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Case Report / *Olgu Sunumu*

Pericardial Abscess Associated with *Mycoplasma arginini*: A Rare Case from a Cat

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Abstract: A two and half-year-old, mixed breed, male cat was admitted to Burdur Mehmet Akif Ersoy University, Faculty of Veterinary Medicine, Animal Teaching Hospital with respiratory distress and coughing lasting for a month. During the initial examinations of ultrasound and radiography, a pericardial abscess was detected near the right side of the heart and was drained with pericardiocentesis. Percardial biopsy material was screened for the bacterial isolation and identification. Bacteriological methods based on colony morphology, sugar fermentation tests, and molecular confirmation using 16S rRNA-23S rRNA specific primers were performed. Result on conventional and molecular analysis, *Mycoplasma arginini* (*M. arginini*) were detected. The patient was treated with azithromycin and enrofloxacin. Full recovery was observed during follow-up examination after a month. The findings of this case increase awareness of pathogen *M. arginini* in cats and zoonotic importance has been emphasized for pet owners.
Keywords: Cat, *Mycoplasma arginini*, pericardial abscess.

Mycoplasma arginini ile İlişkili Perikardiyal Apse: Kedide Nadir Görülen Bir Olgu

Özet: Bir aydır süren solunum sıkıntısı ve öksürük şikayeti olan 2,5 yaşında, melez erkek bir kedi Burdur Mehmet Akif Ersoy Üniversitesi Veteriner Fakültesi Hayvan Hastanesi'ne getirildi. Ultrason ve radyografi incelemesinde, kalbin sağ tarafında bir perikardiyal abse tespit edildi ve perikardiyosentez ile drene edildi. Perikardiyal biyopsi materyali, bakteriyel izolasyon ve identifikasyon için tarandı. Koloni morfolojisi, şeker fermentasyon testlerine dayalı bakteriyolojik yöntemler ve 16S rRNA-23S rRNA'ya özgü primerler kullanılarak moleküler doğrulama gerçekleştirildi. Konvansiyonel ve moleküler analiz sonucunda *Mycoplasma arginini* (*M. arginini*) tespit edildi. Hasta azitromisin ve enrofloksasin ile tedavi edildi. Bir ay sonraki kontrol muayenesinde tam iyileşme görüldü. Bu vakanın bulguları, kedilerde patojen olan *M. arginini* konusundaki farkındalığımızı arttırmakta ve evcil hayvan sahipleri için zoonotik önemi vurgulanmaktadır.
Anahtar sözcükler: Kedi, *Mycoplasma arginini*, perikardiyal apse.

Mycoplasma species are cell wall-less bacteria that survive on mucosal surfaces where they act as both primary and commensal opportunistic pathogen of the conjunctiva and upper respiratory system in cats (1, 11). Especially *Mycoplasma felis* (*M. felis*), *Mycoplasma gateae* (*M.* gateae), *Mycoplasma arginini* (*M. arginini*), and *Mycoplasma felininutum* (*M. feliminutum*) are regarded as fairly host-specific species that are isolated from the upper respiratory tracts of cats (3, 8, 11, 12).

Since its first description in 1968 (2), *M. arginini* has been recovered from tissues and secretions of various animals such as cattle, camel, sheep and goat (6, 10). *M. arginini* also was implicated in zoonotic transmission, especially for immune-compromised humans (23, 25).

Pericardial diseases are uncommon conditions in cats. Previous studies report that the prevalence of pericardial diseases ranging between %1.0-2.3. Among the pericardial diseases, infectious pericarditis and pericardial abscess are even rarely reported in cats (5, 20).

A two and half-year-old, male castrated mix breed cat, weighing 3.4 kg brought to the Animal Hospital, Burdur Mehmet Akif Ersoy with respiratory complaints

including breathing difficulties and ongoing coughs for a month Multiple courses of antibiotic, i.e. amoxicillin and clavulanic acid (Synulox, Zoetis, 20 mg/kg, SC, BID for 7 days) had been prescribed previously in a private veterinary clinic. However, according to the owner, cat's condition worsened despite the medical treatment and anorexia and lethargy developed.

On physical examination of the cat, it was observed that open mouth, abdominal breathing, sitting in the sternal position were present. Pathological changes in lung sounds were further detected during auscultation. The heart sounds taken from the left side of the patient were clearly heard, while the sound of the heart from the right was muffled and dull. The patient had normothermia (38.7°C), tachycardia (158 / min), and tachypnea (68 / min).

Blood was collected from the cat for hemogram and serum biochemistry. Hematological parameters were identified leukocytosis (27.11 x 10^9/l) with granulocytosis (19.88 x 10^9/l). Other parameters were unremarkable (Table 1). The patient's serum biochemistry values were also normal (Table 2). For further examination, the patient was referred to the relevant units for radiography and echocardiography.

