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Short Communication

MANAGEMENT OF ARRHYTHMIA AND MYOCARDIAL INJURY ASSOCIATED WITH BRONCHIAL CONGESTION IN A DOG

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ABSTRACT : A one and half years old male Pug dog was brought to the clinic with symptoms of inappetance, nocturnal coughing and occasional loss of consciousness since last two weeks. The c-arm revealed bronchial congestion and cardiac arrhythmia was detected in the ECG. Analysis of myocardial injury markers *i.e.* CKMB, LDH and SGOT levels in the serum revealed myocardial injury. The dog was treated with antibiotic Doxycycline and a corticosteroid Prednisolone. After seven days of treatment antibiotic and corticosteroid therapy were discontinued. The symptoms gradually disappeared after seven days of treatment and the Electrocardiogram was again recorded which revealed normal cardiac rhythm.

Key words: Bronchial congestion, ECG, Myocardial injury markers, Cardiac arrhythmia, Dog.

Bronchial congestion is the result of the inflammation of the mucus linings of the airways in the lungs. It may be due to many factors including infection, cold or the inhalation of irritants. Cardiac arrhythmia is a condition in which the electrical activity of heart is irregular than normal (Gupta *et al*. 2015). The etiology of cardiac arrhythmia may be of cardiac or non cardiac origin. A case of cardiac arrhythmia and myocardial injury associated with bronchial congestion is reported in the present clinical report.

Case history and observation

A one and half years old male Pug dog weighting 8 kg was presented to the Teaching Veterinary Clinical Complex of College of Veterinary Science And Animal Husbandry, Orissa University of Agriculture and Technology, Bhubaneswar, Odisha with a history of inappetance, nocturnal coughing and had lost consciousness thrice in last two weeks. The dog was restless with signs of respiratory distress from last five days. Clinical examination revealed the rectal temperature of 102.5 ^{o}F and irregular heartbeat on auscultation of heart. The Total Leucocyte Count (TLC) was 15,400 per cu.mm of blood (Neutrophils 64%, Eosinophils 05%, Basophils 0%, Lymphocytes 27%, Monocytes 04%) with total RBC count of 3.83 million per cu.mm. Electrocardiogram and c-arm and myocardial enzymes *viz* serum CKMB (Creatinine Kinase MB Isoenzyme), LDH (Lactate Dehydrogenase) and AST (SGOT- Serum Glutamic-Oxaloacetic Transaminase) were analysed from the serum using modified International Federation of Clinical Chemistry (IFCC) methods. An electrocardiogram (ECG) is the recording of electric potentials generated by the cardiac impulse by placing electrodes on the skin on opposite sides of the heart. C-arm report diagnosed bronchial congestion (Fig. 1).

The electrocardiogram was recorded in the right lateral recumbency position with paper speed of 25 mm/sec and sensitivity of 1 (1 cm=1mv) (Mohapatra *et al.* 2016). Lead II electrocardiogram is taken into study for diagnosis.

Cardiac arrhythmia was extrapolated from the electrocardiogram with irregular interval between QRS complex. The electrocardiogram recording of the dog when presented to the clinic for the first time, on the 4th day of treatment and after recovery is presented in the Fig. 2. Blood was collected from recurrent tarsal vein in a clot activator vial and serum was collected. Electrocardiographic tracings reveal that there is a variation in the heart rate before treatment which narrowed during the progress of the treatment. The heart rate after recovery was found to be 88 beats per minute. The concentration of the respective markers before treatment, on the 4th day of treatment and after recovery is shown in the Table 1.

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Table 1. CKMB, LDH and SGOT values at different stages.

Cardiac marker	Before treatment (U/L)	During treatment (U/L)	After recovery (U/L)	Normal reference values (U/L)
CKMB	188.648	101.990	25.735	20.1 ± 0.14[a]
LDH	459.29	221.98	100.66	88.25 ± 0.56[a]
SGOT	36.66	28.98	20.12	10.00-50.00[b]

[a]Kumar *et al.*(2016), [b]Chakrabarti (2006).

Treatment and discussion

Cardiac arrhythmia was evident from the ECG and report of C-arm revealed severe bronchial congestion. CKMB (Creatinine Kinase MB Isoenzyme), LDH (Lactate Dehydrogenase), SGOT (Serum Glutamic-Oxaloacetic Transaminase) are the markers of myocardial injury (Nigam 2007). So an increased level of serum myocardial enzymes suggested myocardial damage.

