

## Clinico pathological studies of Pericardial effusion in fourteen dogs

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### Abstract

Fourteen dogs presented to the Small Animal Outpatient Unit of Madras Veterinary College Teaching Hospital, Chennai, exhibiting clinical signs suggestive of pericardial effusion were subjected to detailed clinical, radiographic, electrocardiographic, ultrasonographic, and echocardiographic evaluations. Pericardiocentesis was performed for diagnostic and therapeutic purposes. Echocardiography proved to be a reliable diagnostic tool for confirmation and monitoring of pericardial effusion. Cytological evaluation aided in differentiation of idiopathic, neoplastic, and inflammatory causes.

**Keywords:** Pericardial effusion, Echocardiography, Pericardiocentesis, Cytology, Dog.

Pericardial effusion in dogs is a clinically significant condition characterized by abnormal accumulation of fluid within the pericardial sac, often leading to cardiac tamponade and impaired hemodynamics. The etiopathological diagnosis relies heavily on pericardial fluid analysis, which provides essential clues regarding underlying disease processes.

Dogs presented to the small animal outpatient unit of Madras Veterinary College Teaching Hospital, Chennai exhibiting dyspnoea, respiratory distress, weight loss, exercise intolerance and abdominal distension were taken up for the study. These dogs were subjected to detailed clinical, haematological and serum biochemical examinations, thoracic radiography, electrocardiography and echocardiography parameters were analysed. Of the fourteen dogs with pericardial effusion, seven dogs (50%) were diagnosed with idiopathic pericardial effusion, five dogs (36%) had neoplastic pericardial effusion, and two dogs (14%) were identified with inflammatory pericarditis. Among the five neoplastic cases, two were diagnosed as lymphoma, two as mesothelioma, and one as aortic body tumor. The common clinical signs observed were inappetence, lethargy, dyspnea, exercise intolerance, ascites, tachycardia, muffled heart sounds,

jugular distension, and pulsus paradoxus. In some cases, cough, pedal oedema, and syncope were noticed. Clinical manifestations noticed in affected dogs in the present agree with descriptions by Wann and Passen (2008) and Case *et al.* (2014), who stated that these signs primarily reflect right-sided cardiac tamponade due to impaired diastolic filling. Mild anemia was observed in some cases whereas all other hematobiochemical parameters were within the normal range.

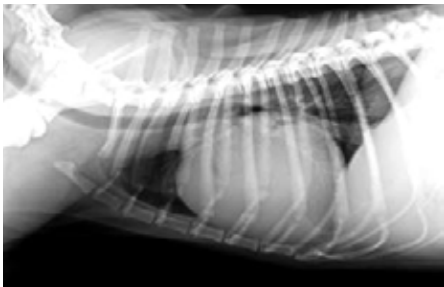
Radiographic examination revealed a globoid cardiac silhouette (**Fig. 1**) and in some cases, pleural effusion was also noticed. Electrocardiography revealed reduced 'R' wave amplitude (**Fig. 2**) and electrical alternans. Abdominal ultrasonography showed ascites, hepatic venous congestion, and marked hepatomegaly without evidence of any specific hepatic pathology (**Fig. 3**). Radiographic findings in the present study, including a globoid cardiac silhouette and concurrent pleural effusion in some dogs, correspond to the observations of Ehrhart *et al.* (2002) and Vicari *et al.* (2001). The electrocardiographic features of low voltage QRS complexes and electrical alternans seen in the present investigation are also in agreement with Cobb *et al.* (1996) and Sidley *et al.* (2002), who reported these changes as typical of pericardial effusion and cardiac tamponade.

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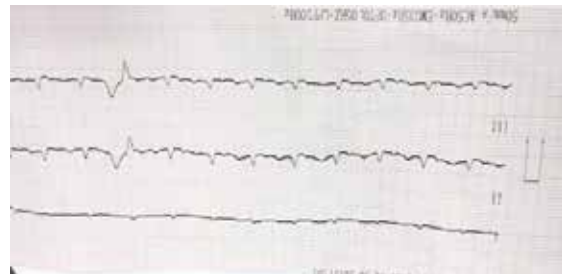
Echocardiographic examination confirmed the presence of pericardial effusion (**Fig. 4**). Echocardiographic M-mode parameters were within the normal range. Pulsed wave tissue doppler imaging at the mitral annulus showed mild to moderate diastolic impairment. (**Fig. 5**). The M-mode and two-dimensional echocardiographic findings of diastolic collapse of the right atrium and ventricle, along with echo-free space surrounding the heart, were consistent with previous reports by Jutkowitz (2008) and Olcott and Sleeper (2010).