Table 1. Hematological values of the cat before the treatment.

Parameter	Value	Range	Evaluation
White Blood Cell(WBC)	24.11 x 10^9/l	5.5-19.5	High
Lymphocytes (Lym)	5.54 x 10^9/l	1.5-7	Normal
Monocytes (Mon)	1.69 x 10^9/l	0-1.5	Normal
Granulocytes (Gra)	16.88 x 10^9/l	2.5-14	High
Lym%	23.0 %	20-55	Normal
Mon%	7.0 %	1-3	High
Gra%	70.0 %	35-80	Normal
Red Blood Cell (RBC)	10.37 x 10^{12}/l	5-10	High
Hemoglobin (HGB)	11.0 g/dl	8-15	Normal
Haematocrit (HCT)	33.32 %	24-45	Normal
Mean Cell Volume (MCV)	32 fl	39-55	Low
Mean Cell Hemoglobin (MCH)	10.6 pg	12.5-17.5	Low
Mean Cell Hemoglobin Concentration (MCHC)	33.0 gr/dl	30-36	Normal
Red Cell Distribution Width (RDW)	30.7 %	-	
Platelets (PLT)	228 x 10^9/l	300-800	Low
Platelet Crit (PCT)	0.22 %	-	
Mean Platelet Volume (MPV)	9.5 fl	12-17	Low
Platelet Distribution Width (PDW)	28.7 %	-	

Table 2. Serum biochemistry values of cat before the treatment.

Parameter	Value	Range	Evaluation
Blood Urea Nitrogen(BUN)	37 mg/dl	19-34	High
Creatinine(Cre)	0.59 mg/dl	0.9-2.2	Low
Alanine Transaminase (ALT)	90 mg/dl	25-97	Normal
Gamma-Glutamyl Transferase (GGT)	13 u/l	1.8-12	High
Alcaline Phosphatase(ALP)	121 u/l	0-45	High
Glucose(Glu)	123.6 mg/dl	60-120	High
Total Protein(TP)	7.2 mg/dl	6-7.9	Normal
Albumin(Alb)	2.45 g/dl	2.8-3.9	Low
Total Bilirubin(TBil)	0.04 mg/dl	0-0.26	Normal
Calcium(Ca^+)	12.95 mg/dl	9.3-11.2	High
Potasium(K^+)	5.37 mEq/l	3.8-4.5	High

Thoracic ventrodorsal radiography revealed a mass on the right caudal lobe, next to the right ventricle (Figure 1). To evaluate the mass and its effect on the heart, an echocardiography examination was performed. There was no evidence of any kind of myocardial dysfunction due to the abscess's formation is towards to right caudal lobe of the lung (Figure 2). According to the ultrasound examination, the mass had an echoic wall and anechoic area (Figure 3). To confirm the suspicion, it was determined to do a pericardiocentesis. Following aseptic preparation of the right hemithorax, pericardiocentesis was performed under ultrasound guidance. Biopsy material was taken and submitted for microbiological analysis. The bacteriological culture was performed as described (17). Briefly, the abscess swap was streaked on 5% defibrinated sheep blood, Mac Conkey agar, and PPLO agar supplemented mycoplasma G maintained in aerobic conditions at 37°C for 24-48 h and microaerophilic condition at 37°C for 48-72 h respectively. Mycoplasma suspected colonies were examined with stereomicroscopic (20-60x). Molecular identification of isolate was done with 16S rRNA sequence

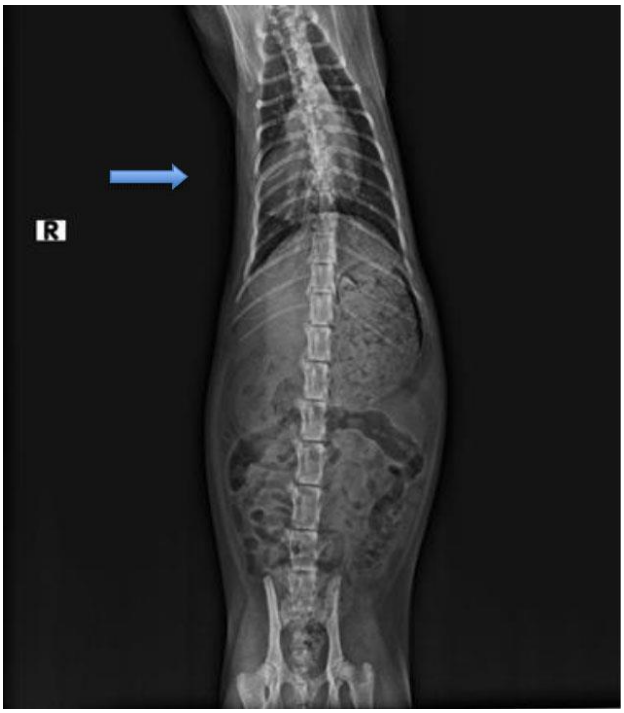

Figure 1. X-ray of the patient's chest.
A mass next to the right ventricle (blue arrow).

