

INTESTINAL METAPLASIA OF ESOPHAGEAL MUCOSA (BARRETT ESOPHAGUS) IN A CAT.

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Background and Objective

Barrett's esophagus is defined in humans as an intestinal metaplasia (IM) of the esophageal mucosa with surface and crypt epithelium composed of a mosaic of cell types [1]. These include cells normally found in the stomach and those normally located in the intestines, such as goblet cells, Paneth cells, enterocyte-like cells, and intestine-specific endocrine cells. Morphologically, the "intestinal phenotype" is defined by the presence of columnar epithelium containing one or more of the cell types normally found in the intestines. Few reports in animals exist (Table 1), and a possible neoplastic transformation is reported in both humans and dogs.

The present case aims to describe the cytological, histopathological and histochemical findings of an esophageal hyperplasia associated with IM in a 5-year-old neutered male Ragdoll cat presented for chronic regurgitation and vomiting.

Table 1: References list of reported cases of esophageal IM in dog and cat

REFERENCE	SIGNALMENT	CLINICAL FINDINGS	ENDOSCOPY FINDINGS	HISTOLOGICAL DIAGNOSIS AND ADDITIONAL
Gualtieri et al. JAAHA, 2006	Cat 18 months M DSH	Vomiting	Severe chronic localized esophagitis	Severe esophagitis and epithelial hyperplasia Goblet cells PAS+
Gualtieri et al. JAAHA, 2006	Cat 3.5 years F DSH	Dyspnea, stertorous respiratory sounds, vomiting	Hyperemia mucosa of the distal third of the esophagus	IM and lymphocytic and plasmacytic infiltrate Goblet cells PAS +
Gualtieri et al. JAAHA, 2006	Cat 2 years M DSH	Vomiting	Edema and hyperemia mucosa of the distal third of the esophagus	Severe epithelial hyperplasia Goblet cells PAS+
Gibson et al. Vet Pathol, 2010	Dog 13 years neutered M standard Poodle	Pain swallowing	Inflammation distal part of esophagus with polypoid mass	Esophageal adenomatous polyp with IM Goblet cells Alcian blue +
Okanishi et al. JSAP, 2015	Dog 6 years M mixed breed.	Chronic vomiting and regurgitation	Esophageal dilation, multiple small greyish-white nodules over the esophageal lumen and cauliflower-like masses in the caudal esophagus	Esophageal adenosquamous carcinoma developed from Barrett's esophagus
Chambers et al. J Tox Pathol, 2017	Dog 9 years M bulldog	Hypersalivation, increasing incidence of vomiting, weight loss	Mass in the mucosa of the distal esophagus	Esophageal adenocarcinoma derived from Barrett esophagus Neoplastic cells Alcian blue and MUC5AC positive
Kopke et al. JVDI, 2018	Dog 10 years neutered M Irish Setter	Recurrent episodes of regurgitation and vomiting	Solitary polypoid mass immediately rostral to the lower esophageal sphincter	Carcinoma in situ within an area of Barrett esophagus

Material and Methods

A clinical examination comprehensive of CBC, biochemistry profile and serum protein electrophoresis was performed, followed by esophagogastroduodenoscopy. Endoscopic biopsies of the lesion were performed, one of which was used to prepare a cytological specimen using the squash preparation technique. The cytological smear was air-dried and stained with May-Grünwald Giemsa. The bioptic specimens were fixed in 10% buffered formalin and routinely processed for histology. Alcian blue-PAS stain was subsequently performed on some section.

Results

Endoscopy

Esophagogastroduodenoscopy revealed a severe erosive-proliferative esophageal lesion and mild edematous gastroenteropathy (Fig.1).

Cytology

The cytological specimen was highly cellular. A mixed population was seen, with prevalence of epithelial cells of the normal squamous esophageal mucosa arranged in groups with pavement pattern, without evidence of atypia (Fig.2, insert); occasionally, cuboidal/columnar epithelial cells arranged in palisade or papillary pattern were seen. Interspersed among these cells, few cuboidal/polygonal cells were seen, characterized by abundant bluish cytoplasm containing several small red/magenta granules; nuclei were round, central/paracentral (Fig.2).

