

Gastric Type Adenocarcinoma with Fundic Gland Differentiation in the Duodenum Resected by ESD (Endoscopic Submucosal Dissection)

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Abstract

Background: Gastric type adenocarcinoma with fundic gland differentiation (GA-FG) has been reported as a new, rare, chief cell differentiation composed carcinoma. Clinicopathologically, it exists on the gastric cardia/fundus, with low proliferative activity and low-grade malignancy. Until now, there has been no report of this GA-FG type cancer in the duodenum.

Case presentation: In this case, we report a case that coincidentally diagnosed GA-FG neighboring to Brunner's glands hyperplasia in the duodenum, and successfully resected by ESD (Endoscopic Submucosal Dissection). Unfortunately, owing to a thin submucosal, pin hole perforation was caused while snaring the tumor. Endoscopic 4 clippings, expelled remaining abdominal air, and 2 weeks non oral in take was cured acute peritonitis.

Conclusions: We report the experience of the rare case of Gastric type adenocarcinoma with fundic gland differentiation in the duodenum, arising from Brunner's gland hamartoma / hyperplasia, resected by ESD (Endoscopic Submucosal Dissection).

Keywords: Duodenal neoplasms; Fundic gland; Chief cells; Gastric; Cell differentiation; ESD

Introduction

Ueyama H and Yao T etc.[1] proposed gastric adenocarcinoma of fundic gland type (GA-FG) as a new entity within gastric adenocarcinomas. They reported 12 cases and described their clinicopathologic features. Histologically, they were well differentiated adenocarcinomas composed of chief cells. Clinicopathologically, some authors have reported these on the gastric cardia/fundus, with low proliferative activity and low-grade malignancy [2-4].

Previously, some strange cases on the gastric cardia, such as parietal cell carcinoma have been reported [5,6]. Differentiation of parietal cells was confirmed by staining for H+/K+ ATPase in one case [7]. Until now, there has been no report of this GA-FG type cancer in the duodenum. Meanwhile, duodenal neoplasm is very rare, accounting for 0.4% of gastro-intestinal malignancies [8,9].

In this case, we report the first case of a duodenal variant of adenocarcinoma of fundic gland type arising from a Brunner's gland hamartoma/hyperplasia and successfully resected by ESD (Endoscopic Submucosal Dissection).

Case presentation

A 67-year-old male was routinely seen at a hospital after a rectal cancer operation in December 2005. Every year he received a GI fiber examination. Five years after the operation, gastric endoscopic examination revealed a small nodular lesion at the bulb, and subsequently a mucosal biopsy was performed (Figure 1a).

Microscopically, the biopsy specimen demonstrated characteristics of gastric adenocarcinoma of fundic gland type. Laboratory examinations revealed that all parameters were within normal limits. CT scan showed no duodenal wall invasion to pancreas and no lymph node metastases.

We firstly planned to resect the tumor with endoscopic mucosal resection with a cap-fitted endoscope (EMR-C). Nevertheless a large amount of 0.4% sodium hyaluronate solution was injected into the submucosal layer because mucosal lesions could not be adequately lifted.

Therefore, we performed EMR using endoscopic submucosal dissection (ESD) technique to remove the tumor completely [with] one segment resection. ESD achieved complete resection of the tumor, which was 2.5 cm in diameter (Figure 1b).

Unfortunately, owing to a thin submucosa, a pinhole perforation developed as a complication of snaring of the tumor, with peritonitis ensuing. Four endoscopic clippings were performed, and the remaining abdominal air was expelled with a 20 gauge needle (Figure 1c). A small amount of free air was detected by abdominal X-ray after ESD. After two weeks of observation with non-oral intake, the acute peritonitis resolved, a gastrografin exam showed no duodenal wall fistula, so we started oral intake. The patient was discharged 18 days after surgery. The resected specimen was fixed and the tumor was diagnosed by histopathological examination as gastric type adenocarcinoma with fundic gland differentiation.

