

Chylothorax in a Non-descript Dog: A Case Report



A Case Report Presented in Partial Fulfilment of the Requirement for
the Degree of
Doctor of Veterinary Medicine (DVM)

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Acknowledgement

The author extends heartfelt appreciation and gratitude to the Almighty Allah, upon whom we rely for sustenance and guidance. It is with great honour that sincere thanks are conveyed to the supervisor, Dr. Abdul Mannan, Deputy Chief Veterinary Officer of Teaching and Training Pet Hospital and Research Center from Chattogram Veterinary and Animal Sciences University (CVASU), for the steadfast guidance, patience, invaluable suggestions, and unwavering encouragement provided throughout this endeavor. Additionally, the author wishes to sincerely thank the esteemed teacher, Professor Dr. A.K.M. Saifuddin, Director of External Affairs, for his insightful counsel and motivational support. Lastly, heartfelt gratitude is extended to the author's parents for their unyielding support and continuous encouragement throughout the study, without which this accomplishment would not have been attainable.

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The Author

November, 2023

Abstract

This case study is focused on the successful treatment of chylothorax in a 3.5-year-old female non descriptive dog which was presented to TTPHRC, CVASU with history of marked dyspnea for last 1 week and subsequent weight loss. A range of diagnostic methods including thoracic radiography, thoracocentesis, pleural fluid analysis and hematological analysis, which allowed confirming the condition through elevated triglyceride and cholesterol levels in the pleural fluid. The treatment plan including thoracocentesis and medications like amoxicillin, dexamethasone, furosemide, and pantoprazole, was administered at specific doses over 14 days. As a result, the dog showed remarkable improvement.

Key word: Dog, Radiography, Thoracocentesis, Pleural fluid.

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1. Introduction

Chylothorax, the accumulation of fatty fluid, chyle within the thoracic cavity and represents a challenging and potentially life-threatening condition in dogs. This condition is relatively more common in dogs than in cats, emphasizing the need for in-depth exploration of its causes and treatment approaches (Reeves et al., 2019). Chylothorax mainly occurred due to granuloma, trauma, congenital abnormalities of the thoracic duct, diaphragmatic hernia, cardiac disease, thoracic surgery and intra-thoracic Neoplasms (Sundaranjan et al., 2022). It is clinically characterized by clinical signs such as pleural effusion, respiratory distress, cough, and weight loss, chylothorax poses a significant medical concern for canine patients.

Definitive diagnosis of chylothorax in dogs typically involves thoracentesis and analysis of pleural fluid, which reveals the characteristic presence of chylous effusion (Vishnurahav et al., 2020). Hematological and serum biochemical tests play a crucial role in the diagnostic process, aiding in the assessment of the patient's overall health and guiding the treatment plan (Hussain et al., 2019). It is important to recognize that the underlying causes of chylothorax can vary widely, ranging from trauma to idiopathic origins, further highlighting the complexity of this condition (Yee et al., 2018).

Chylothorax management in dogs traditionally involves both medical and surgical interventions. However, the lack of comprehensive evidence-based treatment protocols poses a challenge for veterinarians in determining the most effective approach. Generally, a combination of antimicrobial therapy and thoracic drainage is commonly employed. In cases where systemic inflammatory response syndrome or sepsis is present, cardiovascular stabilization through intravenous fluids becomes a critical step to address shock, dehydration, electrolyte imbalances, and acid-base disturbances (Fang, 2015). Administering supplemental oxygen is imperative for patients exhibiting hypoxemia or cardiovascular instability, as it helps ensure adequate tissue oxygenation. The prognosis for dogs diagnosed with chylothorax depends

significantly on the timeliness of diagnosis and the appropriateness of the treatment regimen. With early initiation of proper antibiotic therapy and the efficient evacuation of fluid from the pleural cavity through thoracocentesis, the prognosis can be fair to good (Wong et al., 2022).

