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CASE REPORT

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Esophageal diverticulum in a young feline: anatomopathological characterization

Divertículo esofágico em um felino jovem: caracterização anatomopatológica

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ABSTRACT: Esophageal diverticula are sac-like dilations in the esophageal wall, rare in felines, and classified as congenital or acquired. An 8-month-old male, mongrel cat presented with regurgitation, dysphagia, emesis, and reflux. Radiologic examination revealed a sacculation in the esophageal topography in the cranial portion of the cardiac silhouette. The patient underwent a gastrostomy to place a tube. Subsequently, he underwent esophageal endoscopic surgery, and diverticula of the thoracic esophagus and an underlying stenosis were identified. There was no resistance during the endoscopic passage between the esophagus and stomach, indicating a probable incompetence of the lower esophageal sphincter. The patient died post-surgery and was referred for necropsy. On macroscopic examination, the esophagus presented moderate dilatation in the medial portion, which, on cross-section, was formed by multiple diverticula. Caudal to the diverticula, an area of esophageal stenosis was noted. Microscopically, the esophageal diverticula had mucosa, submucosa, muscular and adventitia, and necro suppurative esophagitis. Thus, the present study aims to report a case of esophageal diverticulum associated with esophageal stenosis in a young feline, characterizing its anatomopathological aspects.

Keywords: esophagus; esophageal stenosis; necropsy.

RESUMO: Os divertículos esofágicos são dilatações em forma de bolsa na parede esofágica, raros em felinos e classificados como congênitos e adquiridos. Um felino, de 8 meses, macho e sem raça definida, apresentou regurgitação, disfagia, êmese e refluxo. O exame radiológico revelou uma saculação em topografia de esôfago na porção cranial à silhueta cardíaca. O paciente realizou uma gastrostomia para colocação de sonda. Posteriormente, foi submetido a cirurgia endoscópica esofágica e foram identificados divertículos do esôfago torácico e uma estenose subjacente. Na passagem endoscópica entre esôfago e estômago não houve resistência, indicando uma provável incompetência do esfíncter esofágico inferior. No pós-cirúrgico veio a óbito e foi encaminhado para necropsia. No exame macroscópico, o esôfago apresentava, na porção medial, uma dilatação moderada que, aos cortes, era constituída por múltiplos divertículos. Caudal aos divertículos, notou-se área de estenose esofágica. Microscopicamente, os divertículos esofágicos possuíam mucosa, submucosa, muscular e adventícia, havia, também, esofagite necrossupurativa. Assim, o presente trabalho tem como objetivo relatar um caso de divertículo esofágico associado à estenose esofágica em um felino jovem caracterizando seus aspectos anatomopatológicos.

Palavras-chave: esôfago; estenose esofágica; necropsia.

INTRODUCTION

Esophageal diverticula are irregular pouches or herniations of the esophageal mucosa through a defect in the muscular layer (Uzal; Plattner; Hostetter, 2016). In dogs and cats, they are rare and classified as congenital or acquired. Acquired diverticula are subdivided into pulsion and traction, according to their pathogenesis. The pulsion is caused by increased luminal pressure and compromise of the esophageal wall, and traction arises from the formation of fibrous adhesions between the esophageal adventitia and adjacent inflamed tissues. They are also divided into false diverticulum, when there is a protrusion of the submucosa and mucosa through a defect in the muscular layer, and true diverticulum when it involves a protrusion of all layers (Fossum, 2014; Lhuillery; Etchepareborde, 2021). Histologically, pulsion diverticula comprise esophageal epithelium and connective tissue, while traction diverticula comprise all esophageal layers (Strombeck; Guilford, 1990).

Traction esophageal diverticula results in chronic inflammation, perforation, or fistulae, while pulsion diverticula occurs due to obstruction, stenosis, or esophageal motility disorders. In the case of stenosis, there is an increase in proximal intraluminal pressure, which may lead to the formation of diverticula due to herniation of the mucosa. In addition, obstruction and food stasis favor inflammation and ulceration, contributing to fibrosis and narrowing of the lumen. This progressive cycle between stenosis and diverticulum may aggravate swallowing difficulties and increase complications, such as perforation and infections (Uzal; Plattner; Hostetter, 2016). This study aims to report the anatomopathological characteristics of an esophageal diverticulum associated with esophageal stenosis in a young feline.

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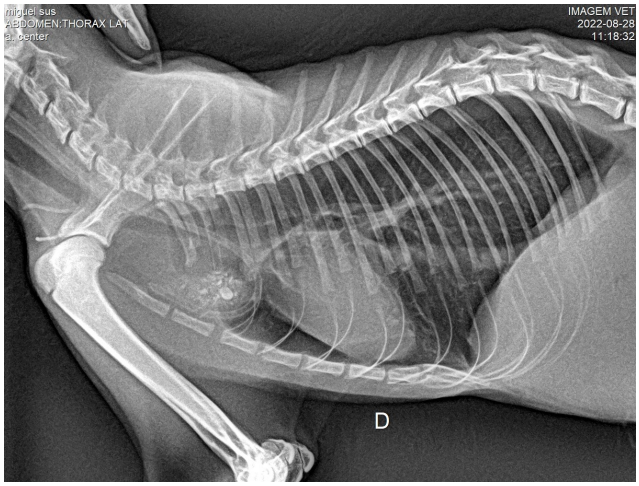
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CASE REPORT

