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Case Report

A Case of Poorly Differentiated Adenocarcinoma with Signet Ring Cell Carcinoma of the Duodenal Bulb: A Case Report

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Duodenal cancers are rare. Histopathologically, most duodenal cancers are adenocarcinoma. Signet ring cell carcinoma (SRCC) is a rare tumor more commonly found in the stomach than at other sites in the digestive tract. SRCC is extremely uncommon in the duodenum, with most of these tumors occurring in the ampulla. Until now, there are few case reports of duodenal cancers with SRCC. To accumulate case reports, we report a rare case of nonampullary duodenal bulb SRCC. A 74-year-old man was admitted to our hospital with melena. Esophagogastroduodenoscopy (EGD) showed a duodenal bulb ulcer. He was treated with a proton pump inhibitor. However, 1 month later, he was readmitted to our hospital with epigastric pain and nausea. A second EGD examination showed an ulcer at the duodenal bulb. Biopsies taken from the ulcer showed SRCC. Distal gastrectomy and duodenal bulb resection were performed. Histologic examination of the specimen showed a type 4 lesion located from the duodenal bulb to the pyloric antrum. The tumor was composed of poorly differentiated adenocarcinoma (por) with SRCC. The distal margin of the duodenal bulb was invaded with tumor. Therefore, pancreatoduodenectomy was performed. One year after the initial operation, he is alive and had no relapse. We described a rare case of por with SRCC of the duodenal bulb. It is

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important to bear in mind that an ulcer following an abnormal clinical course should be biopsied, and we have to select a suitable operation in cases of duodenal bulb cancer.

Key words: Signet ring cell carcinoma – Duodenum – Nonampullary

Duodenal cancers are rare. Histopathologically, most duodenal cancers are adenocarcinoma. Signet ring cell carcinoma (SRCC) is a rare tumor more commonly found in the stomach than at other sites in the digestive tract. SRCC accounted for 35% to 45% of gastric adenocarcinoma cases in recent studies.[1,2] However, SRCC is extremely uncommon in the duodenum; about 21 cases of SRCC in the duodenum have been reported,[3–6] with most of these tumors occurring in the ampulla. Until now, there are few case reports of duodenal cancers with SRCC. To accumulate case reports, we report a rare case of nonampullary duodenal bulb SRCC.

Case Report

The patient was a 74-year-old man who had a history of surgery for appendicitis and medical treatment for duodenal ulcer. He had consulted a local physician with the complaint of a few days of melena. He was admitted to our hospital for detailed examinations. Physical examination showed no peritoneal signs. Blood test revealed a decreased hemoglobin level (10.4 g/dL), and esophagogastroduodenoscopy (EGD) revealed an ulcer at the duodenal bulb, which showed Forrest III (Fig. 1a). The ulcer showed non-active bleeding and biopsy of the ulcer was not performed at that time. He was treated with a proton pump inhibitor and then was discharged. However, 1 month later, he was readmitted to our hospital with epigastric pain and nausea. Plain abdominal computed tomography (CT) and fluoroscopy of the stomach showed an abnormally distended stomach suggestive of gastric outlet obstruction (Fig. 2). Until operation, he was prohibited from eating and drinking, and he received medical treatment and nutrition intravenously. A second EGD performed 4 days after admission showed an ulcer at the duodenal bulb (Fig. 1b), and biopsy specimens taken from the ulcer showed SRCC. Contrast-enhanced chest and abdominal CT showed thickened wall of the duodenal bulb, and no enlarged nodes or metastases were seen. Distal gastrectomy and duodenal bulb resection were performed. Pathologic examination showed an elevated tumor of 2.8 × 2.0 cm in size that was composed of aggregated small granules. Hematoxylin-eosin (HE) staining showed that the tumor was mainly composed of SRCC with poorly differentiated adenocarcinoma (por). Heterotopic gastric mucosa was not detected around the tumor. The poorly differentiated adenocarcinoma submucosally invaded the duodenal bulb circumferentially to the pyloric antrum. The entire tumor was a type 4 lesion macroscopically and was sized 6.5 × 6.0 cm (Fig. 3a and b). The tumor partially invaded the subserosa. During the surgery, 29 lymph nodes were also resected and no metastasis was detected. The TNM classification was T3N0M0, Stage IIA. Immunohistochemistry of the tumor showed positive staining for mucin-2 (MUC-2) and caudal type homeobox 2 (CDX2), and very slightly positive staining for mucin-5ac (MUC-5AC) and mucin-6 (MUC-6). Accordingly, the MUC apomucin profile of this tumor corresponded with neither primary colorectal-type signet ring cell carcinoma nor primary gastric-type signet ring cell carcinoma. This tumor had cells that were consistent with mixed intestinal-type and gastric-type (Fig. 4). Because the distal margin of the duodenal bulb was positive for tumor cells, pancreatoduodenectomy with lymphadenectomy was performed and histological examination revealed no malignancy in the duodenum and lymph nodes. He was administered TS-1 orally as adjuvant chemotherapy. He has remained alive and disease-free for almost 12 months since the initial operation.