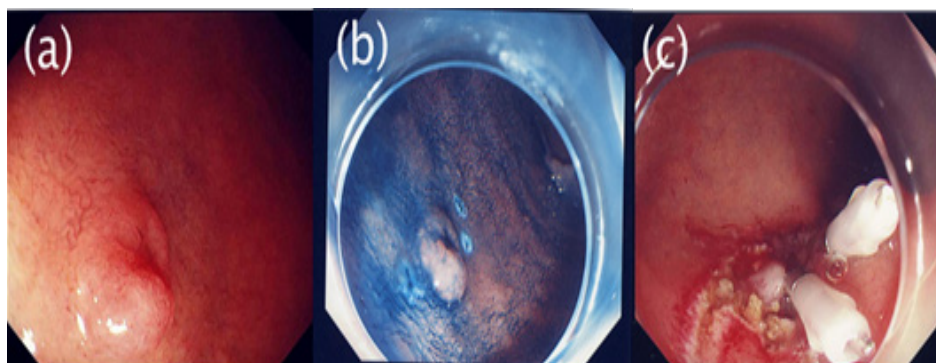


Figure 1: (a) Endoscopic findings of the bulbus revealed small elevated tumor about 10 mm in size
(b) ESD achieved complete resection of the tumor with 2.5 cm diameter
(c) Four endoscopic clippings were performed and cured pin hole perforation

Pathological report: The resected tumor specimen measured 5 x 5 mm in size. Histopathologically, the lesion was composed of two elements: Gastric type adenocarcinoma with fundic gland differentiation, and an excess of Brunner's glands (Figure 2a,b). Due to this feature, this carcinoma was thought to arise from Brunner's gland hamartoma / hyperplasia.

The carcinoma cells were characterized by pale gray-blue, basophilic cytoplasm and enlarged round nuclei with occasional small nucleoli, mimicking chief cells (Figure 2c). Immunohistochemically, carcinoma cells revealed diffuse positivity for MUC6 (Figure 3e) and pepsinogen-I (Figure 3f), and were weakly positive for MUC5AC (Figure 3d), minimally positive for H⁺/K⁺ -ATPase (Figure 3g), and negative for MUC2 (Figure 3c). There were a few Ki-67 positive cells (1~2%) (Figure 3h). The tumor cells were negative for CD10, p53 and Chromogranin A. The result was compatible with that of gastric adenocarcinoma with chief cell differentiation. No lymphovascular invasion was recognized. The lateral and vertical margins were histologically negative.

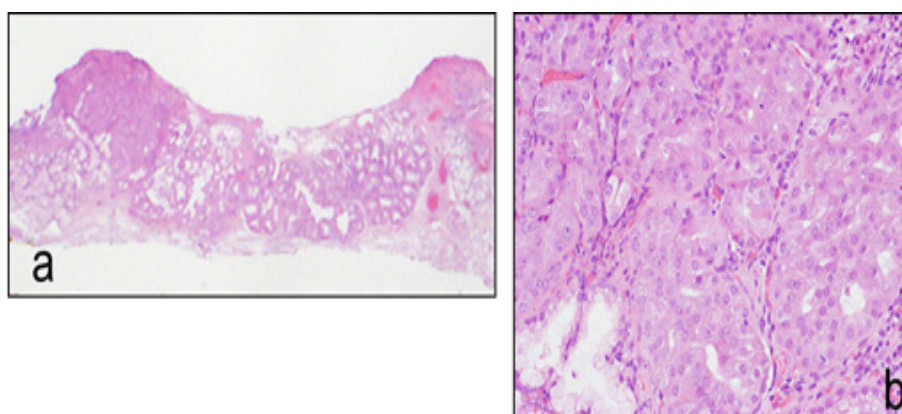


Figure 2: Histological examination of the EMR specimen of this case (hematoxylin and eosin stain)

Figure 2: a) In low-power view. The well-demarcated lesion is composed of adenocarcinoma and an excess of Brunner's glands (HE, x 40)
b) In high power view, the adenocarcinoma shows irregular tubular structure without cell polarity, composed of highly differentiated round columnar cell mimicking chief cell. The carcinoma cells have pale gray-blue, basophilic cytoplasm and enlarged nuclei with small nucleoli (HE, x 200)

