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Successful management of megaoesophagus associated with hypothyroidism in a dog: A case report

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Abstract

A seven-year-old male Dachshund was presented with a history of chronic regurgitation and weight loss for two months. On clinical examination, dry and rough hair coat with alopecia on nose bridge and rat tail appearance were observed. Elevated rectal temperature and increased respiratory rate were noticed. Auscultation of lung field revealed mild crackles. Leucocytosis and mild anaemia were evident on complete blood count. Hypercholesterolaemia, hypertriglyceridaemia and elevation of Lactate dehydrogenase (LDH) and Alkaline phosphatase (ALP) were observed in serum biochemistry. The total T4 (TT4) value was low and canine-specific thyroid stimulating hormone (cTSH) was elevated. Megaoesophagus was confirmed by plain radiography. Barium contrast radiograph revealed generalised dilatation with pooling of barium in the oesophagus. The animal was treated with levothyroxine sodium at 0.02 mg/kg BW PO BID and bethanechol at 10 mg PO TID. Supportive therapy included antibiotics, antacids and antiemetics. Elevated feeding was advised. The animal had no episodes of regurgitation even after one month.

Keywords: *Megaoesophagus, hypothyroidism, bethanechol, elevated feeding*

Megaoesophagus is characterised by the focal or generalised dilatation of the oesophagus leading to regurgitation in dogs. Acquired megaoesophagus may be a result of myasthenia gravis, hypothyroidism or hypoadrenocorticism that inhibits oesophageal peristalsis either by disrupting oesophageal neural pathways or by causing oesophageal muscular dysfunction. Canine endocrinopathy megaoesophagus is relatively uncommon. While hypothyroidism has been suggested as a potential cause, the precise association between the two is not entirely clear (Fracassi and Tamborini, 2011). Hypothyroidism which is characterised by obesity, lethargy, non-pruritic symmetrical truncal alopecia and rat tail appearance, typically does not manifest with gastrointestinal symptoms. However, in some dogs with megaoesophagus, there may be a correlation with hypothyroidism, attributed to hypothyroidism-induced myopathy or neuropathy (Lee *et al*., 2022). Treatment with thyroxine in such cases had shown improvements in oesophageal function (Jaggy *et al*., 1994; Huber *et al*., 2001; Fracassi and Tamborini, 2011; Lee *et al*., 2022).

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A seven-year-old male Dachshund was presented with a history of chronic regurgitation and weight loss. Regurgitation started occurring two months before the presentation. The animal was active and alert. Rectal temperature was elevated (104.2^{0}F) and conjunctival mucous membranes were congested. Dry and rough hair coat with scaling, alopecia on nose bridge and rat tail appearance were observed. The owner reported hypopigmentation of the coat (Fig 1a). The respiratory and heart rates were elevated and mild crackles were observed on auscultation of lung field. Leucocytosis (41.5x10^3/µL; reference range: 6-17x10^3/µL) and mild anaemia (Volume of packed red cells (VPRC) 34.2 % (reference range 35-58 %); Haemoglobin (Hb) 11.1 g/dL (reference range 12-18 g/dL); Total erythrocyte count (TEC) 4.6 x 10^6/µL (reference range 5.1-8.5 x10^6/µL) were evident on complete blood count. Hypercholesterolaemia (273.36 mg/dL; reference range 120-270 mg/dL), hypertriglyceridaemia (123.76 mg/dL; reference range 23-102 mg/dL), elevation of LDH and ALP were observed on serum biochemistry (Table 1). Total T4 (TT4) value was low (0.7 µg/dL; reference range 1.5-4.5 µg/dL) and cTSH level was elevated (0.697 ng/mL; reference range < 0.6 ng/mL). Megaoesophagus was confirmed by plain radiography on a right lateral view. Generalised dilatation of the oesophagus was observed, with food in the cervical oesophagus. The Relative oesophageal diameter (ROD) was found to be 0.62 (Wray and Sparkes, 2006). Aspiration pneumonia was evident as a broncho-interstitial pattern in the middle and caudal lung lobes. Contrast radiograph revealed generalised dilatation of oesophagus with pooling of barium in the oesophagus. Electrocardiography revealed tachycardia with increased T wave amplitude and ST slurring indicating myocardial hypoxia (Fig 2a). The mean electrical axis was +60^0.

The animal was treated with Tab levothyroxine sodium @ 0.02 mg/kg BW PO BID for a month and Tab bethanechol @ 10 mg PO TID for two weeks. Supportive therapy included broad-spectrum antibiotics (amoxicillin-clavulanic acid @ 15 mg/kg BW PO BID), antacids (pantoprazole @ 1 mg/kg BW PO SID) and anti-emetic (ondansetron @ 0.2 mg/kg BW PO BID) for seven days. Elevated feeding of small quantities of calorie-rich meals (slurry consistency) multiple times a day and water feeding as ice cubes was advised. The frequency of regurgitation reduced gradually and no episodes of regurgitation were seen after one month. Radiographic examination revealed a reduction in dilatation of the oesophagus (ROD – 0.43).

