



CASE REPORT

Diagnostics of Barrett's Esophagus in a Dog - Case Report

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ABSTRACT

An eleven-year old female English Pointer with symptoms of hypersalivation, changeable diet and painful swallowing was referred for endoscopy of anterior segment of alimentary tract for diagnostic purpose. The endoscopic examination revealed hyperemic, edematous, irregular mucosa of about 1.5×2.5 cm size at the distal esophagus. The histopathological examination showed typical pattern of Barrett's esophagus. The following therapy including: omeprazole, metoclopramide and sucralfate were instituted. Unfortunately, the applied therapy did not bring satisfying results and after 10 days the dog owners decided on euthanasia. The endoscopic examination is very useful in diagnostics of Barrett's esophagus because it allows evaluation of the state and extent of the mucosa lesions. It also allows precise collection of the affected mucosa samples. The diagnosis made on the basis of the endoscopic picture should always be confirmed by the histopathological examination of the biopsates.

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INTRODUCTION

Barrett's esophagus is a disorder consisting in replacement of stratified squamous epithelium of the distal esophagus part by metaplastic columnar epithelium of gastric or intestinal type (Shaheen and Ransohoff, 2002; Odze, 2009; Gibson *et al.*, 2010). That disease is one of possible complications of gastro-oesophageal reflux disease (GERD) and is thought to precede neoplastic hyperplasia (mainly esophageal adenocarcinoma). Currently three clinical forms of Barrett's esophagus are distinguished: ultra-short-segment Barrett's esophagus, short-segment Barrett's esophagus and long-segment Barrett's esophagus (Odze, 2009; Shaheen and Richter, 2009). Diagnosis of Barrett's esophagus is based on the oesophagoscopy result and histopathological evaluation of samples collected from the area of the oesophageal mucosa lesions (Shaheen and Ransohoff, 2002; Wang and Sampliner, 2008; Shaheen and Richter, 2009). Aim of the study is to present own experience in respect to diagnosis of Barrett's esophagus in the dog based on the clinical case report.

Case history, examination and results: An eleven-year old, female English Pointer was referred to Department of Internal Medicine, Wrocław University of Environmental and Life Sciences for endoscopy of the anterior part of the alimentary tract. The patient had one month old history of ptyalism, capricious appetite and signs of painful swallowing. As also, owner also complaint occasional history of vomiting. Palpation of the abdominal cavity revealed slight tenderness in *progastrium*. The haematological tests showed slightly decreased leukocyte count and decreased mean corpuscular haemoglobin concentration (MCHC). The physiological and biochemical parameters were insignificant. The survey radiographic and ultrasonographic examinations did not indicate any pathological changes. The endoscopic examination of the anterior part of the alimentary tract revealed in the distal segment of the esophagus an intensely red and oedematous oesophageal mucosa area - about 1.5 cm long and 2.5 cm wide, of uneven surface, brittle, with a tendency to bleeding (Fig 1, 2). The lower oesophageal sphincter was closed. The mucosa of the entire stomach was slightly reddened and oedematous; yellowish excretion was observed in the



Fig. 1: Endoscopic picture of Barrett's esophagus. Intense reddening of mucosa is visible in lower oesophageal sphincter area.



Fig. 2: Endoscopic Picture of Barrett's esophagus. Intense reddening, oedema and irregular surface of oesophageal mucosa are visible.

pyloric part of the stomach. The pyloric sphincter was closed. The histopathological examination of a bioplates revealed typical appearance of Barrett's esophagus: esophageal squamous epithelium was replaced by columnar epithelium of intestinal type with goblet cells, lamina propria was fibrotic with mild to moderate chronic inflammation, muscularis mucosa was thickened or splayed and esophageal glands were focally cystically dilated (Fig 3). In areas of inflammation, the epithelium showed regenerative features, such as mucin depletion, increased size and hyperchromicity of the cell nuclei, cell stratification, and increased frequency of mitoses which focally mimic the appearance of low-grade dysplasia (Fig 4). Based on the diagnosis of Barrett's esophagus the following therapy was instituted: omeprazole in the dose 1 mg/kg b.w. p.o., sid, metoclopramide in the dose 0.4 mg/kg b.w., p.o., tid and sucralfate in the dose 1 g/dog p.o., tid. The drugs were administered in the following sequence: in the morning – omeprazole, after about 5 min. – metoclopramide, next after about 30 min. – sucralfate and after another 30 min. – food; in the afternoon – metoclopramide, after about 30 min. – sucralfate and after another 30 min. – food; in the evening – the drugs were administered like in the afternoon. Unfortunately, the applied therapy did not bring satisfying results and after 10 days the dog owners decided on euthanasia. The dog owners did not consent to doctors performing autopsy in the dog.

