

# Mesothelioma – Cytological Studies and Medical Management in a Non-Descript Dog – A Case Report

R.C. Sundararajan.<sup>1\*</sup>, K. Preethi<sup>2</sup>, K. Gopal<sup>3</sup>, D. Vishnugurubaran<sup>4</sup>, V. Vijayanand<sup>5</sup>, M. Balagangatharathilagar<sup>6</sup>

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Mesotheliomas are tumors of low grade malignancy originating from mesothelial cells covering the coelomic cavities such as the pericardium, pleura, peritoneum and vaginal tunic (Seo *et al.*, 2007). The three types of mesotheliomas are epithelial, fibrous (arcomatous) and biphasic (mixed). The epithelial form, which closely resembles the carcinoma and adenocarcinoma, is the most common type of mesothelioma in dogs (Echandi *et al.*, 2007). Pleural effusion is one of the most classical characteristic feature of mesothelioma. They cause minimal tissue invasion and rarely metastasis to other regions (Vural *et al.*, 2007). In addition to viral or genetic factors long term exposure to dusts such as asbestos, iron or silica plays a major role in the pathogenesis of this neoplasm. It is more common in older animals than younger animals (Echandi *et al.*, 2007). The major clinical sign of this condition occurs due to the accumulation of fluid in the body cavities (Seo *et al.*, 2007). The cytological analysis of the fluid helps to determine the cause of pleural effusion and to make rapid diagnosis (Martin *et al.*, 2011). The morphology of the mesothelial cells are round to polygonal in outline, with anisocytosis, anisokaryosis, pleomorphic multi-nucleated cells, minimal eosinophilic or basophilic cytoplasm, mitosis, loose chromatin, evident nucleoli and ovoid to angulated vesicular nucleus (Martin *et al.*, 2011).

## CASE HISTORY AND OBSERVATIONS

A fourteen years old female non-descript dog was presented to Veterinary Clinical Complex, Veterinary College & Research Institute, Tirunelveli, Tamil Nadu with the complaint of respiratory distress and hyporexia for the past one week. The animal was very dull and depressed with wobegone expression. Physical examination revealed dyspnoea, paroxysmal breathing, drooping of head and neck with orthopneic posture. Clinical examination revealed congested conjunctival mucous membrane, temperature of 38.7°C, heart rate of 160 beats/min, respiratory rate (paroxysmal breathing) and sunken eye balls. Thoracic auscultation revealed mild wheezes over the cranio-ventral region of the thorax.

Hematological analysis revealed elevated leucocytes (WBC=36,900/cmm), neutrophilia (N=83%), whereas hemoglobin (Hb=13.2 g/dl), packed cell volume (PCV=43.1%), total erythrocytes count (RBC=6.45 m/cmm), platelets (666,000/cmm) and lymphocytes (17%) were within the

<sup>1,2,5</sup> Department of Veterinary Medicine, Veterinary College and Research Institute, Tamil Nadu Veterinary and Animal Sciences University (TANUVAS), Tirunelveli-627 358, Tamil Nadu

<sup>3</sup>Department of Veterinary Pathology, Veterinary College and Research Institute, Tamil Nadu Veterinary and Animal Sciences University (TANUVAS), Tirunelveli-627 358, Tamil Nadu

<sup>4</sup>Department of Veterinary Surgery and Radiology, Veterinary College and Research Institute, Tamil Nadu Veterinary and Animal Sciences University (TANUVAS), Tirunelveli-627 358, Tamil Nadu

<sup>6</sup>Veterinary Clinical Complex, Veterinary College and Research Institute, Tamil Nadu Veterinary and Animal Sciences University (TANUVAS), Tirunelveli-627 358, Tamil Nadu

**Corresponding Author:** Sundararajan R.C., Department of Veterinary Medicine, Veterinary College and Research Institute, Tamil Nadu Veterinary and Animal Sciences University (TANUVAS), Tirunelveli-627 358, Tamil Nadu, India, e-mail: rcsundararajan@gmail.com

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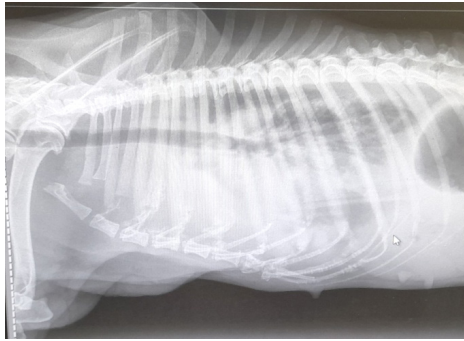
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normal range. Serum biochemical analysis revealed an elevated blood urea nitrogen (BUN = 91.47 mg/dl), reduction in glucose (28 mg/dL), whereas creatinine (1.4 mg/dL), total proteins (5.7 g/dL), albumin (2.9 g/dL), alanine aminotransferase (18 IU/dL), alkaline phosphatase (62 IU/dL), calcium (9.4 mmol/dL), phosphorus (4.8 mmol/dL), triglycerides (226.2 mg/dL), sodium (153.92 mmol/dL) and potassium (5.64 mmol/dL) were within normal range.