In dogs with idiopathic pericardial effusion (n=7), cytological smears showed a mixed population of erythrocytes, macrophages, and reactive mesothelial cells with occasional small lymphocytes (**Fig. 7**). Macrophages frequently exhibited erythrophagocytosis, and mesothelial hyperplasia was evident in some samples, indicating chronic irritation of the pericardium. In cases with lymphoma (n=2), cytology was dominated by large atypical lymphoid cells exhibiting anisocytosis, coarse chromatin, and prominent nucleoli (**Fig. 8**). In mesothelioma (n=2), cytology revealed clusters

of reactive mesothelial cells arranged in papillary aggregates with distinct cell borders and basophilic cytoplasm, along with macrophages and lymphocytes. The inflammatory pericarditis cases (n=2) exhibited a predominance of macrophages and non-degenerate neutrophils, accompanied by a moderate number of reactive mesothelial cells and a few lymphocytes. Bacteriological examination of pericardial fluid samples collected from thirteen dogs revealed no evidence of bacterial organisms, either on direct staining or on culture using suitable media. Cytological examination revealed reactive mesothelial cells and macrophages with erythrophagocytosis in idiopathic effusion, large atypical lymphoid cells in lymphoma cases, and mesothelial clusters in mesothelioma, similar to the findings of Vasilatis and Vernau (2022) and Ojeda et al. (2015). The clinicopathological and imaging findings are consistent with those documented by Shaw and Rush (2007), Olcott and Sleeper (2010) and Vasilatis and Vernau (2022). Early echocardiographic diagnosis and etiological differentiation are essential for prognosis and management.



**Fig.1. Globoid enlarged heart**



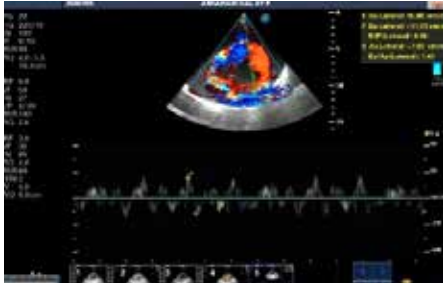
**Fig.2. Reduced 'R' amplitude and sinus tachycardia**



**Fig.3. Hepatic vein congestion and ascites**



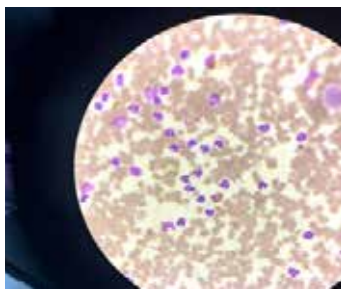
**Fig.4. 2D – Right parasternal long axis view- severe pericardial effusion with right atrial and mild degree of ventricular collapse**



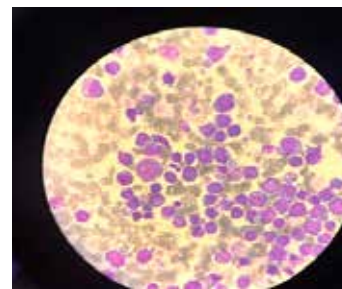
**Fig.5. PW - TDI left parasternal apical view at mitral annulus E/E' – 8.96 moderate diastolic dysfunction**



**Fig.6. Pericardiocentesis**



**Fig.7. Numerous RBC, neutrophils, haemosiderin crystals, few macrophages – Idiopathic pericardial effusion**



**Fig.8. Numerous lymphoblasts /reactive lymphocytes – suggestive of lymphoma**

## References

- Cobb, M.A., MacGregor, J.M. and Dunn, J.K. 1996. Electrocardiographic findings in canine pericardial effusion. *J. Small Anim. Pract.* **37**:12–17.
- Ehrhart, N., Monnet, E., Orton, C. 2002. Outcome after subtotal pericardiectomy for idiopathic pericardial effusion in dogs. *J. Am. Vet. Med. Assoc.* **221**: 1276–1280.
- Jutkowitz, L.A. (2008). Pericardial effusion and cardiac tamponade in the dog and cat. *Vet. Clin. North Am. Small Anim. Pract.* **38**: 709–722.
- Ojeda, J., Marín, L.M., Pérez-Sánchez, S., Bernal, L.J., Fernández del Palacio, M.J. 2015. Clinical findings, diagnosis and treatment of pericardial effusion in dogs: 15 cases (2007–2014). *Vet. Med. (Praha)*.**60**:357–363.
- Olcott, E.W., and Sleeper, M.M. 2010. Pericardial disease in dogs: an update. *Compend. Contin. Educ. Vet.* **32**: E1–E12.
- Shaw, S.P., and Rush, J.E. 2007. Canine pericardial effusion: diagnosis, treatment, and prognosis. *Compend. Contin. Educ. Vet.* **29**: 400–408.
- Sidley, J.A., Kittleson, M.D. and Drobatz K.J. 2002. Electrocardiographic features of pericardial effusion in dogs. *J. Vet. Emerg. Crit. Care.* **12**: 5–12.
- Vasilatis, D. and Vernau, W. 2022. Diagnostic cytology of pericardial effusion in dogs: correlation with clinical and imaging findings. *Vet. Clin. Pathol.* **51**: 210–218.
- Vicari, E.D., Swindle, M.M. and Herring D.S. 2001. Radiographic diagnosis of pericardial effusion and cardiac tamponade in dogs. *Vet. Radiol. Ultrasound*.**42**: 20–26.