Increased pressure on the Right Ventricle due to an increase in pulmonary artery pressure might be the reason behind the myocardial injury (Tai and Huang 2013). The animal was administered Doxycycline @ 10 mg per kg body weight 24 hours orally for a period of 7 days and Prednisolone tablets @ 5 mg per kg body weight for the first four days and @ 2.5 mg per kg body weight for the next 4 days. Multivitamin oral drops were prescribed @1 ml per day during the period of treatment. The irregular spacing between the R waves of the ECG was the diagnostic criteria of cardiac arrhythmia. The TLC value of the dog was much above the normal range of 9000-13000 per cu mm of blood is suggestive for a probable bacterial infection (Reece 2004). Therefore Doxycycline, a broad spectrum antibiotic for bacterial infections of dogs was prescribed and administered. The possible underlying cause of a cardiac arrhythmia can be broadly classified into primary cardiac diseases and non cardiac diseases (Tilley 1992). In a vast majority of situations in which a non-cardiac disease has been found in association with an arrhythmia, treatment directed towards the condition will lead to resolution of the arrhythmia (Martin 2007). Significantly a higher level of CKMB and LDH is the indication of myocardial injury (Bakirel and Gunes 2009). Prednisolone is a corticosteroid that is used in dogs to treat various conditions of inflammation, allergies and certain autoimmune diseases. Several respiratory diseases in dogs, such as chronic bronchitis and eosinophilic bronchopneumopathy (EBP), require the use of chronic anti-inflammatory or even immunosuppressive doses of corticosteroids (Bexfield *et al.* 2006). Therefore irrespective of the cause of the bronchial congestion in this case prednisolone administration has reduced the congestion in the respiratory tract and the dog was out of respiratory distress after five days of medication. Prednisolone also prevents atrial fibrillation promotion by atrial tachycardia remodeling in dogs (Shiroshita-Takeshita *et al.* 2006). The symptoms gradually

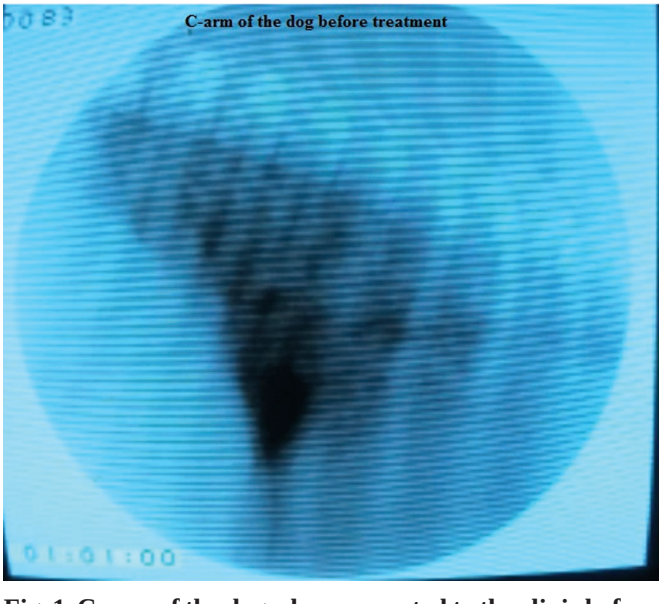

Fig. 1. C-arm of the dog when presented to the clinic before treatment.

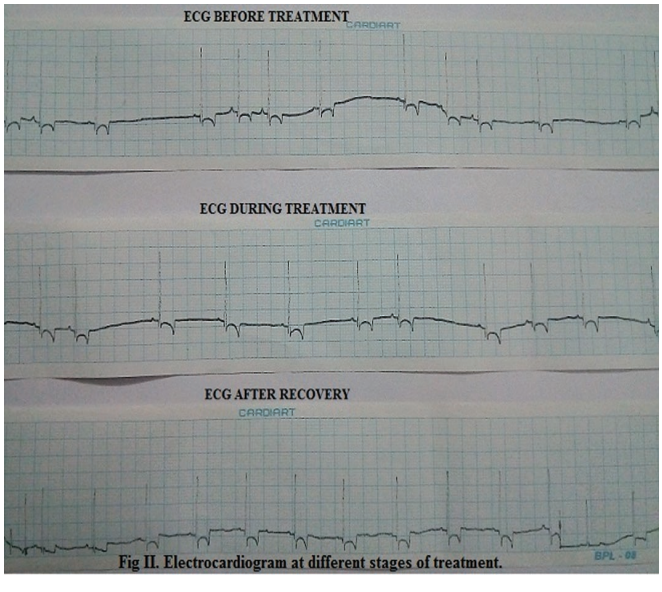

Fig. 2. Lead II Electrocardiogram at different stages of treatment.

disappeared by seven days of treatment. The TLC also dropped down to 11500 per cu. mm of blood. ECG was recorded after recovery and it was found that the normal cardiac rhythm has been restored (Fig. I). In this case a non-cardiac disease has been found in association with cardiac arrhythmia. However, treatment directed towards the same disease led to the resolution of the arrhythmia.

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