An 8-month-old male, mixed-breed, unneutered feline presented with regurgitation, dysphagia, emesis, and reflux. In the anamnesis, the patient had no previous clinical history since birth, nor any other information available, making it impossible to determine the exact moment of onset of clinical signs. The radiological examination revealed a sacculation in the esophageal topography in the cranial portion of the cardiac silhouette, with heterogeneous content, suggesting a possible esophageal diverticulum (Figure 1). A gastrostomy was performed to place a gastric tube. Afterward, the patient underwent esophageal endoscopy, where diverticula of the thoracic esophagus and an underlying stenosis were identified.

Figure 1 – Radiological examination in an 8-month-old feline patient, presenting sacculation in the esophageal topography in the cranial portion to the cardiac silhouette.



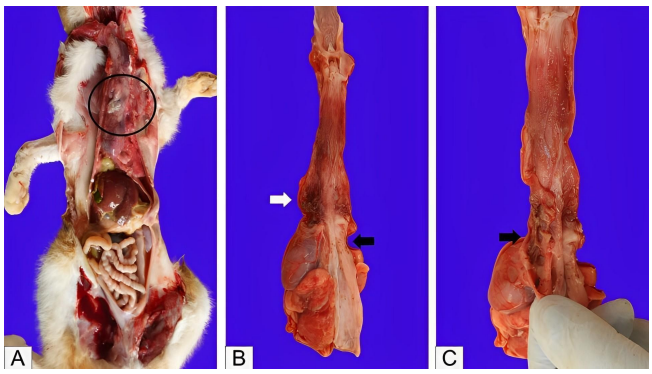
Source: Image provided by the tutor.

There was no resistance during the endoscopic passage between the esophagus and stomach, indicating possible incompetence of the lower esophageal sphincter. During surgery, the patient presented bradycardia, and, therefore, esophageal dilation was not performed. Post-surgery, there was cardiorespiratory arrest and death. Thus, the patient was referred for necropsy.

At necropsy, macroscopically, the feline was in poor physical condition and presented pale oral and ocular mucosa. A suture was observed on the skin in the left lateral abdominal region. There was brownish, friable, and fetid content, consistent with purulent content in the subcutaneous tissue. There was also a suture in the healing process in the retro-umbilical region, the changes possibly resulting from the gastrostomy.

There was moderate hydrothorax and discrete multifocal purulent content in the thoracic cavity. In the medial portion, the esophagus presented moderate dilation, which, on cuts, was constituted by multiple diverticula (Figure 2A). An area of esophageal stenosis was noted (Figure 2B), caudal to the diverticula (Figure 2C). In the trachea and bronchi, there was moderate edema, in addition to the presence of food content. The lung presented a moderately reddish surface and on cuts, there was moderate multifocal edema and discrete multifocal congestion.

Figure 2 – Esophageal diverticula, feline. A) Observation of the viscera "in situ", presence of esophageal dilation (circle). B) Caudal to the diverticula (white arrow), area of esophageal stenosis (black arrow). C) moderate esophageal dilation, on cross-section, consisting of multiple diverticula (black arrow).

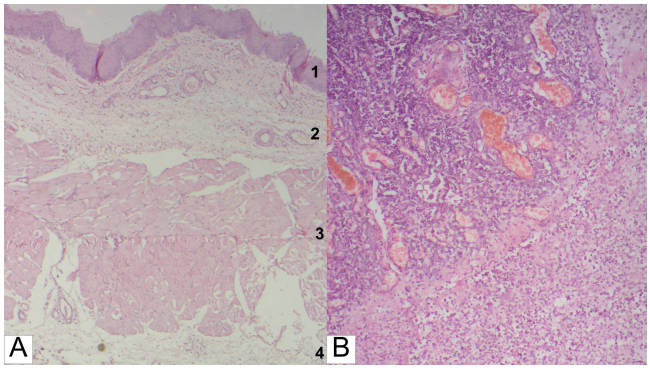


Source: Author's collection.

The abdominal cavity contained moderate brownish fluid, viscera with moderately pale serous membranes, and the presence of surgical fixation of the stomach on the left side of the cavity (with external communication), in addition to a layer of fibrin deposited on the liver surface. The omentum was covered by brownish, fibrinous-like contents. Samples of all organs were collected, fixed in 10% buffered formalin, processed according to conventional histological methods, and stained with hematoxylin and eosin (HE).

Microscopically, the esophageal diverticula consisted of mucosa, submucosa, muscularis, and adventitia (Figure 3, A). There was also moderate to severe chronic multifocal necro suppurative esophagitis, sometimes ulcerative, occasionally with bacterial colonies (Figure 3, B), moderate multifocal granulation tissue, and mild multifocal fibrosis. Edema, congestion, and moderate multifocal hemorrhage between the layers were also observed. The omentum presented chronic diffuse severe suppurative omentitis, sometimes fibrinosuppurative, associated with bacterial colonies, in addition to moderate to severe multifocal congestion and hemorrhage.

