

LONG TERM MONITORING OF A CAT WITH IDIOPATHIC MEDIASTINAL CYST

Andreea Cătălina TURCU¹, Radu Andrei BAISAN¹, Eusebiu Ionuț CONDURACHI¹, Vasile VULPE¹

Corresponding author: Andreea Cătălina Turcu catalina.andreea.turcu@gmail.com

Abstract

Mediastinal cysts are previously described as incidental findings in cats. A nine years old, 2.8 kg, Persian cat was presented to out Veterinary Teaching Hospital (VTH) for mild dyspnea. Chest radiographies, revealed an incapsulated soft tissue opacity in the cranial mediastinum. Thoracic lung ultrasonography (LUS), evinced the presence of a cyst-like structure. Furthermore, the cat was subjected to complete cardiological examination and complete blood analysis. Echo-guided drainage followed by cytological examination was carried out in order to reach a definitive diagnostic and to improve the general status of the patient. No other medical treatment has been pursued. Monthly evaluations have been performed during a period of five months, and the drainage was repeated one more time until the complete resolution of the pathology. No signs of relapse have been noticed over a period of two years. Only four cats diagnosed with idiopathic mediastinal cyst have been mentioned in the literature. To the author's best knowledge, this is the first case report which describes the dynamic evolution of an idiopathic mediastinum cyst in Persian cat presented for mild dyspnoea.

Key words: idiopathic mediastinal cyst; cranial mediastinum; dyspnoea; thoracic radiography; lung ultrasonography

INTRODUCTION

A nine years old, 2.8 kg, spayed female Persian cat has been presented to our VTH for asynchronous breathing pattern and tachypnea associated to stressful situations. The clinical signs have been observed by the owner a week prior to presentation. The cat had no history of associated pathologies. At time of presentation, the animal was alert and responsive. Physical examination revealed normal body condition score, normal-colored mucosal membranes and capillary refill time (CRT) less than two seconds, normal findings during palpation of the lymph nodes. The animal presented a respiratory rate (RR) of 42 rpm, heart rate of 220 bpm, oxygen saturation (SpO₂) of 85% and arterial pressure of 181/89 mmHg (SAP/DAP). Pulmonary auscultation revealed absent breath sounds on the cranial half of the thorax and decreased cardiac sounds. Based on the findings, a pleural space occupying lesion has been suspected.

CASE PRESENTATION

Written consent for all the following medical procedures has been obtained from the owners. The first intention procedure was oxygen supplementation administered via nasal cannula.

Lateral (LL) and dorso-ventral thoracic (DV) radiographies have been obtained using the Intermedical Basic 4006 machine equipped with mobile arm using phosphor plates and the X-CR Smart Exam digital system. On the lateral view, an ovoid shape with soft tissue opacity occupied the cranial half of the thoracic cavity. A mass effect affected the tracheal silhouette, which narrowed the angle between the tracheal bifurcation and the thoracic spine. The opacity overlapped the cranial contour of the heart. The area of the tissue opacity assessed on the right LL view was 33.8 cm². The lung parenchyma of the diaphragmatic lobes had a normal radiological aspect (*figure 1*).



Figure 1 – Right LL thoracic radiography, 1st evaluation. Soft tissue opacity creating a mass effect on the trachea and heart

¹ Clinic Departament, Faculty of Veterinary Medicine, University of Life Sciences “Ion Ionescu de la Brad”, Iași, Romania

On the DV view, the right hemithorax appeared occupied entirely by soft tissue opacity, with the heart silhouette displaced towards the left hemithorax (*figure 2*). The maximal measured dimensions of the mediastinal soft tissue opacity mass were 105/53/46 mm.



Figure 2 – DV thoracic radiography, 1st evaluation. Soft tissue opacity occupying the right hemithorax

Subsequently, LUS was performed using the General Electric LOGIQ V5 Expert ultrasound machine (equipped with a microconvex transducer 7.5-10 MHz, linear transducer 6-12 MHz and phased array transducer 4-8 MHz). An ovoid, thin walled, single lumen, anechoic-filled structure localized in the cranial mediastinum has been identified when assessing the right hemithorax, with a maximal diameter measured cranial to the heart base of 5 cm (*figure 3*). No pleural effusion was detected. Computed tomography (CT) was suggested, but owners declined. We consider this a limitation of the study, due to the fact that no CT results correlated to idiopathic mediastinal cyst have been reported.