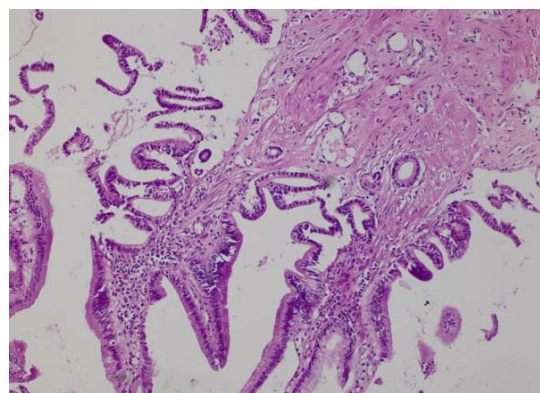


Fig. 3: Histologic appearance of Barrett's esophagus: esophageal squamous epithelium replaced by columnar epithelium of intestinal type with single goblet cells and presence of fibrotic lamina propria with mild chronic inflammation. Stained with hematoxylin and eosin; magnification x100.

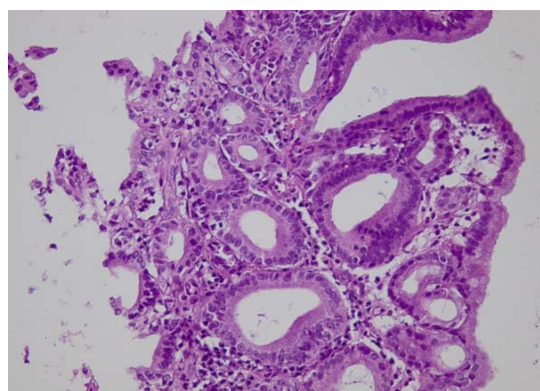


Fig. 4: Barrett's esophagus with areas of inflammation where the epithelium presents regenerative features (increased size and hyperchromicity of the cell nuclei, cell stratification and increased frequency of mitoses) which focally mimic the appearance of low-grade dysplasia. Stained with hematoxylin and eosin; magnification x200.

DISCUSSION

Barrett's esophagus is a rare disorder in animals. The incidence of spontaneous Barrett's esophagus has been described in three cats and one dog in veterinary literature. There are also reports about experimental induction of that disease in dogs (Gualtieri and Olivero, 2006; Gibson *et al.*, 2010). However, Barrett's esophagus is a much more common oesophageal disease in humans. It is thought that about 1.6-3.6% of the world population suffer from this disorder. (Shaheen and Richter, 2009). Unfortunately, due to a very small number of reported cases of Barrett's esophagus in animals its prevalence cannot be determined.

The clinical signs of Barrett's esophagus in humans are mainly related to gastro-oesophageal reflux disease (Shaheen and Ransohoff, 2002; Shaheen and Richter, 2009). In the presented clinical case the dog had hypersalivation, changeable appetite, frequent and painful swallowing, and sporadic vomiting. The similar clinical signs, such as painful swallowing, lack of appetite and hypersalivation were observed by Gibson *et al.* (2010) in the dog with Barrett's esophagus. The clinical signs of gastro-oesophageal reflux were also observed by Gualtieri and Olivero (2006) in three cats with diagnosed Barrett's

