $147/570 \, \text{mg/dL}$ in serum) and lipoprotein electrophoresis with a great increase in proportion of chylomicron to $17.7 \%$.

**Treatment and response to therapy**

Initially fluid replacement (intravenous Lactated Ringer’s solution and $5 \%$ dextrose, $120 \, \text{mL/kg body weight, q 24 h}$), antibiotic ($15 \, \text{mg/kg amoxicillin q12 h}$), diuretic ($2 \, \text{mg/kg furosemide q24 h}$) and vitamin E were administered. Conservative therapy included paracentesis 3-day intervals, a low-fat diet, and additionally medium-chain triglyceride supplementation to the diet.

On day 4 the cat had begun to eat on his own and IV fluids were discontinued. Over the next six days a total of $400 \, \text{mL}$ chyle was removed via thoracocentesis. On day 10, blood was withdrawn for serum biochemical analysis that showed no abnormalities. Pleural fluid panel was also submitted, that showed pleural fluid cholesterol : triglyceride ratios (a ratio of less than 1 ; $186.9/1816 \, \text{mg/dL}$) (Table I).

On day 14 the cat was discharged and the owner was instructed to continue conservative management, including a low-fat diet. The cat was still alive at the time of writing with a suspected long-term prognosis.

**Discussion**

Chyle is the term that resembles lymphatic fluid arising from the intestine [5]. Chylothorax or chyloperitoneum, the potentially fatal accumulation of chylous fluid (lymph and
Chylomicron) in the pleural or peritoneal cavity, respectively, has been previously reported in cats [4, 8, 10, 11].

Chylous effusion in cats has been associated with damage to the thoracic duct caused by right-sided heart failure, neoplasia and/or mediastinal masses such as lymphangiosarcoma, granulomas, trauma, congenital thoracic duct anomalies, thoracic/intestinal lymphangiectasia, cranial vena cava thrombi, biliary cirrhosis and vitamin E deficiency associated steatitis [2, 4, 5, 6, 7]. Often an underlying cause is not found and idiopathic chylothorax and chyloperitoneum is diagnosed [10, 11].

The diagnosis of chylous effusion is usually based on gross examination, biochemical analysis (lipid studies in blood serum and effusion; triglyceride and cholesterol levels, and lipoprotein electrophoresis) and cytological examination [3, 7, 12]. In the present case chylothorax was confirmed on the basis of serum and pleural fluid cholesterol : triglyceride ratios. These findings were diagnostic for chyle [4, 5, 10, 11]. In addition lipoprotein electrophoresis was used to detect and confirm chylomicrons, which showed a great increase in proportion of chylomicron to 17.7 % (Table I).

Adult male cats roaming outdoor consist the major risk group for FIV-infected cats. Feline immunodeficiency virus (FIV) is a lymphotrophic lentivirus that is characterized by a long duration of clinical latency with deteriorating immune function. Cats infected with feline immunodeficiency virus may manifest non-specific and opportunistic infections. Histologic findings of the ulcerative stomatitis, one of the most common disease induced by FIV infection in cats, demonstrated an immune response to chronic antigenic stimulation or immune dysregulation. Concurrent infection with FeLV or FIV may contribute to the antigen-antibody complex formation and deposition in the wall of small blood vessels leading to complement fixation, neutrophile chemotaxis, vasculitis and tissue damage induced by feline infectious peritonitis [1].

In a previous case report possible association between feline infectious peritonitis and chyloperitoneum was discussed [9]. In that previous case report chylous effusion was thought to be originated from vasculitis. In this clinical case, the association of chylous effusion and FIV might have been fortuitous.

To the present authors’ knowledge this is the first report of a cat with pleural and peritoneal effusion diagnosed to have feline immunodeficiency virus.

**References**


**Table I. — Serum biochemical and pleural fluid panels.**

<table>
<thead>
<tr>
<th></th>
<th>Serum</th>
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<th>Pleural fluid</th>
<th>Serum reference range</th>
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<td>1.2</td>
<td>0.5-1.5</td>
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<td>7</td>
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