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Primary duodenal signet-ring cell carcinoma presenting as gastric outlet obstruction

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Small bowel tumors occur rarely. We present an unusual case of a 68 year old man with gastric outlet obstruction secondary to a non-ampullary primary duodenal signet ring cell carcinoma. A review of the literature of small bowel malignant tumors is presented along with the case.

Key words: Gastric outlet obstruction, Small bowel tumors, Signet ring cell carcinoma, Duodenum

Small bowel tumors are uncommonly seen in clinical practice. We present a case of gastric outlet obstruction secondary to a rare variant of a primary tumor of the duodenum.

Case report

A 68 year-old man with a history of hypertension and hyperlipedemia was admitted to the hospital after a two month history of early satiety, nausea, non-bilious emesis and twenty pound weight loss. Physical exam was unremarkable except for a mildly distended abdomen and the presence of a succussion splash on auscultation. On admission, there was no evidence of anemia or liver function test abnormalities. Abdominal films performed demonstrated an abnormally distended stomach with retained secretions suggestive of gastric outlet obstruction. Upper endoscopy disclosed a large ulcerated lesion at the duodenal apex causing partial narrowing of the lumen. (Figure 1) The endoscope was advanced with difficulty into the second portion of the duodenum, where the ampullary region showed no gross abnormalities. The stomach although distended was normal. Multiple biopsies were obtained from the duodenal lesion. Rapid urease test was positive. Upper gastrointestinal series and abdominal CT-scan confirmed the extension of the duodenal apex lesion into the second portion (Figure 2 and 3). Chest, abdomen and pelvis CT-scan did not show evidence of metastatic disease or biliary duct dilatation. Histological examination of the biopsy specimen was compatible with a signet ring cell carcinoma with positive mucin stain (Figure 4). During an exploratory laparotomy the lesion was found to be unresectable due to the presence of two left lobar hepatic lesions and several celiac, periportal and retroperitoneal nodes consistent with metastatic disease. A palliative surgery was performed.

