IMAGE OF THE ISSUE

Quadri-modal Imaging for Real-time Diagnosis of Early Gastric Cancer

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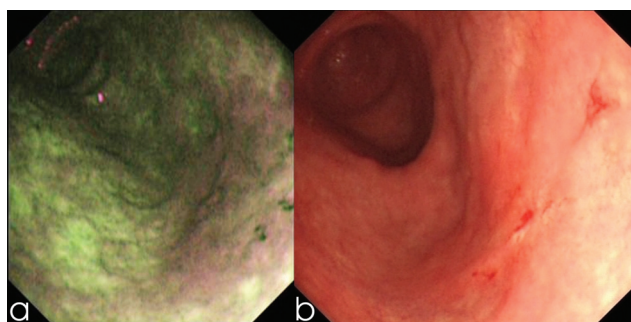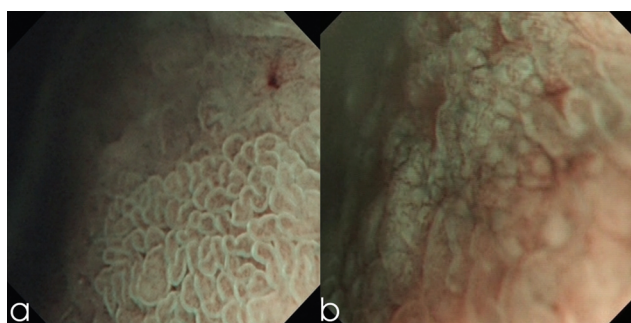
Fig 1.

Fig 3.

Fig 2.

Fig 4.

A 56-year-old woman was admitted to our Gastroenterology Department for diffuse upper abdominal pain with no other signs or symptoms. Her medical history and food behavior was not relevant. All lab tests performed and transabdominal ultrasound were normal. An upper gastrointestinal endoscopy was performed (Olympus Evis GIF-Q240Z endoscope) under general anesthesia with propofol. White light endoscopy (WLE) showed no abnormalities, but auto-fluorescence imaging (AFI) revealed a 2 cm area on the posterior gastric body with abnormal aspect (magenta area surrounded by green normal mucosa) (Fig 1a). A second-look zoom WLE of the suspected zone revealed a slightly elevated and centrally depressed lesion very easily to be missed with classic endoscopy (Fig 1b). Narrow band imaging (NBI) with magnification (1.5x) was subsequently performed and showed areas of intestinal metaplasia, with a characteristic light blue crest sign (Fig 2a). A very irregular pattern of the mucosa, as well as distorted capillaries and vessels were very suggestive for high grade dysplasia or even gastric carcinoma (Fig 2b).

Upper confocal laser endomicroscopy (CLE) imaging (Pentax EC3870K endomicroscope) was achieved after
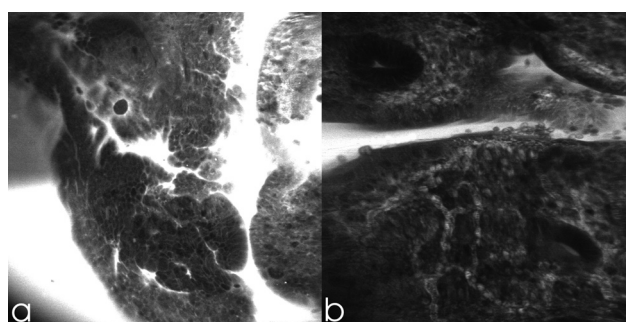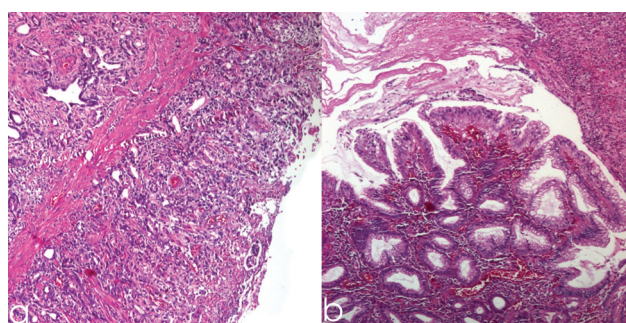
i.v. injection of 5 ml of 10% fluorescein sodium. Confocal imaging showed a disorganized architecture with irregular crypt openings and thickening of epithelial layer (Fig. 3a). The vessels were also distorted, with various calibers and irregular shapes, suggestive of neo-angiogenesis (Fig. 3b). The pathological examination of conventional forceps biopsy tissue fragments confirmed the real-time endomicroscopy diagnosis (Fig. 4a).

An endoscopic mucosal resection (EMR) was attempted, but it was not possible due to a non-lifting sign during submucosal injection. The patient was referred for surgery and a distal gastric resection was performed. The diagnosis of T1sm gastric adenocarcinoma (lesion involving the mucosa and submucosa) was confirmed (Fig. 4b).

Comments. In early gastric cancers, AFI can visualize flat or isochromatic tumors in a way that WLE cannot [1]. In our case, because of the difference in fluorescence between neoplasia and normal tissue, a slightly elevated neoplasm was visible with AFI only. A recent study concluded that AFI is of limited value in detecting superficial gastric neoplasia because of its poor specificity. However, a few neoplasms (mainly elevated lesions) have been detected by AFI alone [2].

The low specificity (high false-positive rates) of AFI can be improved by using additional imaging techniques such as

NBI with magnification for description of the pit pattern of the lesions [3]. In our case, NBI showed the irregular pattern of the mucosa, suggestive for gastric carcinoma [4].

We further used CLE to achieve an in vivo histological analysis. Diagnostic CLE features in gastric cancer include architectural atypia, increased nuclear-cytoplasmatic ratio and chromatin condensation [5]. The superficial microvascular network was clearly visualized, with an increased density of thick and irregular caliber vessels, connected in a honeycomb-like pattern [6].

To conclude, the quadri-modal imaging investigation of mucosal layer can be safely and efficiently used for real-time optical diagnosis of early gastric cancer, which is curable by local endoscopic or surgical therapy.

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