CASE REPORT

Management of Pericardial and Pleural Effusion in a Dog with Pericardial Mass

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The pericardium is a hard, fibroelastic sac that encloses the heart, with the ability to stretch appreciably in dogs tormented by pericardial effusion (PE) (Lorell and Braunwald, 1984). PE is characterized with the aid of a bizarre buildup of fluid in the pericardial space, at the same time as small volumes of PE won't produce medical signs and symptoms, will increase in fluid volume and pressure can cause cardiac tamponade. The most common causes of PE in dogs are cardiac neoplasia, right sided heart failure, cardiac rupture, and idiopathic pericarditis and less commonly congenital pericardial disorders, trauma, or infectious origin. Pericardial tumors can make contributions to both pleural and pericardial effusions in dogs (Scollan *et al.,* 2015). Blood analysis might also display mild anaemia and leukocytosis in cases regarding pericardial tumors, in particular haemangiosarcoma (Shaw and Rush 2007).

The common physical findings in dogs with pericardial and pleural effusion encompass Muffled heart sounds, jugular vein distention, tachycardia, abdominal distension, abdominal respiration, poor pulse quality, ascites, dyspnea, and tachypnea (Kladakis *et al,* 2018). In lateral thoracic radiographs, the coronary heart often seems globoid or rounded. PE is now and again mistaken for dilated cardiomyopathy (DCM), and pleural effusion may also be seen on radiographs. Common ECG findings in dogs with PE encompass sinus tachycardia, ventricular arrhythmias, low-voltage QRS complexes, ST phase elevation, and electrical alternans (Guglielmini *et al.*, 2012). Echocardiography is a non-invasive and enormously effective diagnostic tool for detecting even small amounts of PE. The presence of PE itself complements visualization of the masses on the heart, because the fluid acts as a assessment medium (MacGregor *et al.*, 2005). Echocardiography is considered the gold standard well known for diagnosing PE and formulating a therapeutic plan (Shaw and Rush, 2007). Treatment for pericardial and pleural effusion consists of pericardiocentesis and thoracocentesis, respectively, at the side of diuretic remedy. Chemotherapy may be considered in instances of cardiac neoplasia (Shaw and Rush, 2007). This communication reports successful management of pericardial and pleural effusion in a dog with pericardial mass.

Case History and Observations

A 7-year old, male mixed breed dog was presented at Sri Venkateswara Veterinary Super Speciality Hospital, Vishakapatnam (India) with a one week history of severe cough, dyspnoea, exercise intolerance, anorexia, paradoxical respiration. The dog underwent a routine physical and clinical examination. On initial physical examination dog was alert, dyspnoeic, with a heart rate of 132 beats per min, a respiratory rate of 35 per min, and a normal rectal temperature. Auscultation found out muffled heart sounds, constant with pericardial effusion. A complete blood count confirmed moderate anaemia, thrombocytopenia and leukocytosis, even as all other biochemical values were within a normal range. Radiographic examination showed a clear radiolucent fluid surrounding the heart in lateral and ventrodorsal views. The six leads electrocardiography (ECG) showed tachycardia and reduced R-wave amplitude in lead II. The two-dimensional echocardiography revealed an echo-loose space surrounding the heart, giving it a globoid appearance, along with a mass connected to the pericardium near the right atrium (Fig. 1, 2). Pulse-wave Doppler showed a higher late diastolic velocity (A wave) than early diastolic wave (E wave) (Fig. 3), indicating compromised diastolic function. Left ventricular Indices-Fractional shortening (FS), Left ventricular internal diameter at diastole (LVDd) and Left ventricular internal diameter at systole (LVDs) were 42%, 17.1 mm, 9.8 mm, respectively. It was decided to perform thoracocentesis and pericardiocentesis along with diuretic remedy.