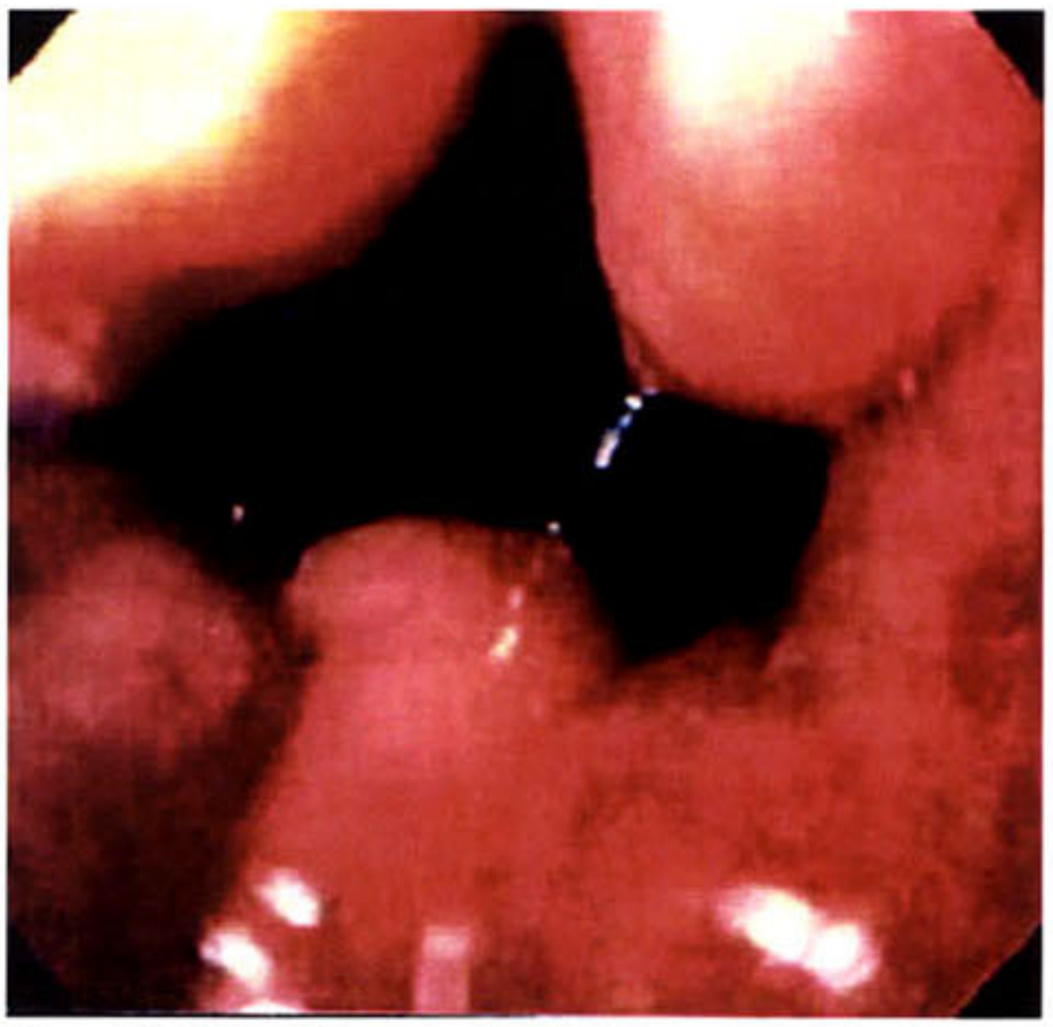

Figure 1. Upper endoscopy showing a large mass at the duodenal apex partially occluding the lumen.

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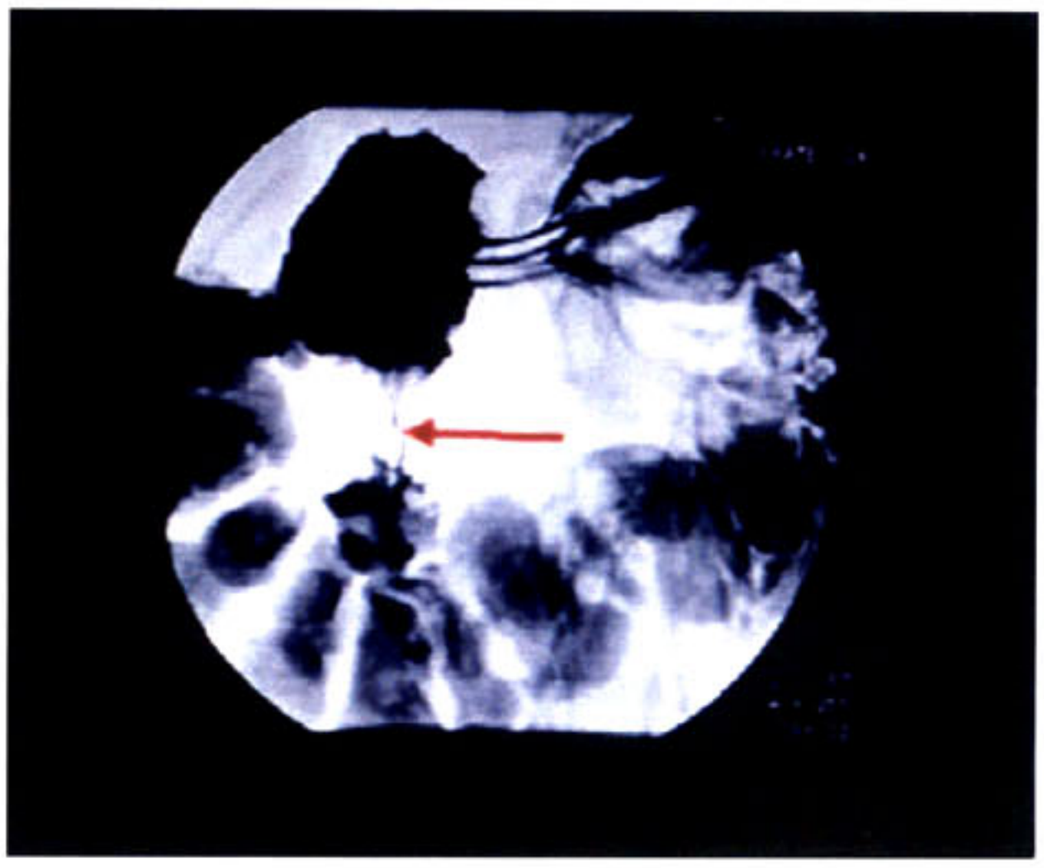

Figure 2. Upper gastrointestinal series, showing a mass at duodenal apex extending into the second portion of the duodenum (see arrow).