The primary objective of this case study is to provide a comprehensive account of the diagnostic and treatment procedures employed in managing chylothorax in dogs. Furthermore, this research aims to investigate the recovery period and outcomes associated with successful treatment of this challenging condition in canine patients.

2. Materials and Methods

2.1 Case history and physical examination

A 3.5 years aged female dog of non-descriptive breed was brought to the Teaching and Training Pet Hospital and Research Center, Chittagong Veterinary and Animal Sciences University (CVASU) due to presenting clinical symptoms of open mouth breathing, tachypnea, and dyspnea. A comprehensive series of clinical examinations were conducted with the primary aim of diagnosing the underlying condition and thoracic auscultation revealed dull lung sound.

2.2 Thoracic radiography

Thoracic radiography, specifically employing lateral view imaging, was employed as part of the diagnostic process and to monitor the patient's condition. This imaging modality allowed for a comprehensive assessment of the thoracic region, aiding in the diagnosis and providing insights into the evolving condition and overall health status of the patient. Thoracic radiography revealed fluid filled pleural space (Figure-3).

2.3 Thoracocentesis

Thoracocentesis, a procedure in the clinical context, was meticulously executed on the patient while positioned in sternal recumbency. This intervention took place at the 7th intercostal in the ventral third of the thoracic cavity space at right side (figure-1). Before intervention the site was prepared aseptically. To enabling the extraction of pleural fluid through the strategic utilization of a 12-milliliter syringe, connected to a fine 23-gauge butterfly needle. The proficiency of this approach resulted in the collection of a substantial 624 milliliters of pleural fluid. Subsequently, an extensive analysis of the pleural fluid was conducted, involving the physical characteristics and chemical characteristics like triglyceride and cholesterol levels, as well as the observation of fluid sedimentation post-centrifugation.

2.4 Hematological and Biochemical analysis:

The analysis of the dog's hematological and biochemical parameters are crucial for understanding the impact of chylothorax on blood composition. For this purposes a total of 5 ml blood were collected from the cephalic vein and transferred to EDTA tube for hematological analysis and Red tube for biochemical analysis.

2.5 Treatment

Amoxicillin (20 mg/kg) was subcutaneously administered (s/c) twice daily (bid) over a 14-day period, in adherence to clinical guidelines (Moxin®, Opsonin Pharmaceuticals Ltd.). This regimen was designed to target and mitigate potential bacterial infections associated with the condition. Dexamethasone Sodium Phosphate (0.3 mg/kg) was administered intramuscularly (i/m) once daily (sid) for an initial 7-day period, following the prescribed regimen (Dexamethasone Sodium Phosphate (Roxadex® Nuvista Pharma Ltd)). Subsequently, the dosage was tapered to 0.15 mg/kg for an additional 7 days, as part of the treatment plan to address inflammation and support the patient's recovery. Furosemide (1 mg/kg) was intramuscularly administered (i/m) twice daily (bid) for 7 days, in accordance with the recommended dosage (Furosemide (Fusid®, Square Pharmaceuticals Ltd.). This diuretic therapy was implemented to effectively manage the accumulation of excess pleural fluid. Pantoprazole (20 mg/kg) was orally administered twice daily (bid) for 7 days, as per the prescribed treatment (Pantoprazole (Pantonix® Incepta Pharmaceuticals Ltd)). This medication was utilized to address potential gastric issues, providing the patient with gastrointestinal comfort during the recovery process. These treatments were selected based on scientific rationale to target specific aspects of the chylothorax condition and promote the overall well-being of the dog.

3. Results

3.1. Pleural fluid analysis:

Pleural fluids are milky white in color (Fig-3) and after centrifugation remaining same and no sediment was observed. Chemical analyses of the fluid revealed triglyceride (410 mg/dl) are higher than the cholesterol (164mg/dl) (Table-1).