Fig. 1: Mass attached to pericardium at the level of right atrium

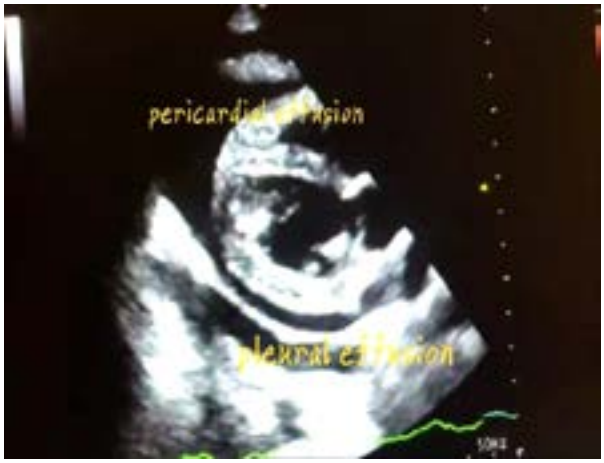

Fig. 2: Pericardial and pleural effusion due to pericardial tumor

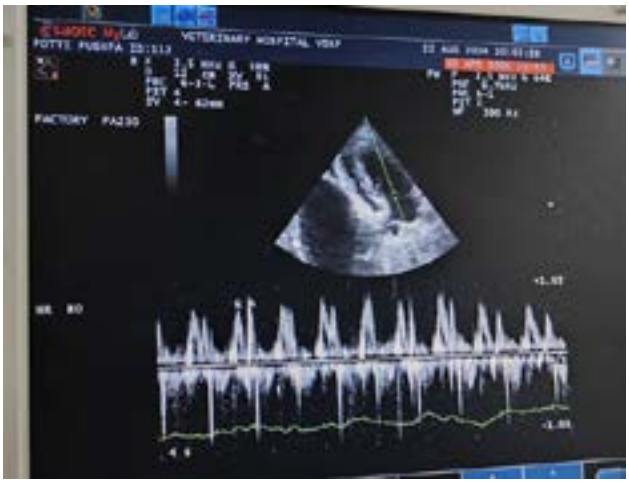

Fig. 3: A wave velocity higher than E wave velocity clearly indicating diastolic dysfunction.

Treatment and Discussion

For thoracocentesis, the patient was restrained in right lateral recumbancy. The site of needle insertion was shaved and aseptically prepared, and 2 % lignocaine was administered at the site of needle insertion. The needle was inserted at the 7th intercostal space next to the cranial surface of the rib to minimize the risk for lacerating the vessels on the rib's caudal border. After insertion, as a whole lot pleural fluid was removed, and ultrasonography was done to test for any residual effusion.

Ultrasound-guided pericardiocentesis was executed with the animal in proper lateral recumbency. Proper restraint was maintained to prevent cardiac puncture, coronary artery laceration, or lung injury. A large area of the right haemithorax from the 3rd rib to the 8th rib was shaved and aseptically prepared and local anesthesia was achieved by administration of 2 % lignocaine hydrochloride. ECG leads were connected as per procedure to monitor the cardiac arrhythmias, while performing pericardiocentesis. The needle was inserted at 4th intercostal space at the costochondral junction. The needle was attached to a three-way stopcock, extension tubing, and syringe. The use of mild suction, most of the pericardial fluid was removed under ultrasound guidance.

Following thoracocentesis and pericardiocentesis, a diuretic (furosemide at 2 mg/kg), an antibiotic (ceftriaxone @ 25 mg/kg), and an analgesic (meloxicam @0.3 mg/kg) were administered. The dog was maintained with furosemide @ 2 mg/kg PO and spironolactone @ 2 mg/kg, PO for 15 days. The dog had been scheduled every 15 days for evaluation. The pericardiocenetesis and thoracocentesis being done on every visit till date, as there is continuous accumulation of both pleural and pericardial effusions due to the mass on the pericardium.

Auscultation in pericardial effusion attenuates coronary heart sounds (Shaw and Rush, 2007). The anaemia and thrombocytopenia is a common paraneoplastic syndrome in dogs affected with benign or malignant tumors (Mates *et al.,* 1995). Radiographic and ECG findings in this case aligned with findings of Vakamudi *et al.* (2017) and Mahendran *et al*. (2021). Following pericardiocentesis and thoracocentesis the left ventricular cardiac indices values were changed to FS at 53% and LVDd at 22.3 mm and LVDs 10.4 mm. After removal of effusion the left ventricular internal diameter was increased at both diastole and systole along with improvement in cardiac function and amelioration of clinical signs, which was similar to the findings of Mahendran *et al.* (2021). Due to continuous accumulation of both pleural and pericardial effusions for presence of a mass on the pericardium the pericardiocenetesis and thoracocentesis were being done on every fortnightly visit till date since last six months.

This case underscores the diagnostic importance of echocardiography for detecting pericardial effusion and

highlights the therapeutic benefits of pericardiocentesis in managing recurrent effusions caused by pericardial masses in dogs.

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