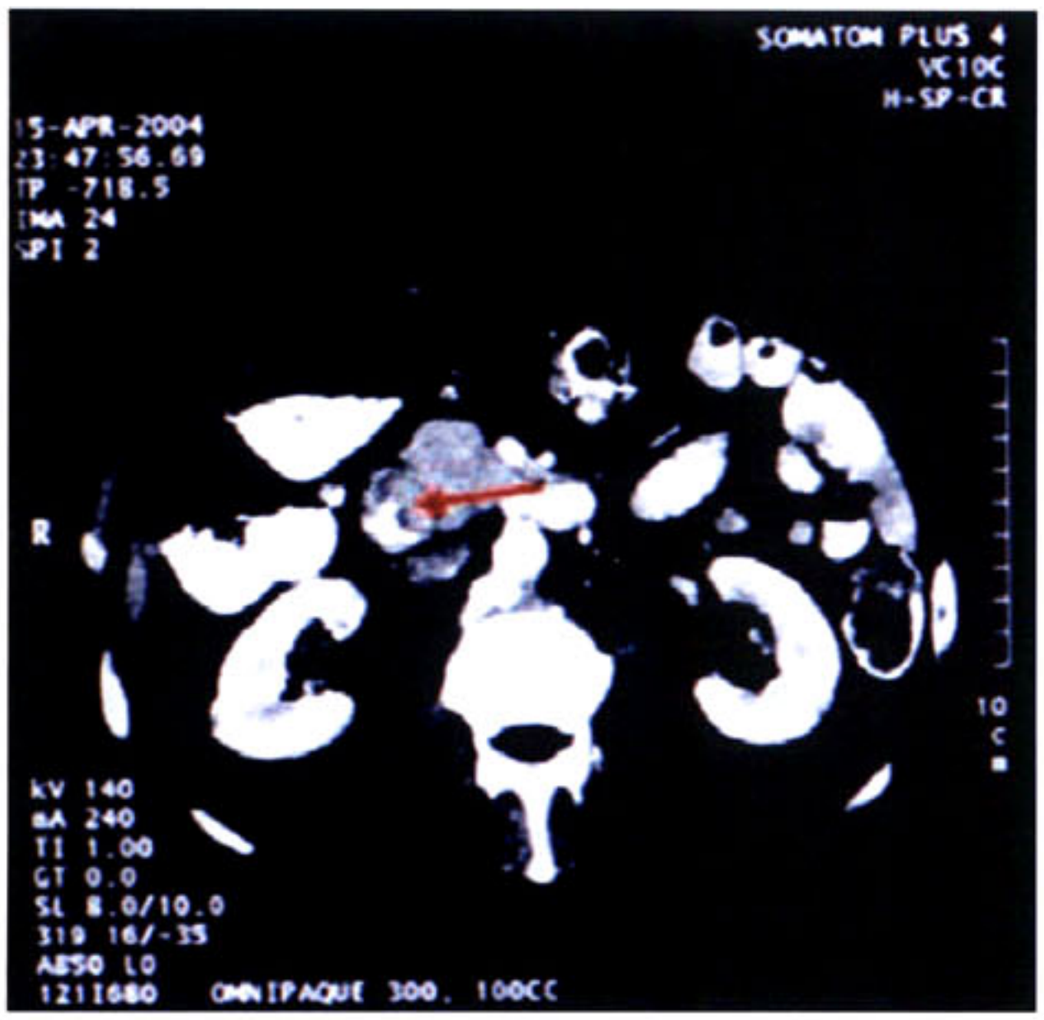

Figure 3. Abdominal CT scan showing partial narrowing of the duodenal lumen. (see arrow)

Discussion

Although the small intestine makes up to 75 percent of the length and 90 percent of the surface area of the gastrointestinal tract, small bowel tumors occur rarely and make up only 1 to 5 percent of all malignant gastrointestinal neoplasms (1-2). A population-based study revealed small-intestinal cancers to be 35 times less common than colorectal cancer (3). The most common small-intestinal malignancies are adenocarcinoma (45%), followed by

