

## A challenging radiographic diagnosis – extraluminal leiomyoma of the oesophagus in a small-sized dog: a case report

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**ABSTRACT:** An 11-year-old, intact male Maltese dog presented with a history of vomiting and regurgitation. On plain radiographs, a caudodorsal thoracic mass was identified, and there were no radiographic signs frequently associated with an oesophageal mass. An oesophagram with fluoroscopy showed no classical signs of an oesophageal mass such as an irregular mucosal surface, a filling defect, or decreased ability of the lumen to pass contrast medium through the oesophageal lumen. A mass of pulmonary or mediastinal origin rather than of oesophageal origin was suggested. During the operation for mass removal, a gross connection between the suspected mass and the adventitia of the distal oesophagus was identified; thus, excision of the extraluminal mass was performed from the outer oesophageal wall. Histopathology confirmed the mass to be an oesophageal leiomyoma. This case highlights that the differentiation of an extraluminal oesophageal mass from other masses of mediastinal or lung origin can be challenging with radiographs and oesophagram alone. Even when the radiographic signs are not suggestive of an oesophageal mass, an extraluminal oesophageal mass should be considered.

**Keywords:** dog; oesophagus; leiomyoma; oesophagram; mediastinal mass

Oesophageal neoplasia is very rare and accounts for less than 0.5% of all canine and feline cancers (Ridgway and Suter 1979; Trumpatori and White 2011). The clinical signs associated with oesophageal neoplasia are variable but typically include regurgitation, anorexia, salivation, weight loss, dysphagia, and others (North and Banks 2009; Trumpatori and White 2011). The diagnosis of oesophageal neoplasia generally relies on recognition of the associated signs with plain radiography, an oesophagram (with or without fluoroscopy), and endoscopy. Usual laboratory tests are often invaluable, except in the case of *S. lupi*-associated oesophageal cancer (Higginbotham 2009). Plain thoracic radiographs might reveal retained gas within the oesophageal lumen, a mass or oesophageal dilation proximal to the neoplasm, which are classic radiographic signs of an oesophageal mass. Positive

contrast radiography might be more valuable for demonstrating either a stricture or a filling defect within the oesophageal lumen (Higginbotham 2009; North and Banks 2009; Dennis et al. 2010; Trumpatori and White 2010; Withrow 2013). These radiographic tools, however, are not always helpful or diagnostic for an oesophageal mass. The presented case describes the difficulty of diagnosing an oesophageal mass using radiographic tools.

### Case description

An 11-year-old, intact male Maltese dog weighing 1.9 kg was presented to Chonbuk Animal Medical Centre due to regurgitation and salivation which had lasted for three weeks. The episodes of regurgitation occurred immediately after intake of either

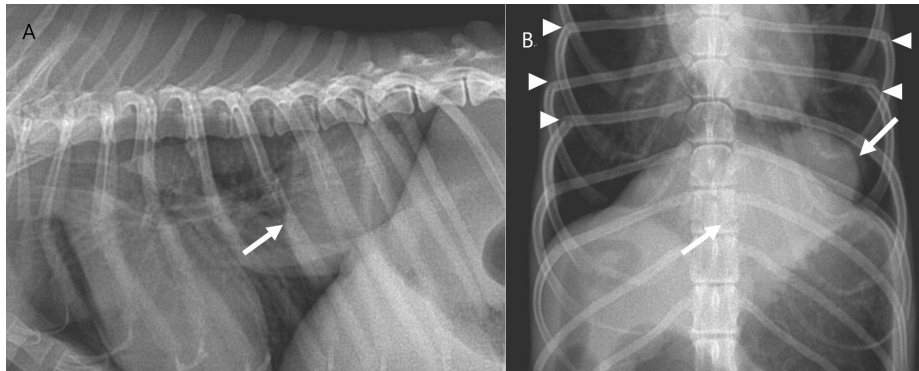


Figure 1. **A:** Right lateral thoracic radiograph. A well-defined, 45mm × 35 mm sized, soft tissue density mass (arrow) in the caudodorsal thoracic region. **B:** Dorsoventral thoracic radiograph. The mass (arrow) was found in the left caudal lung field close to the mid-line of the thorax. Multiple fractures of the bilateral ribs (arrow heads) were seen