Histopathology and Histochemistry

The samples were representative of portions of the esophageal mucosa prevalently lined by squamous epithelium diffusely and markedly hyperplastic, composed of keratinocytes without atypia. Focally, the squamous lining epithelium was replaced by a columnar gastric/intestinal-type epithelium (Fig.3), with abundant pseudogoblet cells (goblet shaped gastric foveolar cells) and fewer disseminated goblet cells, identified by Alcian blue/PAS staining at pH 2.5 (metaplastic changes) (Fig. 4). In mucosal lamina propria several lymphocytes, plasma cells, a moderate number of eosinophils and segmented neutrophils were seen. An epithelial glandular component was also observed, and appeared markedly hyperplastic in the specimens where aspects of metaplasia of the lining epithelium were seen. The glandular component of the mucosal tissue was composed of tubular structures, lined by hyperplastic epithelium, without oxintic parietal and principal cells, but with disseminated goblet cells. Some intraepithelial globule leucocytes (GL) were also seen, and moderate widespread hyperemia and edema were noted.



Fig.1: Endoscopy, distal esophagus. A raised and proliferative appearance of the mucosa, with irregular polypoid surface was noted in the precardial area, associated with marked hyperemia, erosive areas, and severe edema. On biopsy sampling, marked tissue fragility and a moderate tendency to bleeding were noted.