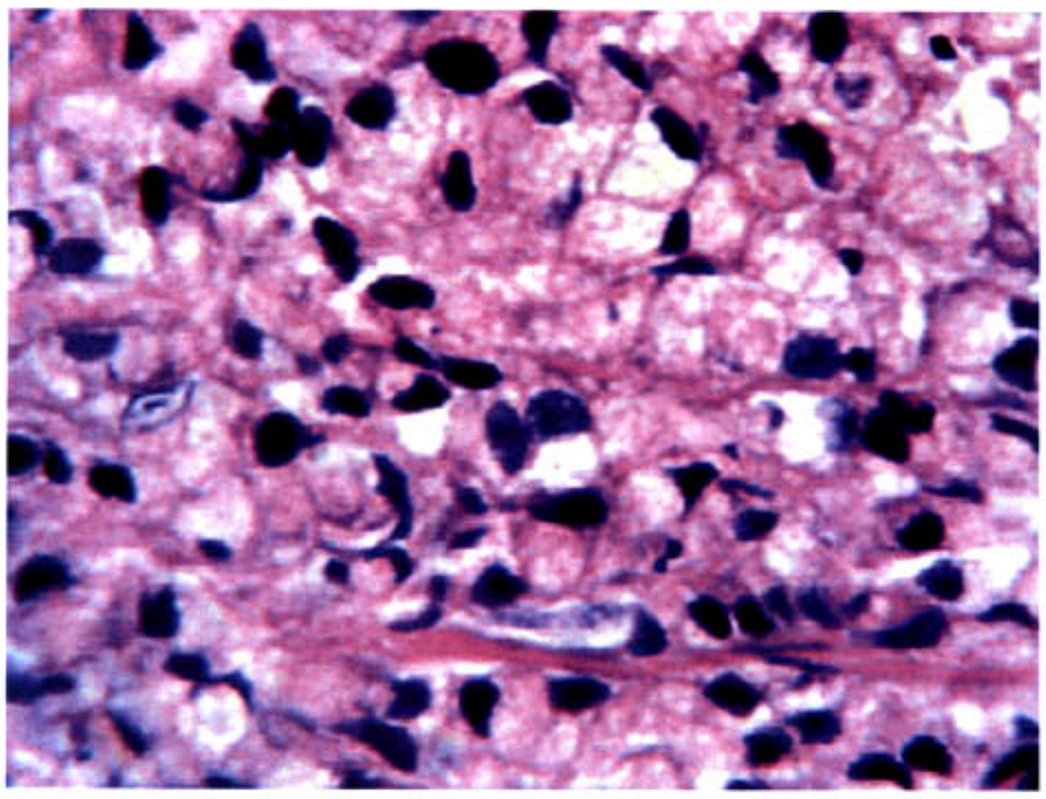

Figure 4. Histological examination showing signet ring cell carcinoma (H&E, orig. mag. X 400)

carcinoid tumors (29%), lymphomas (15%), sarcomas (10%) and 1% of unclassified cases (4). Small bowel adenocarcinoma occurs more frequently in the proximal small bowel, with its frequency decreasing distally (50% in the duodenum, 28% in the jejunum and 22% in the ileum) (3). Lymphomas and carcinoid tumors occur in the opposite distribution, been more frequent distally (48% in the ileum, 40% in the jejunum and 12% in the duodenum).

Mechanisms believed to protect the small bowel against neoplasm includes: the rapid transit of intestinal content, lack of bacteria and an alkaline pH that results in fewer carcinogens (5-6). The rich lymphatic supply, immunoglobulin production and the small bowel mucosa rapid proliferation also protects against malignant transformatio (5-6).

Several conditions predispose to the development of malignant small-bowel tumors (6-7) . The risk of small bowel adenocarcinoma is increased in Celiac disease, Crohn's disease, familial adenomatous polyposis (FAP), and Peutz-Jeghers syndrome. Lymphomas are associated with Celiac disease, immunoproliferative small intestinal disease (IPSID) and very rarely to Crohn's disease. Each of these conditions provide unique models for the development of malignancy.