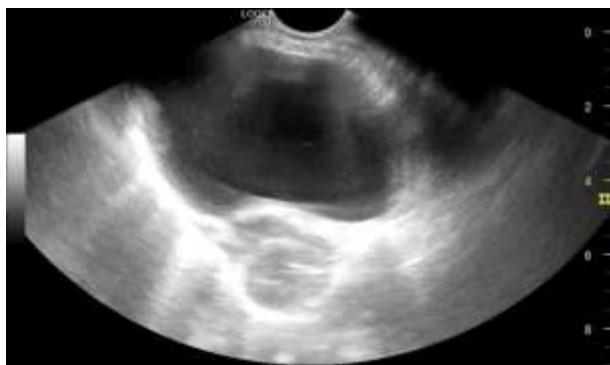


Figure 3 – Initial LUS findings. Anechoic-filled ovoid structure in the cranial mediastinum

Ultrasound-guided drainage was performed using a 5 cc syringe and a 21 G 3/4 inch needle. At the end of the procedure, a residual volume was not removed, observed as an anechoic triangular shape cranial to the base of the heart, with a maximal depth of 2.6 cm. The aspirate obtained sixty milliliters of clear fluid with a specific gravity <1.010, refractive index <1.3360 and no protein contain (*figure 4*). Cytological examination was negative for the presence of cellular contents.



Figure 4 – Macroscopic aspect of the fluid during drainage

After the procedure, the breathing pattern normalized, with a RR of 22 rpm and 98% SpO₂. The oxygen supplementation was stopped, and chest radiographies were repeated. On LL view, a triangular shaped soft tissue opacity was overlapped with the cranial aspect of the heart silhouette, with an area of 7.13 cm². The area of the structure decreased by 78.9% (*figure 5*). The maximal dimensions of the opacity decreased to 37/31/22 mm. No mass effect modified the topography of the trachea and the heart. No signs of reactive thoracic lymph nodes were observed.



Figure 5 – Right LL thoracic radiography, 1st evaluation after aspiration. Decreased area of the soft tissue opacity

A complete cardiological examination revealed normal ECG and normal morphology of the heart. Blood analysis consisting of complete blood count and biochemical blood test were unremarkable. Based on the findings, the definitive diagnosis of idiopathic mediastinal cyst with a good prognosis has been established. No medical treatment was prescribed for the patient, and a reevaluation has been scheduled in 30 days. The owners have been informed about the possibility of

relapse, and were instructed to measure the RR of the cat three times a week, during sleep (Ohad D., 2013).

One month later, the owners described no signs of respiratory effort, absence of exercise intolerance and normal behavior. The physical examination revealed normal colored mucosal membranes and normal CRT, with a RR of 24 rpm and 98% SpO₂. Chest X-ray and LUS were repeated. On the LL view, a triangular shape with soft tissue opacity and an area of 8.77 cm² was overlapped to the cardiac silhouette. On ventro-dorsal view (VD), the mass overlapped the right cranial lung lobe and the right atrium. No mass effect was observed. The maximal dimensions of the cyst were 65/33/18 mm. Therefore, the comparison of the areas assessed on LL view show an increase of 23% (*figure 6*). LUS revealed a minor accumulation of fluid within the cyst, with a maximal depth of 2.85 cm measured cranial to the heart and 0.7 cm between the right atrium and thoracic wall. No other medical procedures have been carried out. A third monthly evaluation has been proposed.



Figure 6 – Right LL thoracic radiography, 2nd evaluation

Thirty days later, the owners reported no changes in behaviour or respiratory pattern. The RR was 28 rpm, with constant 98% SpO₂. Compared to the previous examination, the LL chest X-ray presented a cranial rectangular accumulation of fluid additional to the triangular shape noticed before. No mass effect was detected. The maximal dimensions of the cyst were 78/32/22 mm, with an area of 13.01 cm² (*figure 7*). Therefore, the cyst increased by 82% in comparison to the area assessed after aspiration. LUS findings revealed an increase of maximal depth cranial to the heart to 4.2 cm and between the right atrium and thoracic wall to 1.7 cm. A second ultrasound-guided fine needle aspiration was proposed but the owners declined the intervention.



Figure 7 – Right LL thoracic radiography, 3rd evaluation

The fourth evaluation was carried out next month. The owners reported no signs of dyspnoea, however they subjectively assessed the cat as being less active. The clinical examination was normal, the areal comparison of the cyst dimension (17.32 cm²) revealed a constant progress, with an increase of 142.98% compared to the area after aspiration (*figure 8*). The maximal dimensions of the cyst were 77/41/19 mm, creating a mass effect on the intrathoracic trachea and the heart. Ultrasound-guided fine needle aspiration was performed using the same protocol. A volume of 31 ml have been withdrawn with the same characteristics. Chest X-rays have not been obtained after the centesis.



Figure 8 – Right LL thoracic radiography, 4th evaluation

One month later, during the fifth evaluation no abnormalities have been reported by the owners or noticed during physical examination. Chest X-rays have been performed using DR MAXIVET 400HF machine and the measurements have been obtained using the VXvue System. The maximal dimensions of the cyst were 41/10.2/18.2 mm, with an area of 2.09 cm² on LL view. The triangular soft tissue opacity overlapped the apex of the heart, with no abnormalities detected in the cranial half of the thoracic cavity (*figure 9*). LUS

detected no fluid interposed between the heart and thoracic wall.