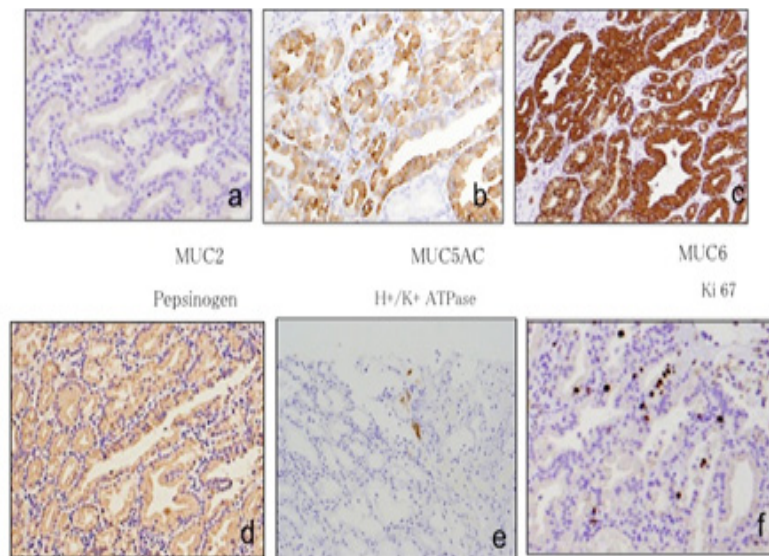


Figure 3: Immunohistochemical examination:

Figure 3: (a-f) : The carcinoma revealed diffuse positivity for MUC6 (c) and pepsinogen-I (d), was focally and weakly positive for MUC5AC (b), minimally positive for H+/K+ -ATPase (e), and negative for MUC2 (a). There were a few Ki-67 positive cells (1~2%) (f).

Discussion

The present duodenal tumor reveals adenocarcinoma possessed Gastric type adenocarcinoma with fundic gland differentiation (GA-FG). Very recently, gastric adenocarcinoma of fundic gland type was proposed. [1-3,10,11]. Histologically, they were well differentiated adenocarcinomas composed of pale gray-blue, basophilic columnar cells with mild nuclear atypia, mimicking chief cells.

Immunohistochemically, scattered positivity for H+/K+ -ATPase was observed in addition to expression of pepsinogen-I and MUC6, indicating focal differentiation toward parietal cells. Gastric adenocarcinoma of fundic gland type might be classified into 3 categories: chief cell predominant type, parietal cell predominant type, and mixed type [1].

Upon analyzing 10 cases of gastric adenocarcinoma of fundic gland type, all of the 10 cases of fundic gland type gastric adenocarcinoma were chief cell predominant type. But almost all lesions were found to be composed of a mixture of various mildly atypical columnar cells, which resembles histologically to mimic chief cells, parietal cells with eosinophilic cytoplasm, and pyloric glands with clear pale cytoplasm. They also demonstrated mucin phenotypes of fundic gland type gastric adenocarcinoma: MUC 6: 100%, MUC5AC: 10%, MUC2: 0%, CD10 : %0, CGA 0%, including only one case of MUC5AC positive.

In contrast, adenocarcinoma of the duodenum is an exceedingly rare condition representing not more than 0.3% to 0.4% of all gastrointestinal tract cancers [12]. About 45% of all carcinomas of the duodenum arise in the third and fourth portions, a distribution pattern that parallels the relative lengths of each portion of this organ [13].

Endoscopic treatments of duodenal tumors are challenging in the presence of the thin duodenal wall and rich vascularity. However, endoscopic resections contribute considerable advantages in terms of organ preservation, risks, recovery and length of hospital stay [14-17].

This case is extremely rare. Although this Brunner's gland hamartoma / hyperplasia in the bulbus has been seen before, no malignant findings have been reported. It seems that a second malignant lesion could be successfully removed without an operation. It is expected that a second operation will be much more difficult than the first operation. Within this line of thinking, it is necessary for a patient to receive routine GI checks postoperatively.

Secondly, this tumor was successfully resected by endoscopic technique, though a pinhole perforation accidentally occurred. Clip and aspiration worked well to reduce pan peritonitis. Presently, the ESD technique is the preferred approach in the stomach and esophagus and reasonable to apply this technique to duodenal tumors, even given the thin duodenal wall.

Conclusion

We reported an experience with a rare case of Fundic Type Gastric Adenocarcinoma, arising from ectopic gastric mucosa, resected by ESD (Endoscopic Submucosal Dissection).

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