Figure 3 – Microscopic image of feline esophagus. A) Esophageal diverticulum, presence of mucosa (1), submucosa (2), muscularis (3) and adventitia (4). B) Esophageal diverticulum, adventitia showing moderate to severe chronic multifocal necrosuppurative esophagitis.



Source: Author's collection.

The lung parenchyma showed mild multifocal mixed interstitial pneumonia, sometimes with bacterial colonies, in addition to mild to moderate multifocal edema, and occasionally the presence of mild amorphous-fibrillar eosinophilic content and intra-alveolar foamy macrophages, suggestive of aspirated content. Mild to moderate multifocal atelectasis, mild multifocal emphysema, and mild multifocal interstitial hemorrhage were also observed. In the skin of the left lateral abdominal region, mild chronic multifocal suppurative superficial and deep dermatitis was observed, sometimes with bacterial colonies and foci of hemorrhagic necrosis. The mesenteric lymph nodes showed moderate chronic multifocal suppurative lymphadenitis. The anatomopathological findings were consistent with esophageal diverticula secondary to esophageal stenosis, necrosuppurative esophagitis, and chronic suppurative peritonitis.

DISCUSSION

Esophageal diverticula are pouch-shaped dilations in the esophageal wall that rarely affect dogs and cats. Congenital diverticula can be attributed to congenital malformations, such as the absence of segments of the muscular lamina during fetal development, which causes dilation of the esophageal wall, resulting in herniation of the mucosa (Theochari *et al*., 2017).

Furthermore, congenital esophageal diverticula are usually located in the thoracic esophagus and associated with a broncho-esophageal fistula. This type of fistula results from an incomplete separation of the esophagus from the respiratory tract during embryological development, leading to a persistent fixation between them. Histopathology usually shows continuity between the esophageal and respiratory epithelia and an absence of inflammation in the tissue surrounding the fistula (Basher *et al*., 1991; Lhuillery; Etchepareborde, 2021). Although this lesion was not observed in the microscopy of the present study, since the feline is young and there is no clinical data on its birth, the possibility of congenital origin is considered.

In contrast, megaesophagus, esophageal stenosis, foreign body, hiatal hernia, and vascular ring anomalies are cited as possible causes of acquired diverticula (Börkü *et al*., 2009; Oliveira *et al*., 2018). Lower esophageal sphincter incompetence can lead to reflux of gastric juice and bile acids into the esophagus, causing chemical aggression to the mucosa and resulting in esophagitis. Over time, chronic inflammation can progress to esophageal stenosis, which may explain the association between these lesions observed in this patient. In small animal medicine, primary lower esophageal sphincter incompetence is still poorly understood. However, it is known that several preanesthetic agents can reduce lower esophageal sphincter pressure, predisposing to reflux during anesthesia. However, in the patient's history, there is no evidence of pre-anesthetic procedures that may have contributed to this condition (Benvenho *et al*., 2007; Kook, 2021).

In this report, the abnormality of the lower esophageal sphincter cannot be confirmed by the patient's clinical and anatomopathological evaluation. Therefore, it is also considered that esophagitis and stenosis may have developed after sacculation, due to stagnation of the contents at the site. Therefore, due to the lack of additional information, the classification of this diverticulum as acquired (traction or pulsion) or congenital cannot be made clear. According to its histogenesis, it is considered a true diverticulum, since its histology confirms the presence of all layers of the esophageal wall (Han; Broussard; Baer, 2003; Kook, 2021; Oliveira *et al*., 2018; Uzal; Plattner; Hostetter, 2016).

Cats with esophageal diverticula have respiratory clinical signs, possibly related to aspiration pneumonia (Börkü *et al.*, 2009). The patient in question presented mixed interstitial pneumonia with bacterial colonies and the presence of associated amorphous-fibrillar eosinophilic content and intra-alveolar foamy macrophages, suggesting aspiration pneumonia.

Gastrostomy tubes can have complications such as pulmonary aspiration of stomach contents, gastric hemorrhage, perforation injury to abdominal organs related to placement or displacement of the tube, abscess formation at the tube site, necrotizing fasciitis and gastric paresis, peristomal inflammation and hemorrhage (Campbell *et al*., 2006; Lhuillery; Etchepareborde, 2021; Salinardi *et al*., 2006). In the present case, the gastric tube was necessary for treatment and resulted in the formation of a subcutaneous microabscess and chronic suppurative peritonitis, worsening the feline's clinical condition.

The main causes of septic shock in felines are: pyothorax and septic peritonitis (Chacar *et al*., 2014). Therefore, through the anatomopathological findings, it is also possible to consider the possibility of septic shock, due to the purulent content evidenced in the thorax, chronic peritonitis, and the presence of basophilic structures compatible with bacteria observed in various organs under microscopy.

CONCLUSIONS

The origin of the esophageal diverticulum in this feline could not be determined, and it may be congenital or acquired. Esophageal diverticula are rarely described in felines, so discussing their pathogenesis and anatomopathological findings is essential for the diagnosis and prognostic determination of the patient.

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