Discussion

SRCC is a rare tumor more commonly found in the stomach than at other sites in the digestive tract. SRCC accounts for 35% to 45% of gastric adenocarcinoma cases in recent studies.[1,2] However, SRCC is extremely uncommon in the duodenum. Among 21 reported cases of SRCC in the duodenum,[3–6] the majority of these tumors arose in the ampulla. Only 4 cases from other duodenal areas have been reported so far in the English literature,[3–6] wherein this report is the fifth case of nonampullary duodenal bulb signet ring cell carcinoma.

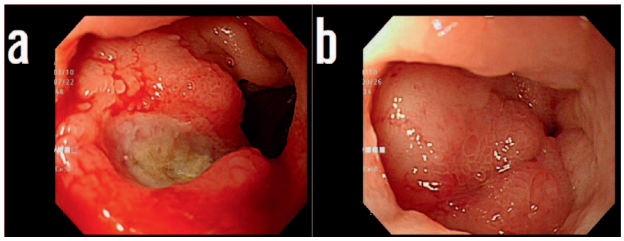

Fig. 1 Esophagogastroduodenoscopy (EGD) findings. (a) The initial EGD shows a round-shaped ulcer with a white mass surrounded by a protrusion at the duodenal bulb near the pylorus. (b) A second EGD performed 7 weeks later shows similar findings. The white mass had disappeared, but the protrusion remained.

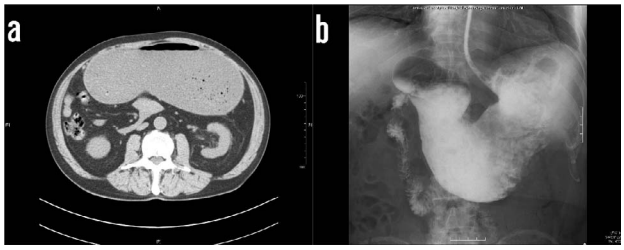

Fig. 2 Plain computed tomography (CT) scan and fluoroscopy of the stomach. (a) The CT scan shows an abnormally distended stomach suggestive of gastric outlet obstruction. (b) Fluoroscopy of the stomach shows the same findings.

Because SRCCs are predominantly found in gastric cancers, these tumors might originate from heterotopic gastric mucosa[7] or gastric-type metaplastic epithelia, which are considered to be a protective response to elevated acidity and are observable in the duodenal bulb of peptic ulcer patients.[8] Although our patient had a history of peptic ulcer disease, no ectopic gastric epithelium was found around the tumor. Immunohistochemical staining demonstrated diffuse positivity for MUC-2 and CDX2 and very weak positivity for MUC-5AC and MUC-6. This tumor was therefore consistent with mixed mainly intestinal-type and slightly gastric-type.

Intestinal-type adenocarcinomas are morphologically similar to colorectal adenocarcinomas and are frequently associated with adenomas. Previous studies suggested that duodenal adenocarcinomas develop in preexisting adenomas, with an adenoma-carcinoma sequence similar to that recognized in colorectal adenocarcinoma.[9] Intestinal-type histology is associated with favorable prognosis in both ampullary adenocarcinomas and nonampullary adenocarcinomas.[10,11] Histologically, gastric-type adenocarcinomas are commonly associated with gastric foveolar metaplasia or Brunner gland hyperplasia, whereas these characteristics are not observed in intestinal-type adenocarcinomas. In the present case, the tumor was mainly the intestinal type; and heterotopic gastric mucosa, gastric foveolar metaplasia, Brunner gland hyperplasia, and adenoma were not detected. The area of the tumor in the stomach was greater than that in the duodenal bulb, but the cancer grew as an elevated tumor with aggregated small granules at the duodenal bulb. Therefore, this case was considered to have arisen *de novo* from duodenal mucosa. First, we selected and performed distal gastrectomy and duodenal bulb resection. However, if endoscopic ultrasound had been performed to get more accurate local oncologic staging before the surgery, we might have selected pancreatoduodenectomy as the first surgery.

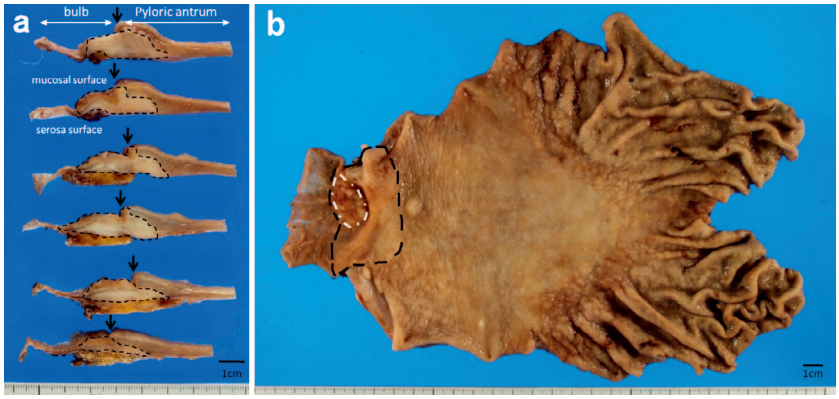

Fig. 3 Macroscopic findings of the tumor that had been resected by distal gastrectomy and duodenal bulb resection. (a) 6 surfaces of the resected tumor that had involved the duodenum and stomach are shown. (b) The specimen that had been resected as a result of distal gastrectomy and duodenal bulb resection is shown. The white dashed line shows the elevated tumor of 2.8 × 2.0 cm in size that was composed of aggregated small granules. The black dashed line shows the entire tumor including the elevated tumor and the submucosally invading tumor.