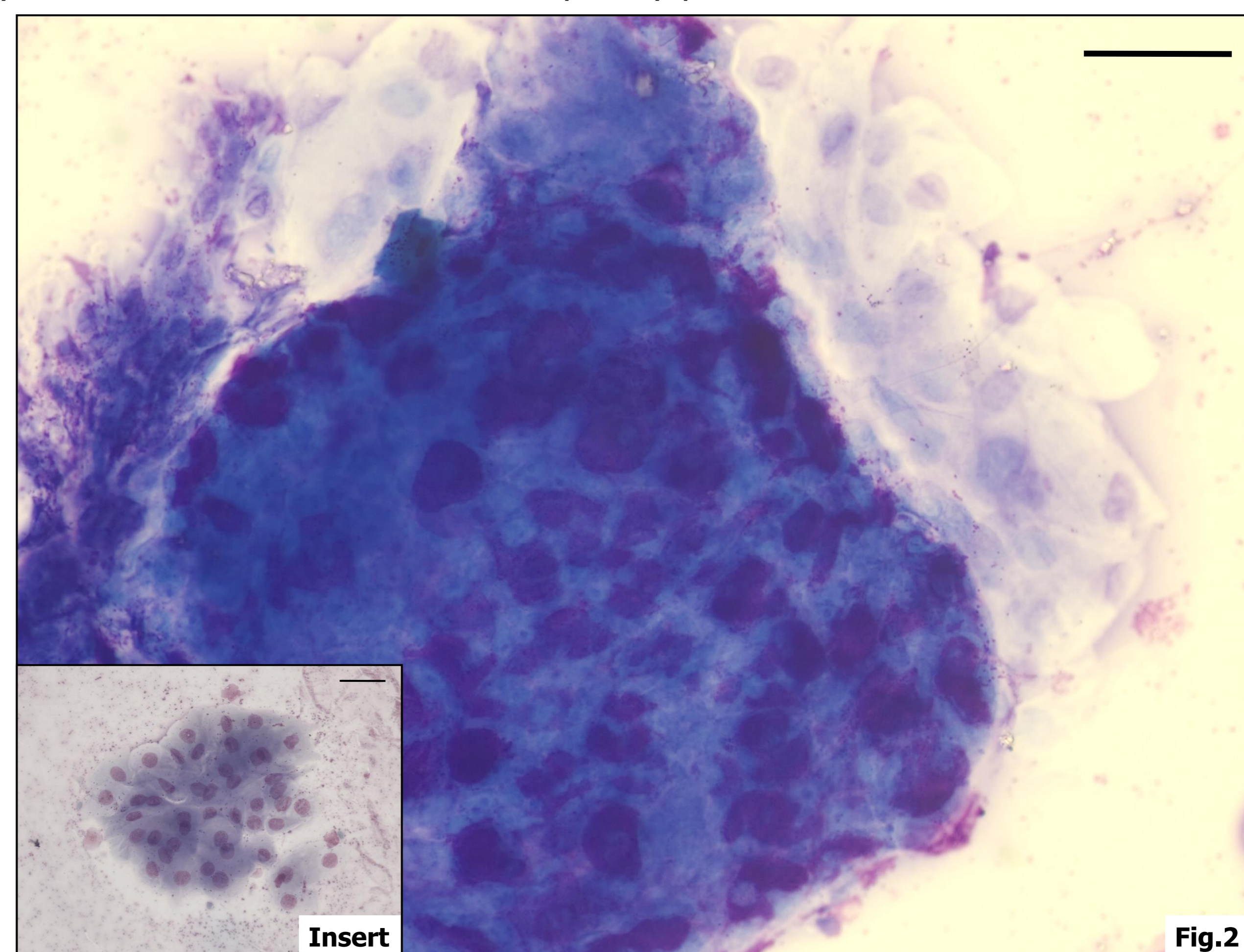


Fig.2: Esophagus, squash prep. MGG; bar=50 µm. On a clear background, the normal squamous esophageal epithelial cells suddenly are replaced by columnar/cuboidal cells forming papillary tridimensional structures resembling glandular epithelium. Several secretory cells are seen among columnar epithelial cells, containing numerous small red/magenta granules. **Insert:** Esophagus, squash prep. MGG; bar=50 µm. Normal non-metaplastic squamous esophageal epithelium