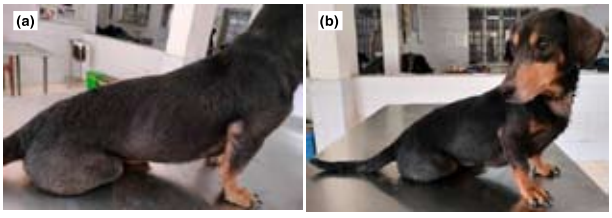

Fig. 1. **(a)** Dry dull haircoat on day 0
(b) Improvement in coat condition after 28 days

Improvement in coat condition was observed and body weight increased from 8.2 kg to 10 kg.

Regurgitation is a common finding in megaoesophagus conditions resulting in aspiration pneumonia, as concurrent laryngeal closure does not occur. This leads to a grave prognosis in the affected dogs with a median survival period of 1-3 months (Mc Bearty *et al*., 2011). Elevated feeding utilises gravity to assist in the passage of food. After feeding, the animal has to be supported in an elevated/upright position for 10-20 minutes to aid in food passage.

Prokinetic agents that act on smooth muscle such as metoclopramide and cisapride are ineffective on the canine oesophagus but instead lead to regurgitation by increasing lower oesophageal sphincter tone and slowing down oesophageal contraction. Whereas, bethanechol generated oesophageal propagating contractions in skeletal muscle by activating cholinergic receptors (Washabau, 2003).

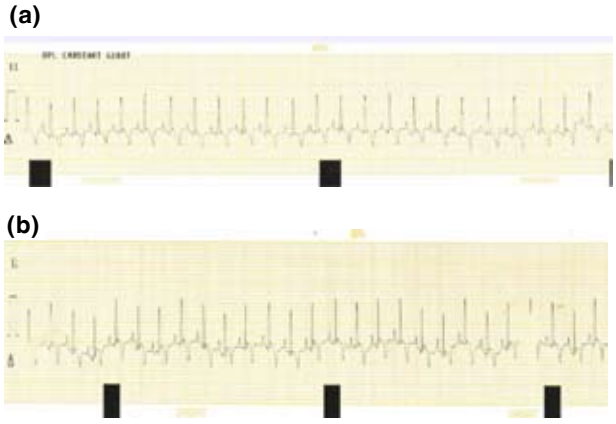

Fig 2. (a). ECG on day 1: Sinus tachycardia with increased T amplitude and ST slurring(bubble) on lead II
(b). Reduced amplitude of T wave on day 28

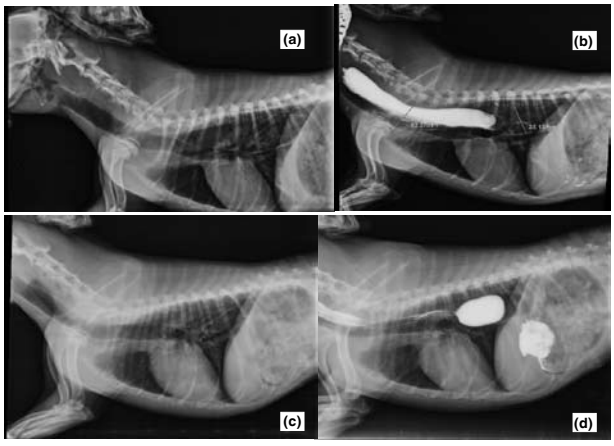

Fig. 3(a) Focal dilatation of cervical and thoracic oesophagus on right lateral projection with relative oesophageal diameter of 0.62 on day 1 **(b)** Contrast radiograph using barium liquid on day 1 **(c)** and **(d)** reduction in dilatation of oesophagus on day 28 (ROD – 0.43).

Table 1. Comparison of haematological, biochemical and hormonal parameters before and after treatment.

Parameter	Reference range	Day 1	Day 28
TLC (10^3/µL)	6-17	41.5	18.3
TEC (10^6/µL)	5.1-8.5	4.6	5.2
VPRC (%)	35-58	34.2	37.5
Hb (g/dL)	12-18	11.1	13.4
TT4 (µg/dL)	1.5-4.5	0.7	2.2
cTSH (ng/mL)	<0.6	0.697	-
Cholesterol(mg/dL)	120-270	273.36	179.7
Triglycerides(mg/dL)	23-102	123.76	104.65
LDH(IU/L)	10-280	496.7	439.3
ALP (IU/L)	7-115	226.31	124.3

Thyroid dysfunction causes neuropathy leading to impairment of nerve impulses consequently resulting in decreased muscle tone (Fors, 2007). The ECG abnormalities observed in dogs with primary hypothyroidism were sinus bradycardia and reduced amplitude of R waves (Kienle *et al*., 1994). Although bradycardia is reported in hypothyroid dogs, tachycardia in the present case can be attributed to aspiration pneumonia and/or anaemia (Kogan *et al*., 2008). In the present case, low TT4 and high cTSH suggest primary hypothyroidism (Gaalova *et al*., 2008).

Summary

In the present case, low TT4 and high cTSH suggest primary hypothyroidism. Total T4 estimation was used as a screening test and estimation of free T4 (TT4) is required for further confirmation of hypothyroidism. Treatment with levothyroxine and supportive prokinetics helped to resolve megaoesophagus and regurgitation leading to an improved quality of life. Megaoesophagus can be successfully managed by early diagnosis, treatment of the cause and appropriate feeding management.

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Conflict of interest

The authors declare no conflict of interest.

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