3.2. Hematological and biochemical analysis:

Hematological analysis was carried out in animal specific cell counter (OV-560 RET, Balio, France) and results were shown in table-2. All the hematological parameters were within normal except few parameters. Total white blood cell count (WBC) was significantly elevated at 22,800/cumm, exceeding the reference range of 6,000-19,000/cumm. In differential count (DLC) there were found lymphocytosis (58% vs. 20-40%), monocytosis (11% vs. 2-8%) and neutropenia (27% vs 45-75%).

In biochemical analysis we tried to evaluate the liver function test, kidney function test, protein status and lipid profile and found all the parameters were within normal limit (Table-3).

3.3. Treatment outcome:

After 14 days of treatment the dog had significant improvement in clinical signs.

Table 1: Fluid chemical analysis report

Parameters	Results
Triglyceride	410 mg/dL
Cholesterol	164 mg/dL



Figure 1: Pleural fluid collection from the patient



Figur-2: Radiographic image of the patient



Figure 3: Fluid in eppendorf tube after centrifuge



Figure-4: Blood collection

Table 2: Analysis report of haematological parameters

Parameters	Results	Reference value
Hemoglobin (Hb)	17.1 g/dl	12-18.5 g/dl
Red blood cells (RBC)	8.30 m/ul	6-10 m/ul
White blood cells (WBC)	22800/cumm	6000-19000/cumm
HCT/Packed cell volume (PCV)	37.31%	30-45%
Neutrophils	27%	45-75%
Lymphocytes	58%	20-40%
Monocytes	11%	2-8%
Eosinophils	4%	1-4%
Basophils	0%	0-1%
MCV	71.8 fL	60-77 fL
MCH	23.5 pg	19.5-24.2 pg
MCHC	32.7 g/dl	31-36 g/dl
Platelet Count	276000 /cumm	220000-600000 /cumm

Table 3: Biochemical report results

Parameters	Results	Reference value
Total protein	4.7	5.4 –7.5 g/dl
Albumin	2.19	2.7 - 4.4 g/dl
Bilirubin	0.6	0.1 – 0.3 mg/dl
SGPT	69	12 - 118 u/L
SGOT	67	15 - 66 u/L

Alkaline phosphatase	37	5 - 131 u/l
Cholesterol	82.7	92 - 324 mg/dl
Triglyceride	108.9	29 - 291 mg/dl
Creatinine	1.2	0.5 – 1.6 mg/dl
Blood urea nitrogen (BUN)	17	6 – 25 mg/dl

4. Discussion

Effusion due to chylothorax occurs when obstruction of thoracic duct drainage supervenes. In dog chyle is produced and drained by the thoracic duct at the rate of 2-4 ml/kg/hour approximately (Brichard et al., 1995) but in that case total amount of fluid is not measured accordingly. The case is mostly considered idiopathic origin as the exact reason was not identified. Confirmation of the case was determined by measuring and comparing thoracic effusion with serum triglyceride concentration and the pleural fluid cholesterol / triglyceride ratio. The findings of the present study consistent with the findings of Leah et al., 2010 who reported that if the value is less than 1, the fluid is of chylous in nature.

The hematological findings are consistent with chylothorax and align with previously reported cases (Ribeiro et al., 2018). The leukocytosis observed is a typical inflammatory response to chyle accumulation in the pleural cavity, and the alterations in leukocyte populations are indicative of this response (Karpathiou et al., 2022).

In that case we choose medicinal intervention is due to the owner unwillingness for surgical intervention. Hence, thoracocentesis was performed to relieve the respiratory distress by draining the pleural space and reducing the formation of chyle (Eric, 2010).

Conclusion

This case study emphasizes the significance of a multidisciplinary approach in diagnosing and managing chylothorax in dogs. Furthermore, it highlights the value of meticulous data collection and comprehensive analysis in providing effective and evidence-based treatment for this challenging condition. Successful outcomes are attainable with prompt diagnosis, appropriate treatment, and close monitoring, ultimately improving the prognosis and quality of life for canine patients facing chylothorax.

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