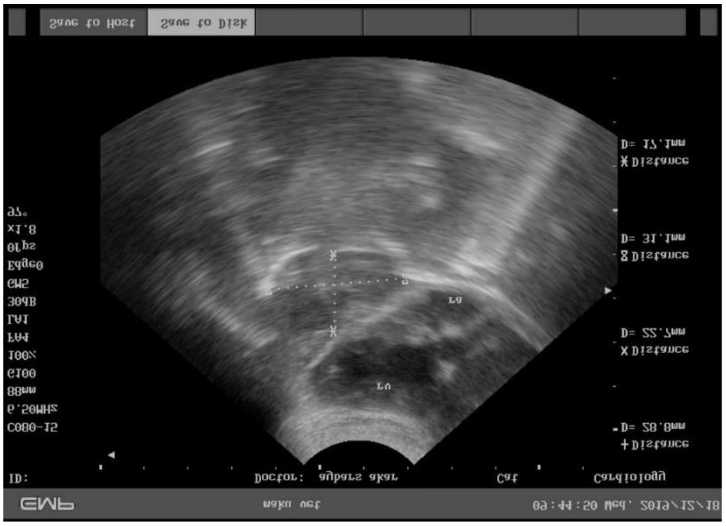

Figure 2. Pericardial mass near the right side of the heart. Left apical four chamber view. ra = right atirum, rv = right ventricle.

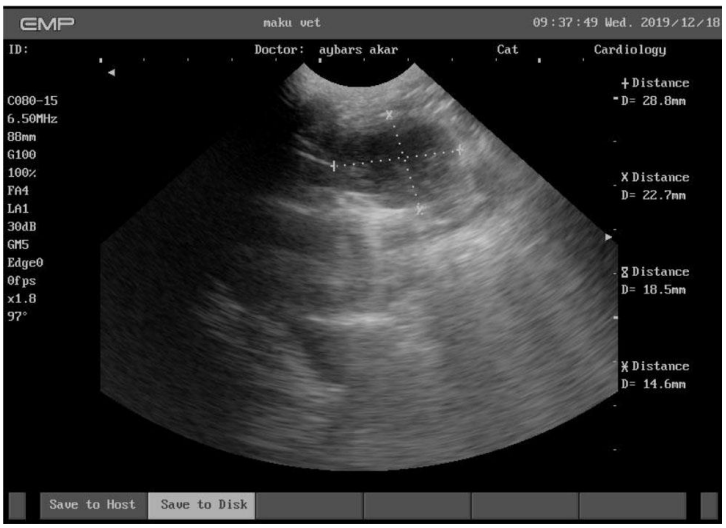

Figure 3. Hyperechoic walls and anechoic area of the mass.

analysis (ABI 3130; Applied Biosystems, USA) using universal primers 27F(5′-AGAGTTTGATCCTGG CTCAG-3'), 1492R(TACGGCTACCTTGTTACGACTT-3') which were used for both amplification and sequencing. Sequences were analyzed in the National Center for Biotechnology Information database using the Basic Local Alignment Search Tool (BLAST).

Analysis of the obtained 16S rRNA gene sequence with BLAST revealed that the isolate had a 98% sequence similarity with *Mycoplasma arginini* strain. The nucleotide sequences obtained in the study were deposited in the NCBI database with the following GenBank accession numbers: MT740481 and MT740482.

Culture of the abscess resulted in isolated of *Mycoplasma* sp. administration of amoxicillin and clavulanic acid had no effect against the infection, it was prescribed azithromycin (10 mg/kg, twice a day, per os, 7 days, Deva Holding, Turkey) and enrofloxacin (2,5 mg/kg, twice a day, subcutaneous, 7 days, Bayer, Germany) without waiting for sequence result. The cat had a complete response to treatment with no recurrence of clinical signs at 1-month post-procedure and continued to improve during the following days. Therefore the owner reported the cat was completely normal at home (Table 3, Table 4).

Table 3. Hematological values of the cat after the treatment.