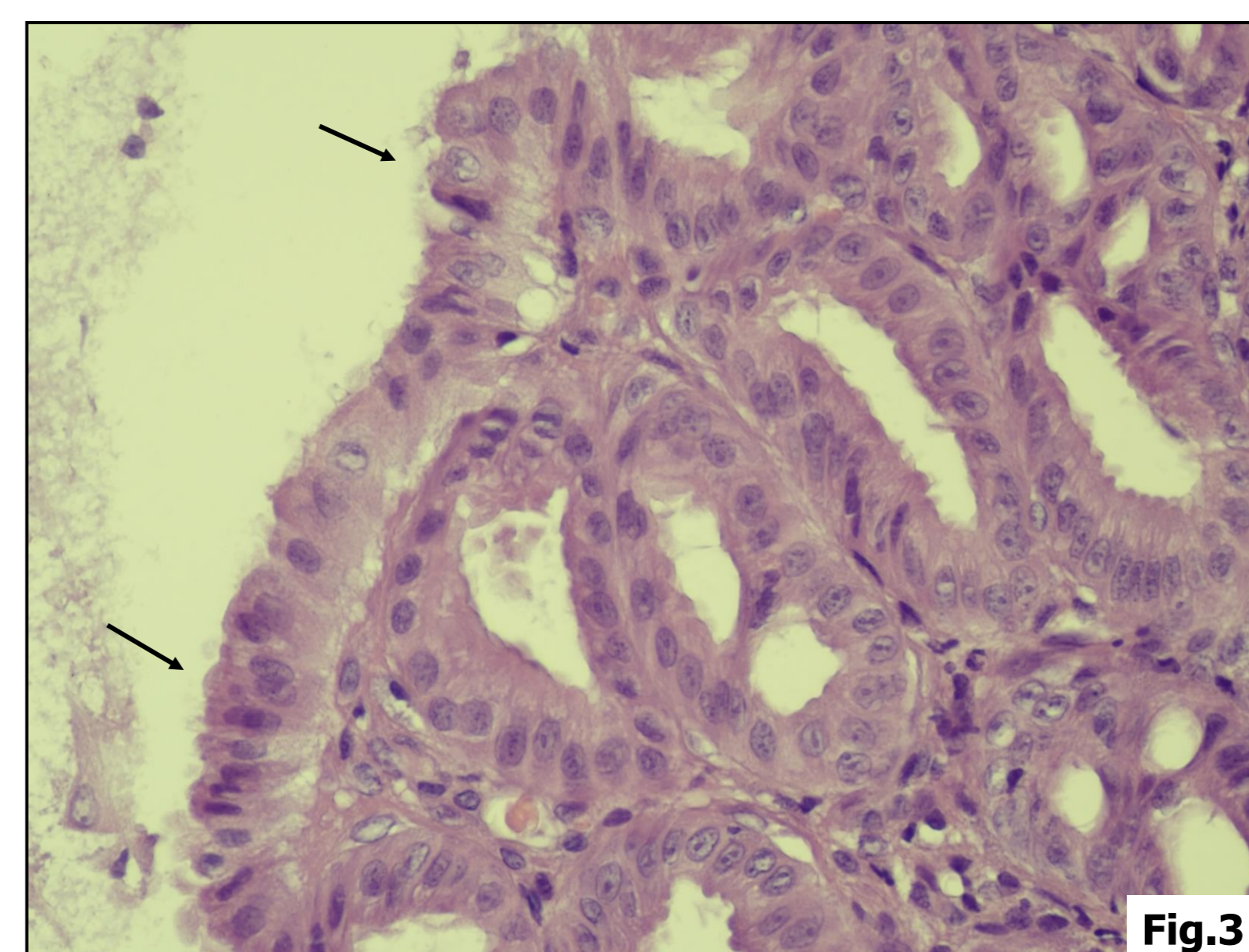


Fig.3: Esophagus, endoscopic biopsy. HE; objective 40x. **Arrows** indicate columnar gastric/intestinal epithelium in the esophageal mucosa.