dry food or water. There was no history of dietary indiscretion. On physical examination, mild respiratory distress and dehydration were noted. The initial diagnostic evaluation consisted of a complete blood count (CBC), biochemistry profile, and thoracic and abdominal radiographs. The CBC and serum biochemistry values were unremarkable with the exception of mild hypokalaemia, which was attributed to frequent vomiting. On lateral thoracic radiograph, an oval-shaped, well-defined, approximately 45 mm × 35 mm in size, soft tissue density

mass was identified at the level of the seventh to the tenth rib in the caudodorsal mediastinal region (Figure 1). On the ventrodorsal radiograph, multiple fractures of the right fifth through eighth rib and left fifth through ninth rib were seen; in addition, the mass was found in the left caudal lung field close to the mid-line of the thorax. In order to rule out the possibility of a foreign body in the oesophagus and to localize the mass, a barium oesophagram was performed under fluoroscopy, which identified neither obstruction nor a filling defect within the

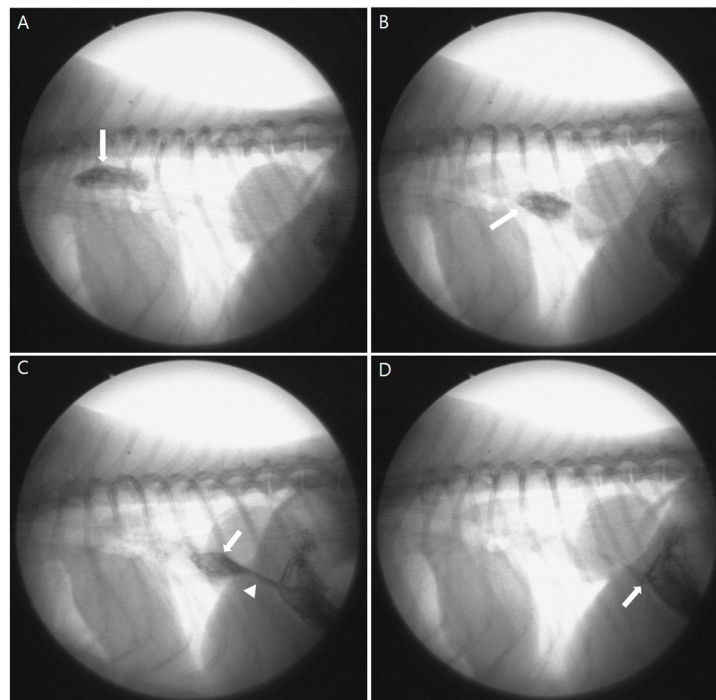


Figure 2. Serial snap images of a fluoroscopic oesophagram. The contrast study found neither an obstruction nor a filling defect within the oesophageal lumen (arrows, **A** to **D**), and there was a narrowing of the distal oesophagus (arrow head, **C**)

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oesophageal lumen. The oesophageal mucosal surface was smooth, and no decreased ability to pass contrast through the oesophageal lumen was identified. Oesophageal motility was normal and the distal oesophagus seemed to be narrowed (Figure 2), but we could not be sure that the narrowed part of the oesophagus was affected by the mass because the location corresponded with the lower oesophageal sphincter which is normally narrow. Based on the radiographic findings, a tumour or cyst originating from either pulmonary or mediastinal structures (other than the oesophagus) was primarily considered; an eccentric oesophageal origin was subsequently suggested. The owner declined further clinical investigations due to economic constraints. A direct surgical approach to identify the exact location of the mass and, if possible, to remove the mass was proposed. A surgical approach was performed through a left-sided eighth and ninth intercostal thoracotomy; during the operation, a gross connection between the suspected mass and the adventitia of the caudal oesophagus was confirmed. Excision of the mass was made from the oesophageal outer wall without difficulty. The mass was submitted in formalin to IDEXX-Laboratories for histopathologic evaluation and was confirmed to be an oesophageal leiomyoma. Fourteen days after the operation, the regurgitation resolved, and the patient was discharged. However, one week later, the dog presented with recurrent regurgitation and vomiting. Although a comprehensive examination was performed, there were no significant findings.

