

Endoscopic, histologic, and electron microscopic description of novel small vesicles with gastric heterotopia, intestinal metaplasia, and/or submucosal glands at the gastroesophageal junction

The gastroesophageal junction (GEJ) is an ill-defined, physiologically and pathologically highly active transition zone connecting the esophagus to the stomach [1,2]. Although several endoscopic and histologic aspects such as the Z-line, cardia, tongues, and/or tiny islands of cylindrical epithelial cells have been well described [2,3], we have often observed the presence of small yellow vesicles or cysts above the Z-line in some patients. These lesions have not been described in the literature.

During upper endoscopy of consecutive patients undergoing the procedure for reflux symptoms or dyspepsia, all potential physiologic and pathologic lesions found in the esophagus and stomach were carefully examined and described (e.g. inlet patches, glycogenic acanthosis, cylindrical epithelia, gastritis, atro-

phy, metaplasia). The occurrence of these yellow vesicles was analyzed in the context of these lesions (univariate and multivariate analysis, Mann-Whitney, and Student's *t* test). In a total of 197 patients (102 women and 95 men; mean age 55.5 [SD 15] years), the incidence of yellow vesicles was 30% (► Fig. 1, ► Fig. 2, ► Video 1). Some lesions had a “volcano-like” shape, with cylindrical epithelium on its tip. Their sizes ranged from 2mm to 10mm. These yellow vesicles had a significant correlation with columnar-lined epithelium (including Barrett's esophagus) ($P=0.009$) and an inverse correlation with erosive esophagitis ($P=0.024$) and female sex ($P=0.011$).

In summary, yellow vesicles are definable lesions in the distal esophagus, above the GEJ, and are found in 30% of patients undergoing esophagogastroduodenoscopy

for clinical symptoms. These lesions are located on the squamous mucosa but contain submucosal glands, cylindrical epithelium, and/or gastric or pancreatic metaplasia. Yellow vesicles are associated with columnar-lined epithelium (Barrett's esophagus) and inversely associated with female sex and less erosive esophagitis, suggesting a protective mechanism of the GEJ. We propose the term esophageal “outlet or GEJ cysts.”

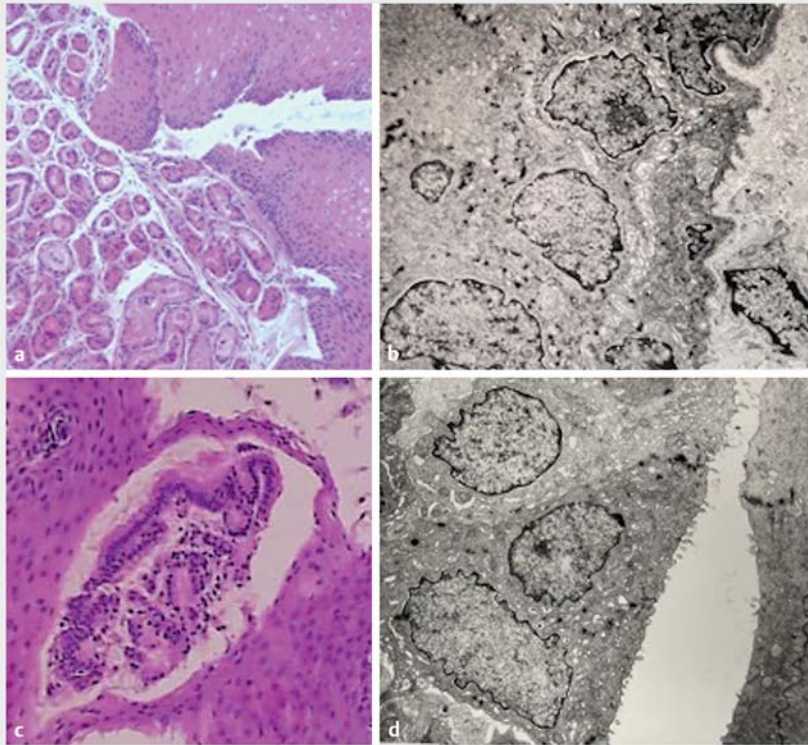
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Competing interests

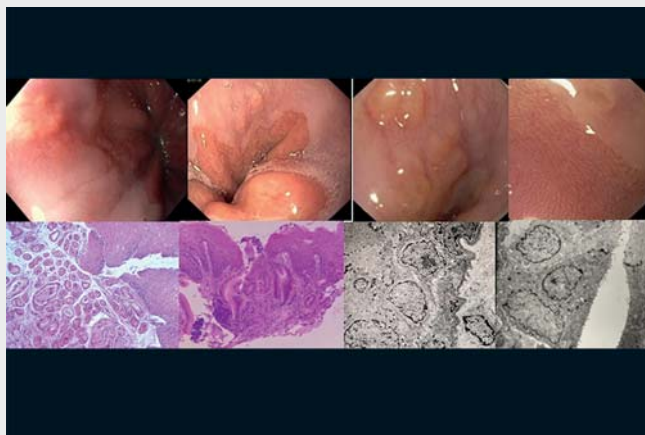
The authors declare that they have no conflict of interest.



► **Fig. 1** Spectrum of esophageal outlet vesicles or cysts. **a** The lesions were visualized using standard and high definition white-light endoscopes. **b** Narrow-band imaging. **c** Magnification up to $\times 110$ (Q160Z; Olympus, Hamburg, Germany). Note the characteristic cyst-like structures. **d, e** Some lesions had a “volcano-like” appearance. **f** The lesions were often located close to tongues of cylindrical epithelium. **g** All lesions were located above the Z-line, on the squamous epithelium.



► **Fig. 2** Histologic (hematoxylin and eosin) and electron microscopic characterization. **a** Histology demonstrated submucosal glands (28%), cylindrical epithelium (including intestinal metaplasia) (25%), gastric heterotopia (15%), squamous epithelium or inflammation (30%), and pancreatic metaplasia (5%). **b** Often the lesions were considered to be “ectopic gastric mucosa” or esophageal “inlet patches.” **c** In 10 patients, we also performed electron microscopy with magnification up to $\times 7000$ (Philips, Eindhoven, the Netherlands). **d** Some cells of the cystic lesions had features combining those of squamous and columnar epithelium. The surface of many submucosal cells showed microvilli (feature of glandular epithelium) and intercellular ridges (feature of squamous epithelium).



► **Video 1** Endoscopic, histologic, and electron microscopic views of novel small vesicles with gastric heterotopia, intestinal metaplasia, and/or submucosal glands at the gastroesophageal junction.



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