esophagus. In the normal esophagus the intersection between the stratified squamous epithelium and the columnar epithelium is termed due to its appearance (jagged surface) - the Z line. In the case of Barrett's esophagus the line of the columnar epithelium moves cranially and may take on the shape of tongues, occupy the entire esophagus circumference or both (Odze, 2009; Shaheen and Richter, 2009). The classification proposed by Sharma *et al.* (2004) in 2004 is at present used in the endoscopic evaluation of Barrett's esophagus. It takes into account occurrence of lesions affecting the entire esophagus circumference (C) and their maximum length (M) (Sharma *et al.*, 2004). Considering the maximum range of the affected epithelium three forms of Barrett's esophagus are distinguished: ultra-short-segment (less than 1 cm long), short-segment (1-3 cm long) and long-segment (over 3 cm long) Barrett's esophagus (Odze, 2009; Shaheen and Richter, 2009). In the present case the endoscopic examination revealed short-segment Barrett's esophagus (tongue shape, maximum range of about 1.5 cm). The similar esophageal endoscopic changes have been reported in a dog with Barrett's esophagus (Gibson *et al.* 2010).

The histopathological changes in the mucosa comprise the metaplastic columnar epithelium which consists of different kinds of cells including mucinous columnar epithelial cells on the surface and in crypt epithelia, and contains a variable number of scattered goblet cells, enterocytes, Paneth cells, endocrine cells, and cells with intermediate features or combined gastric and intestinal or intestinal and squamous-cell features. In the setting of Barrett esophagus, the lamina propria often shows a mild degree of chronic inflammation, but areas of acute inflammation, surface erosion or ulceration may also be present in patients who have ongoing GERD. In areas of inflammation, the epithelium often shows regenerative features, such as mucin depletion, increased size and hyperchromicity of the cell nuclei, cell stratification, and increased frequency of mitoses, which might mimic the appearance of low-grade dysplasia (Odze, 2009). According to American College of Gastroenterology and American Gastroenterological Association the presence of goblet cells in the metaplastic epithelium is necessary for the diagnosis of Barrett's esophagus in the histopathological picture (Sharma *et al.*, 2004; Wang and Sampliner, 2008). However, British Society of Gastroenterology is of different opinion (Playford, 2006). In the presented clinical case the histopathological examination revealed changes characteristic of Barrett's esophagus, namely intestinal metaplasia with goblet cells. Inflammation of a moderate degree and the mucosa lamina propria fibrosis were also observed. Similar histopathological changes were observed by Gibson *et al.* (2010) in the dog with spontaneous Barrett's esophagus, and by Gillen *et al.* (1988) - in the dogs with the disease induced experimentally. Barrett's esophagus is considered as preneoplastic state leading most frequently to adenocarcinoma of the esophagus. The development from Barrett's esophagus to the esophageal adenocarcinoma follows certain stages including metaplasia, dysplasia, neoplasm. In the histopathological evaluation of Barrett's esophagus attention should be paid to absence or presence

of dysplasia. In the latter case it is important to determine whether it is of low or high degree. (Shaheen and Richter, 2009; Gibson *et al.*, 2010). In the presented clinical case of the dog with Barrett's esophagus the histopathological examination of the biopsates showed low-degree dysplasia. It may indicate development of the esophageal adenocarcinoma in the future, and hence it is recommended to perform control endoscopies in that dog, with collection and the histopathological evaluation of the biopsates from the affected esophageal mucosa.

In human medicine the following treatments are instituted in the case of Barrett's esophagus: conservative treatment - with the use of drugs reducing the stomach secretion (e.g. proton pump inhibitors) and protecting the digestive tract mucosa, surgical treatment - consisting of excision of the affected esophagus wall, and endoscopic treatment (thermal ablation, photodynamic therapy and mucosectomy) (Słomka *et al.*, 2004; Odze, 2009; Shaheen and Richter, 2009). Due to the fact that thermal ablation, photodynamic therapy and mucosectomy were not possible to apply in the discussed case as well as the dog owners did not consent to oesophagectomy, only the pharmacological therapy was instituted. Unfortunately, it did not bring satisfying results.

In the case of such symptoms in dogs as salivation, frequent swallowing, painful swallowing or vomiting Barrett's esophagus should always be taken into consideration as their possible cause, though the disease is very rare in dogs. The endoscopic examination is very useful in diagnostics of Barrett's esophagus because it allows evaluation of the state and extent of the mucosa lesions. It also allows precise collection of the affected mucosa samples. The diagnosis made on the basis of the endoscopic picture should always be confirmed by the histopathological examination of the biopsates.

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