Parameter	Value	Range	Evaluation
White Blood Cell(WBC)	14.06 x 10^9/l	5.5-19.5	Normal
Lymphocytes (Lym)	4.64 x 10^9/l	1.5-7	Normal
Monocytes (Mon)	0.69 x 10^9/l	0-1.5	Normal
Granulocytes (Gra)	8.74 x 10^9/l	2.5-14	Normal
Lym%	33.0 %	20-55	Normal
Mon%	4.9 %	1-3	High
Gra%	62.1 %	35-80	Normal
Red Blood Cell (RBC)	10.34 x 10^{12}/l	5-10	High
Hemoglobin (HGB)	15.1 g/dl	8-15	High
Haematocrit (HCT)	43.99 %	24-45	Normal
Mean Cell Volume (MCV)	43 fl	39-55	Low
Mean Cell Hemoglobin (MCH)	14.6 pg	12.5-17.5	Low
Mean Cell Hemoglobin Concentration (MCHC)	34.3 gr/dl	30-36	Normal
Red Cell Distribution Width (RDW)	22.4 %	-	
Platelets (PLT)	162 x 10^9/l	300-800	Low
Platelet Crit (PCT)	0.22 %	-	
Mean Platelet Volume (MPV)	13.4 fl	12-17	Normal
Platelet Distribution Width (PDW)	27.3 %	-	

Table 4. Serum biochemistry values of the cat after the treatment.

Parameter	Value	Range	Evaluation
Blood Urea Nitrogen(BUN)	48 mg/dl	19-34	High
Creatinine(Cre)	1.65 mg/dl	0.9-2.2	Normal
Alanine Transaminase (ALT)	30.7 mg/dl	25-97	Normal
Gamma-Glutamyl Transferase (GGT)	5 u/l	1.8-12	Normal
Alcaline Phosphatase(ALP)	34 u/l	0-45	Normal
Glucose(Glu)	83.16 mg/dl	60-120	Normal
Total Protein(TP)	8.02 mg/dl	6-7.9	High
Albumin(Alb)	3.29 g/dl	2.8-3.9	Normal
Total Bilirubin(TBil)	0.24 mg/dl	0-0.26	Normal
Calcium(Ca^+)	11.84 mg/dl	9.3-11.2	High
Potasium(K^+)	4.44 mEq/l	3.8-4.5	Normal

Mycoplasmas can be caused by numerous etiologies that have various clinical presentations and can often present cases associated with conjunctivitis (11, 15), upper respiratory disease (9), bronchial disease (7), and arthritis (14, 26) in cats. However, there is limited knowledge about the characteristics and clinical manifestations of mycoplasmas in domestic animals, such as horses, dogs, and cats (24). To date, pericardial abscess related to *M. arginini* has been an abnormal finding that stated in previous studies (16, 18). However, the mechanism and etiology of *M. arginini* in cats with this disease is complex.

Pericardiocentesis is effective in the management of septic pericarditis and has been reported with idiopathic pericardial effusion cases. Removing pericardial effusion is important from both a diagnostic and a therapeutic standpoint. When cardiac tamponade is diagnosed in such cases, pericardiocentesis should be performed as soon as possible (4, 13, 22). Unsurprisingly in our case, pericardiocentesis appeared necessary and, if not done, it is associated with and poor diagnosis of *M. arginini* and especially prognosis of the diseased cat.

Diagnosing *M. arginini* from cats may not be initially considered by a laboratory. This is because firstly, feline mycoplasmas may not cause enough economic loss or morbidity as other companion animals, secondly routine isolation procedures from cats do not commonly include mycoplasma-specific. Alternatively, mycoplasmas frequently detected from clinically normal cats and respiratory disease' common clinical features may make it difficult to distinguish from several primary pathogens such as feline herpesvirus 1 (FHV-1), feline calicivirus (FCV) (15, 19).

More recent advances in molecular and genetic technologies have been more effective and specific for the characterization of the 16S rRNA gene nucleotide sequence, which has provided a molecular basis for species identification and phylogeny construction of feline mycoplasmas (1, 11, 15, 21). In our case, these techniques have been applied to *Mycoplasma* isolate for the identification of *M. arginini.*

To date, appropriate treatments for *M. arginini* infections have been treated with long-term administration of anti-mycoplasma drugs, including macrolides (23). In the present case, the patient recovered promptly after administration of azithromycin and enrofloxacin treatment without waiting for the sequence result of *Mycoplasma* spp. isolate.

Here we detected for the first time *M. arginini* associated with pericardial abscess in a cat in Turkey. It was concluded that this case raises awareness in selecting the appropriate imaging and sampling for microbiological and molecular diagnosis in the diagnosis of feline mycoplasmosis. The findings of this case increased our understanding of the pathogen *M. arginini* in cats and highlighted its zoonotic importance in particular for pet owners.

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Ethical Statement

This study does not present any ethical concerns.

Conflict of Interest

The authors declared that there is no conflict of interest.

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