## DISCUSSION AND CONCLUSIONS

Diagnosis and treatment of oesophageal tumours is not simple, and radiography is usually considered to be a valuable tool in the diagnosis of oesophageal neoplasia. Plain thoracic radiographs might reveal oesophageal dilation or retention of gas within the oesophageal lumen proximal to the lesion, which are radiographic signs frequently associated with oesophageal masses (Ridgway and Suter 1979; Withrow 2013).

On contrast radiography, especially fluoroscopy, signs such as mucosal erosion, narrowed lumen size, and a reduced ability to pass contrast through the oesophageal lumen suggest the presence of a mass (Matros et al. 1994; Higginbotham 2009; North and Banks 2009; Dennis et al. 2010). Although a

comprehensive radiographic study was performed, in this case, none of the above radiographic signs was identified. On radiographs neither gas retention nor oesophageal dilation could be observed; in addition, there were no classical signs such as an irregular mucosal surface, filling defect, or disturbance of peristalsis on fluoro-oesophagram. Based on the radiographic findings, the caudodorsal thoracic mass was considered almost irrelevant and to have minimal direct effect on the oesophagus. However, an eccentrically grown oesophageal mass could not be ruled out and was considered to be next on the list of differential diagnoses.

Oesophageal neoplasia is extremely rare in both cats and dogs. The most common types are carcinoma, leiomyosarcoma, fibrosarcoma, and osteosarcoma (Ridgway and Suter 1979; Trumpatori and White 2010). In a retrospective study conducted by Ridgway and Suter (1979), oesophageal tumours were confirmed in eight of 49 229 cases over an 11-year period, and primary neoplasms were diagnosed in only two of the cases. Metastatic invasion of the oesophagus is more common than primary oesophageal neoplasms. The extremely rare occurrence of oesophageal tumours suggests either primarily pulmonary or mediastinal origin rather than oesophageal origin.

Another case study similar to the one described here has been reported (Rollois et al. 2003). On thoracic radiographs, a large caudodorsal thoracic mass was identified in a dog who presented with vomiting and anorexia. The mass was confirmed to be an extraluminal leiomyoma arising from the muscularis mucosa of the oesophageal wall on postmortem examination and was large enough to cause compression of the caudal vena cava and consequently result in passive congestion of the liver. The overall radiographic examination, including fluoroscopy, did not reveal any evidence of an oesophageal mass from a different origin and was not diagnostic of an eccentric oesophageal mass.

In the presented case, despite successful elimination of the mass suspected to be the main cause of regurgitation, the major symptoms of regurgitation and vomiting were not relieved. Digestive clinical signs associated with oesophageal neoplasms such as regurgitation and dysphagia are thought to result from mechanical obstruction of the oesophagus. Rather than oesophageal obstruction, motility disorders should be evaluated as the cause of the symptoms. Particularly in the case of neoplasia originating from the oesophageal muscularis mucosa,

infiltration of tumour cells into the nerve plexus can cause neurological disturbance of the oesophageal musculature, and motility disorders can consequently occur (Ridgway and Suter 1979; Matros et al. 1994; Higginbotham 2009). This can explain the recurrence of regurgitation in the presented case and should be considered for the medical management following oesophageal tumour removal.

Interestingly, bilateral multiple rib fractures were incidentally found with no history of trauma. These rib fractures were presumed to be stress fractures resulting from thoracic bellows associated with regurgitation, although there was a difference in location from the usual sites of stress rib fractures. Variable locations of rib fractures related to thoracic bellows in several cases were reported previously (Hardie et al. 1998), and possibly explained the bilateral multiple rib fractures.

An oesophageal mass can generally be diagnosed based on the striking digestive clinical signs and classical radiographic signs; however, these are not always diagnostic in cases of eccentric oesophageal masses. In this case, the differentiation of an extraluminal oesophageal mass from other mediastinal or lung origins was challenging with radiographs and fluoro-oesophagrams alone. Extraluminal oesophageal neoplastic lesions should be considered in the investigation of canine regurgitation, even when extensive imaging investigation including fluoroscopy is not suggestive of an oesophageal lesion. Therefore, an extraluminal oesophageal mass should be considered in the differential diagnoses. A further cross-sectional study using tools such as computed tomography (CT) or endoscopic ultrasound (EUS) might be necessary for optimal and effective medical treatment.

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