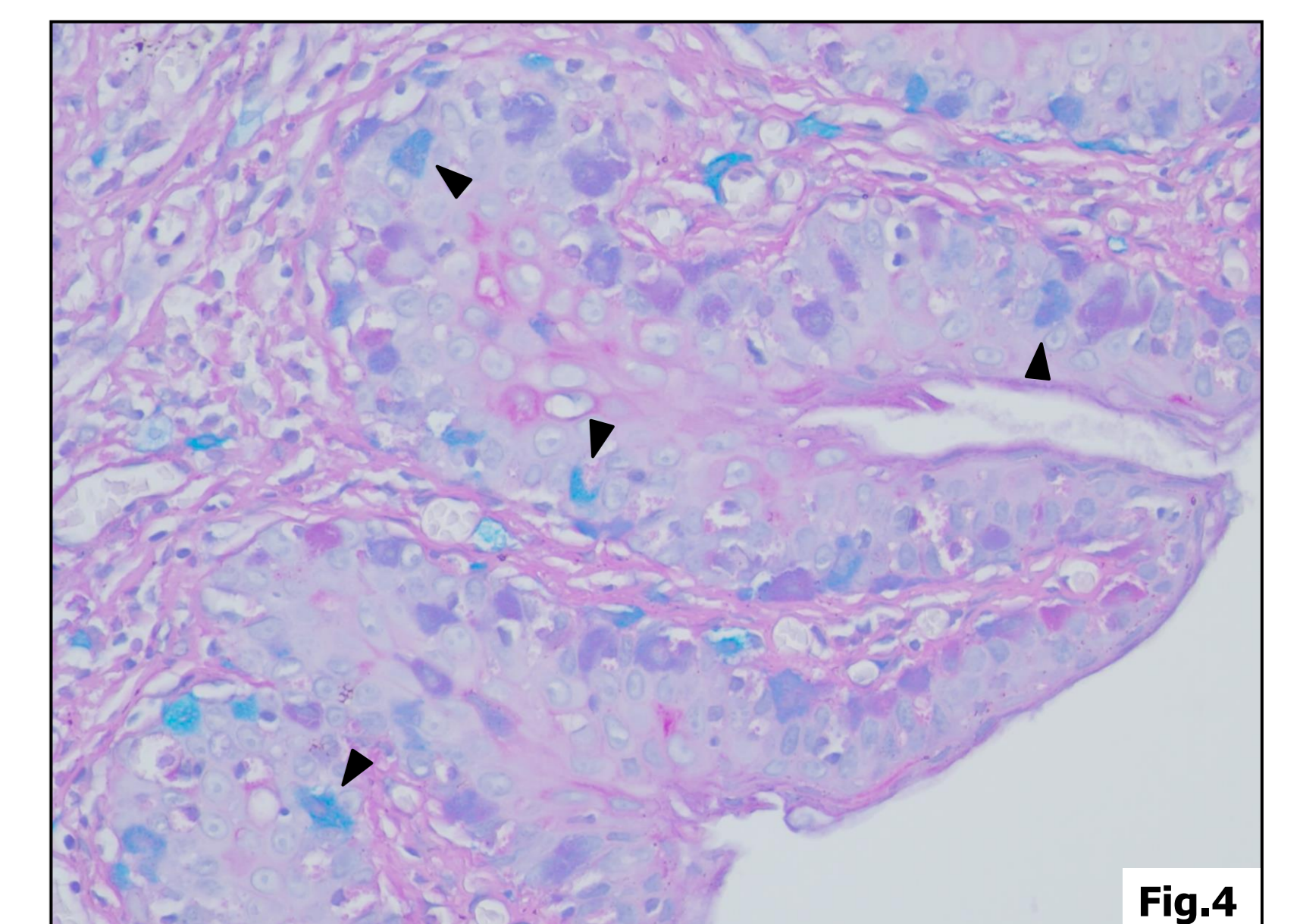


Fig.4: Esophagus, endoscopic biopsy. Alcian blue-PAS; objective 40x. **Arrowheads** indicate disseminated goblet cells Alcian blue-PAS positive.

Conclusions

The present case reports the finding of a proliferative lesion in the distal esophagus of a cat with chronic gastrointestinal signs. The site of the lesion and of endoscopic sampling was proximal to the boundary between the esophageal and the cardiac mucosa. Cytology was considered supportive of epithelial hyperplasia associated with suspect glandular metaplasia. Histopathology was consistent with chronic lymphoplasmacytic esophagitis, associated with hyperplastic changes of the lining epithelium, with focal gastric- and intestinal-type metaplasia. The positivity to Alcian blue-PAS staining confirmed the finding of goblet cells, characteristic of IM component.

Barrett's esophagus should be included in the differential diagnoses when glandular epithelium is found in cytological specimens of esophageal lesions.

References

- [1] Odze R. Histology of Barrett's Metaplasia: Do Goblet Cells Matter?. *Dig Dis Sci.* 2018;63(8):2042-2051.
- [2] Gualtieri M, Olivero D. Reflux esophagitis in three cats associated with metaplastic columnar esophageal epithelium. *J Am Anim Hosp Assoc.* 2006;42(1):65-70.
- [3] Gibson CJ, Parry NM, Jakowski RM, Cooper J. Adenomatous polyp with intestinal metaplasia of the esophagus (Barrett esophagus) in a dog. *Vet Pathol.* 2010;47(1):116-119.
- [4] Okanishi H, Shibuya H, Miyasaka T, Asano K, Sato T, Watari T. Adenosquamous carcinoma of the oesophagus in a dog. *J Small Anim Pract.* 2015;56(8):521-523.
- [5] Chambers JK, Saito T, Fukushima K, et al. Adenocarcinoma of Barrett's esophagus in a dog. *J Toxicol Pathol.* 2017;30(3):239-243.
- [6] Kopke MA, Munday JS, Gal A. Carcinoma in situ within an area of Barrett esophagus in a dog with megaesophagus. *J Vet Diagn Invest.* 2018;30(5):752-754.