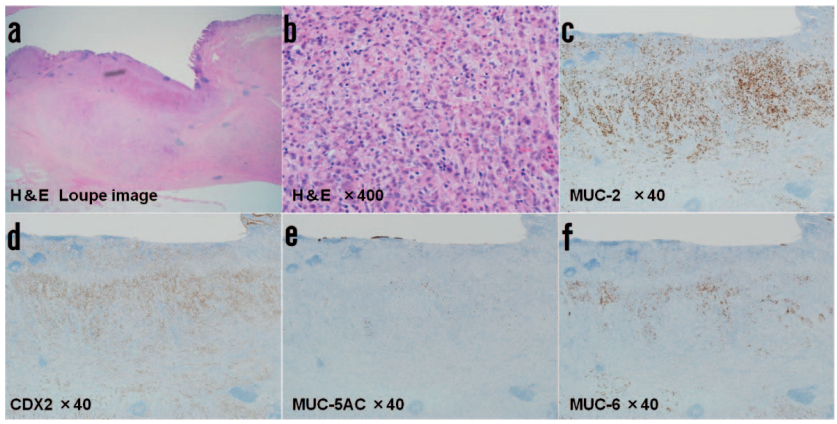

Fig 4 Histologic and immunohistochemical findings of the tumor. (a, b) Hematoxylin–eosin (HE) staining reveals that the tumor invaded to the visceral peritoneum (a, Loupe image) and that the tumor was composed of signet ring cell carcinoma with poorly differentiated carcinoma (b, ×400). (c–f) Immunohistochemistry showed positivity for MUC-2 (c, ×40) and CDX2 (d, ×40), and very slight positivity for MUC-5AC (e, ×40) and MUC-6 (f, ×40).

Conclusion

In this paper, we reported a rare case of poorly differentiated adenocarcinoma with SRCC in the duodenal bulb. It is important to bear in mind that an ulcer following an abnormal clinical course should be biopsied, and we have to select a suitable operation in cases of duodenal bulb cancer.

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References

1. Bamboat ZM, Tang LH, Vinuela E, Kuk D, Gonen M, Shah MA *et al*. Stage-stratified prognosis of signet ring cell histology in patients undergoing curative resection for gastric adenocarcinoma. *Ann Surg Oncol* 2014;**21**(5):1678–1685
2. Taghavi S, Jayarajan SN, Davey A, Willis AI. Prognostic significance of signet ring gastric cancer. *J Clin Oncol*2012; **30**(28):3493–3498
3. Lopez-Garcia LJ, Ojeda A, Toro DH. Primary duodenal signet-ring cell carcinoma presenting as gastric outlet obstruction. *P R Health Sci J* 2006;**25**(4):355–357
4. Aurello P, Petrucciani N, D'Angelo F, Nigri G, Picchetto A, Cicchini C *et al*. Synchronous signet-ring cell carcinoma of the duodenum and ampullary intestinal-type carcinoma. *Am Surg*2011;**77**(12):E262–264
5. Terada T. Signet-ring cell carcinoma of the nonampullary duodenum and proximal jejunum: a case report with an immunohistochemical study. *Endoscopy* 2014;**46** Suppl 1 UCTN:E348
6. Mochizuki K, Kondo T, Tahara I, Inoue T, Kasai K, Oishi N *et al*. Signet ring cell carcinoma of the non-ampullary duodenum: A case report. *Pathol Res Pract* 2015;**211**(10):801–804
7. Ramia JM, Mansilla A, Villar J, Muffak K, Garrote D, Ferron JA. Signet-ring-cell carcinoma of the Vater's ampulla. *JOP* 2004;**5**(6):495–497
8. Wen X, Wu W, Wang B, Yao H, Teng X. Signet ring cell carcinoma of the ampulla of Vater: Immunophenotype and differentiation. *Oncol Lett* 2014;**8**(4):1687–1692
9. Seifert E, Schulte F, Stolte M. Adenoma and carcinoma of the duodenum and papilla of Vater: a clinicopathologic study. *Am J Gastroenterol* 1992;**87**(1):37–42
10. Westgaard A, Tafjord S, Farstad IN, Cvancarova M, Eide TJ, Mathisen O *et al*. Pancreatobiliary versus intestinal histologic type of differentiation is an independent prognostic factor in resected periampullary adenocarcinoma. *BMC Cancer* 2008;**8**:170
11. Ushiku T, Arnason T, Fukayama M, Lauwers GY. Extra-ampullary duodenal adenocarcinoma. *Am J Surg Pathol* 2014; **38**(11):1484–1493