OBESITY ASSOCIATED METABOLIC SYNDROME IN A DOG

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Metabolic syndrome in dogs is defined as central obesity and any two of the following three factors such as plasma glucose level ≥ 120 mg/dl, hyperlipidemic condition (triglyceride ≥ 165 mg/dl, total cholesterol ≥ 200 mg/dl, non-esterified fatty acids ≥ 1.5 m/Eq) and alanine aminotransferase activity ≥ 100 IU/L (Kawasumi et al., 2012). Obesity is an important component in metabolic syndrome (Otani, 2011). A dog is said to be obese when its body weight exceeds 15 percent of standard body weight (Laflamme, 1997). Even moderately obese dogs are at greater risk for earlier morbidity (Gossellin et al., 2007). Altered adipokine secretion appears to be an important mechanism for the link between excess bodyweight and many diseases. Obesity is also associated with increased oxidative stress, which also contributes to related disease development (Zoran, 2010).

Materials and methods

A five-year-old male Labrador retriever dog was presented to Teaching Veterinary Clinical Complex, Mannuthy, with the complaint of excess body weight. The owner informed that the animal had a voracious appetite with a feeding schedule of four times a day was followed. The animal weighed using an electronic weighing machine showed 55.5 kg body weight. Body condition score for the animal was eight in nine point scale chart of Laflamme classification. In this case the animal was obese according to body weight and body condition score. Electrical alternans was recorded in ECG (Fig.1). Echocardiography revealed increased thickness of myocardial free wall and left ventricle diameter during systole which indicated that body weight has a positive correlation with the left ventricular dimensions (Fig.2). Serum biochemical analysis (Table-1) showed an increased blood glucose level, hyperlipidemia, increased alanine aminotransferase (128.7 IU/L) and gamma glutamyl transferase activity (7.3 IU/L). Total antioxidant status was measured using ferric reducing antioxidant power assay.

Ferric reducing antioxidant power assay value of serum showed a lower value of 223 µmole/L. The lipid peroxide level was also high (6.03nM/ml). This suggested an oxidative stress. Based on the clinical, biochemical, electrocardiographic and echocardiographic findings, a diagnosis of obesity associated metabolic syndrome was made. Treatment was started with tab. ezetimibe @ 0.1mg/kg for 30 days and the owner was advised not to change the diet and time schedule.

Fig.1: ECG showing Electrical alternans
Table-1 Clinical Biochemistry

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Observed value 0 day</th>
<th>Observed value after 30 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholesterol</td>
<td>383 mg/dl</td>
<td>202 mg/dl</td>
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<tr>
<td>Triglyceride</td>
<td>561 mg/dl</td>
<td>155.5 mg/dl</td>
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<tr>
<td>Blood glucose</td>
<td>153.1 mg/dl</td>
<td>94.61 mg/dl</td>
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</tbody>
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Results and discussion

In this case the animal was obese according to body weight and body condition score. Animal was hyperlipidemic and had an increased glucose and liver enzyme values which confirmed metabolic syndrome. Electrical alternans in the ECG might be due to alterations in electrical conduction through the atria as also reported by Wolf et al. (2000) and left ventricular hypertrophy as also mentioned by Mehlman et al. (2012).

When presented on day 30 after reducing the diets given to dog; the body weight had reduced (Fig.3 and 4). Blood pressure was reduced from 178/97.3 mmHg to 154/94mmHg. An increased arterial pressure with increased weight gain in animals. Except total anti-oxidant value (289 μmole/L) all other serum biochemical values were within normal range after the treatment.

![Fig. 3: 0 day Body weight = 55.5 Kg. BCS =8](image)

![Fig. 4: After treatment 1.1 Kg reduction in body weight](image)

Ezetemibe selectively blocked the intestinal absorption of cholesterol. It inhibited the passage of dietary and biliary cholesterol across the intestinal wall. It effectively reduced the LDL and triglyceride concentration and increased the HDL as also narrated by Kosoglou et al. (2000). It also decreased the super oxide dismutase, which suggested that it reduced the oxidative stress, thereby preventing the generation of free radicals as also mentioned by Pandya et al. (2006).
References