Radiological examination revealed presence of fluid filled pleural space (Fig. 1). Thoracic ultrasonography revealed severe pleural effusion (Fig. 2a). Hence, ultrasound guided thoracocentesis was performed. Initially, the animal was placed in lateral recumbency and the site was prepared aseptically using surgical spirit and povidone iodine solution. A 20-gauge winged needle was inserted perpendicular to the chest wall along the cranial aspect at the 7<sup>th</sup> intercostal space (Fig. 2b). Needle thoracocentesis revealed pink coloured serosanguineous fluid (Fig. 3). Cytology of the pleural fluid revealed cluster of large cuboidal to polygonal pleomorphic



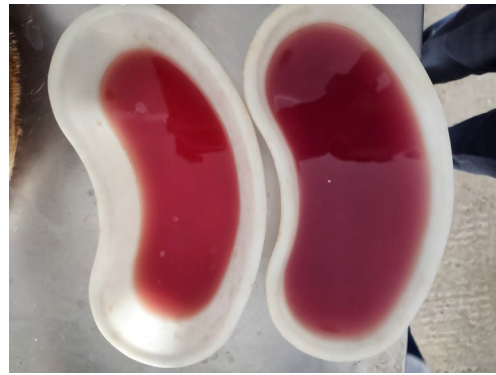
**Fig. 1:** Lateral radiograph revealing severe pleural effusion



**Fig. 2a:** USG showing pleural effusion



**Fig. 2b:** Needle Thoracocentesis



**Fig. 3:** Pleural fluid on day 1



**Fig. 4:** Cluster of large cuboidal to polygonal pleomorphic cells with macrocytosis and anisokaryosis

cells with macrocytosis and anisokaryosis, indicative of mesothelioma (Fig. 4). The cytological analysis of the pleural fluid found to be rapid technique for accurate diagnosis of mesothelioma in certain situations (Martins *et al.*, 2011).

### TREATMENT AND DISCUSSION

Based on the findings of clinical examination, radiological examination, ultrasonography and cytological examination of the pleural fluid, the case was diagnosed as pleural effusion of mesothelial origin. In the present case, the incidence of pleural effusion of mesothelial origin could be attributed to the long term exposure of dusts such as asbestos, iron or silica (Vural *et al.*, 2007). Currently, chemotherapy, radiotherapy

and surgical resection were practised as a treatment option to palliate and slow the progression. In addition, Seo *et al.* (2007) reported that the dogs treated with intrathoracic and intravenous cisplatin or intravenous doxorubicin remained disease free for about 27 months.

As an emergency intervention, pleural evacuation was performed by needle thoracocentesis on the right side (on day 1 & 3) and around 1.1 L & 200 mL of fluid was removed, respectively. Post-procedure, the animal was able to walk properly without respiratory distress. The case was treated with Inj. Ceftriaxone + Tazobactam @ 10 mg/kg b.wt. I/M, Inj. Frusemide @ 3 mg/kg b.wt. I/V, Inj. Flunixin meglumine @ 1.1 mg/kg b.wt. I/M and Inj. Chlorpheniramine maleate @ 0.5

mg/kg b.wt. I/M. Post-treatment, the animal was quite active and was also able to take food and water. This treatment was continued for 3 days and the animal succumbed to death on 4<sup>th</sup> day. The owner was unwilling for the necropsy.

The present case is classified as hemorrhagic pleural effusion evidencing predominant symptoms of dyspnoea, inactivity, crouched sternal posture, with the head and neck extended and the elbows abducted observed in the present case. Open mouth breathing with forceful abdominal efforts during inspiration were also observed by Zoia *et al.* (2018). Thoracocentesis is both a diagnostic and often therapeutic (emergency) procedure to remove pleural air or fluid from the thoracic cavity. The most prominent sign in all dogs with mesothelioma was malignant effusion which has a rapidly progressive clinical course with a grave prognosis which might be due to long term exposure to asbestos, iron or silica dust in industrial settings (Vural *et al.*, 2007).

In the present case, the cytology of the pleural fluid exudates showed mesothelial cells which could be secondary to increased permeability of the pleural surface affected by neoplasia. Moreover, the occurrence of this neoplasm positively correlates with age (Vural *et al.*, 2007). The therapy of pleural effusion consists of maintaining the chest free from fluids and addressing the underlying disease. Radiation therapy, intravenous or intracavitary chemotherapy and pleurodesis were the available supportive therapy. Considering the owners concern, they were not performed. The present case survived only a week after diagnosis which was in concordance with Kang *et al.* (2019), who reported that dogs with a pleural effusion and neoplastic involvement had shorter survival times compared with dogs with non-neoplastic causes.

In conclusion, practical application of diagnostic cytology in the evaluation of effusions is major clinical criteria to guide

the clinician towards determining the underlying etiology and to tailor a more efficacious therapeutic intervention. The most prominent sign in all dogs with mesothelioma was malignant effusion which has a rapidly progressive clinical course with a grave prognosis. Identification of underlying etiology of a pleural effusion is an important factor for determining prognosis especially with a neoplastic aetiology.

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