Figure 9 – Right LL thoracic radiography, 5th evaluation

The last recheck has been carried out two years after the initial diagnosis. The owners reported a less active lifestyle of the animal, without any discomfort observed. The respiratory pattern was normal, with a FR of 30 rpm and an SpO₂ of 99%. On the lateral chest X-ray no sign of enlargement of the cyst was observed. The maximal dimensions of the cyst were 21/9.5/13.7 mm, with an area of 1.29 cm² (figure 10). Age-related changes were observed such as increased sternal contact of the heart silhouette and ventral displacement of the tracheal bifurcation. On LUS no pathological changes were remarked in the cranial mediastinum. It is important to mention that the body weight remained constant throughout the five months, no lymph node enlargement has been detected during physical examination of imaging procedures and no pleural free fluid has been detected during LUS.



Figure 10 – Right LL thoracic radiography, 6th evaluation

DISCUSSIONS

The physical examination of cats can be challenging due to the fact that on one hand they

have the tendency of hiding signs of acute and chronic pain and on the other hand the physiological signs of acute stress can result in abnormal examination findings in otherwise healthy cats (Quimby J. M., 2011). Such signs include tachycardia, tachypnea, hyperthermia and pupillary dilation. Cats may hyperventilate, breathing both rapidly and deeply, or pant from either stress or disease, creating difficulty differentiating cardiac or respiratory compromise from stress (Horwitz D. F., 2018). This cat expressed tachypnea and asynchronous breathing pattern, the latter being a symptom that is significantly associated with pleural space disease as single localization in both dogs and cats. In cats, this breathing pattern has also been associated with chest wall localization. This breathing pattern consists of inward movement of the abdominal wall during inspiration. Moreover, the association with decreased lung auscultation sounds is highly sensitive (99%) but not very specific (45%) for this localization (Sigrist N. E., 2011). A study focusing on nine cats diagnosed with cranial mediastinal cysts reports that eight of them had no signs of respiratory distress, whereas one expressed respiratory distress possibly correlated to associated pathologies (Zekas L. J., 2002). Another study focused on describing six cats with mediastinal cysts states that a cat with an associate diagnosis of feline infectious peritonitis experienced dyspnoea (Camero C. M., 2019). However, the RR and breathing pattern have not been mentioned for any of the patients. Two studies describe four cats with idiopathic mediastinal cyst, none of whom presented dyspnoea (Zekas L. J., 2002; Reichle J. K., 2000). Therefore, we conclude that due to the fact that respiratory signs are mild, they are easily misinterpreted as stress and might be ignored by owners or unexperienced staff. In our case, the low SpO₂ prior to aspiration correlated to the respiratory pattern were the best indicators of dyspnoea.

The age of the cats diagnosed with mediastinal cyst ranged between 9-17 years. For three of the cats diagnosed with idiopathic mediastinal cyst the signalments were not given (Zekas L. J., 2002), still one case report describes this pathology in a thirteen years old Domestic Shorthair cat (Ellison G. W., 1994).

The radiological examination of the thorax is insufficient in carrying a definitive diagnostic. Tissue and liquid opacities have a similar appearance, therefore the differential diagnostic for such findings localized within the cranial mediastinum should include neoplastic disease, such as lymphoma, thymoma, ectopic thyroid

tissue, heart-based tumors or metastatic neoplasia, or non-neoplastic disease, like abscess, granuloma, benign thymic hyperplasia, haemorrhage or cyst (Camero C. M., 2019).

Thoracic ultrasonography is performed in order to differentiate the abovementioned pathologies. It is a fast and stress-free diagnostic procedure that has been thoroughly described during the last years (Lin C. H., 2020). Uniformly hypoechoic masses have been associated with lymphosarcoma, neuroendocrine tumors, and pulmonary lymphomatoid granulomatosis, in contrast to complex or heterogeneous masses that are associated to mast cell tumor, lymphosarcoma, thymoma, thyroid carcinoma, melanoma and hemorrhage (Reichle J. K., 2000).

Depending on the general status of the animal, fine needle aspiration followed by cytological analysis is the standard procedure that needs to be performed in order to obtain a definitive diagnosis of idiopathic mediastinal cyst and to stabilize the patient. If the cyst has a tendency of recurrence, surgical excision must be considered followed by histological analysis (Rogers K., 1997). However, none of the cases reported in the literature underwent surgical excision. Necropsy findings have been reported in one study, where histological analysis noted that the cyst lining was non-ciliated and resembled mesothelium (Ellison G. W., 1994).

The prognosis for idiopathic mediastinal cyst is excellent (Camero C. M., 2019). However, we recommend serial evaluations, due to the fact that discrete clinical signs might mask the recurrence of the disease. In our case, significant changes were observed four months after the initial assessment, with a peak value for the area of the cyst measured 150 days after the first drainage that required a second centesis. Over the next nineteen months the imagistic evaluation of the cyst marked no changes.

CONCLUSIONS

It is important to consider idiopathic mediastinum cyst in the differential diagnosis for cranial mediastinum pathologies. This pathology is underdiagnosed in veterinary medicine. Considering the fact that in all the reported cases,

including this paper, conservatory procedures were sufficient for long-term management of the patients, the authors suggest thorough investigations when assessing mediastinal changes.

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