Genetic abnormalities which has been implicated in the development of small bowel adenocarcinoma includes KI-RAS mutation, p53 tumor suppressor gene and defects in one or more MMR genes resulting in microsatellite instability (MSI) (18). The latter may be related to the increase risk of small bowel adenocarcinoma seen in the patients with hereditary non-polyposis colorectal cancer syndrome (HNPCC).

Primary neoplasms of the small intestine are notorious for their insidious presentation and vague symptoms,

including abdominal pain, anorexia, weight loss and melena (1, 6). These nonspecific symptoms along with lack of physical findings may cause a delay in the diagnosis. Because of the small bowel is relatively inaccessible to standard endoscopic procedures, contrast radiography such as small bowel follow through and enteroclysis has been regarded historically as the standard diagnostic modality. New techniques such as capsule endoscopy, double balloon enteroscopy and CT/ MRI enteroclysis have been developed and likely will have an important diagnostic role (6, 8, 19).

The management of primary small bowel tumors is invariably surgical although adjuvant chemotherapy and radiotherapy may be warranted, depending on the histology of the tumor (1).

Signet ring cell carcinoma is a subtype of mucinous adenocarcinoma that is characterized by cells with abundant cytoplasmic mucin and peripherally displaced nuclei (9). Cases of this type of tumor affecting the stomach, colon and rectum have been reported in the literature, while primary tumors of this type arising in the small bowel are extremely rare. Only a few cases of ampullary signet ring cell carcinoma have been reported, almost all presenting with obstructive jaundice or disseminated carcinomatosis (10-15) In the English speaking medical literature there are no reports of non-ampullary duodenal signet ring cell carcinoma (16). Our case is the first case of such type of tumor in the duodenum presenting with clinical manifestation of gastric outlet obstruction. This case also illustrates the poor prognosis associated with signet ring cell carcinoma as seen in other areas of the gastrointestinal tract (16). Prognosis is improved in patients with ampullary lesions in which early diagnosis permits surgical or endoscopic resection as seen in some of the cases previously reported (12-14).

Resumen

En este artículo presentamos el caso de un hombre de 68 años de edad que se presentó al hospital con un cuadro de obstrucción al vaciado gástrico. La evolución demostró una obstrucción en la primera porción del duodeno. Las biopsias demostraron un adenocarcinoma de células en forma de anillo de sello ("signet ring cell"). El caso es presentado junto a un breve repaso de la literatura.

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References

1. Abu-Hamda EM, Hatabb EM, Lynch PM: Small bowel tumors. Curr Gastroenterol Rep. 2003:386-93
2. Torres M, Matta E, Chinea B, Dueno MI, Martinez-Souss J, Ojeda A, Toro D: Malignant tumors of the small intestine. J Clin Gastroenterol. 2003;37:372-80
3. DiSario JA, Burt RW, Vargas H, McWhorter WP: Small bowel cancer: epidemiological and clinical characteristics from a population-based registry. Am J Gastroenterol 1994;89:699-701
4. Weiss NS, Yang CP: Incidence of histologic type of cancer of the small intestine. J Natl Cancer Inst 1987;78:653-6
5. Lowensfels AB. Why are small-bowel tumors so rare? Lancet. 1973-6;1:24-6
6. Gill S, Heuman D, Mihas A. Small intestine neoplasia. J Clin Gastroenterol 2001;33:267-82
7. Green PH, Jabri D. Celiac disease and other precursors to small bowel malignancy. Gastroenterol Clin north Am 2002;31:625-39
8. Halpern M, Jacob H: Atlas Capsule Endoscopy; Given Imaging Ltd P 47-8
9. Chen JS, Hsieh PS, Hung SY, Tang R, Tasi WS, Hangechien CR. Clinical significance of signet ring cell rectal carcinoma. Int J Colorectal Dis. 2004;19:120-7
10. Tseng LJ, Jao YT, Mo LR. Signet ring cell carcinoma of major papilla. Gastrointest Endoscop. 2002;56:733
11. Hara T, Kawashima H, Ishigooka M, Kashiyama M, Takanashi S, Hosokawa Y. Signet ring cell carcinoma of the ampulla of Vater: a case report. Hepatogastroenterology. 2002; 49:561-3
12. Anral Monreal FM, Lorenzo Patine MJ, Sacristan F, Ghanine Saide G. signet ring cell carcinoma of the Vater's ampulla [article in Spanish with English abstract] Rev Esp Enferm Dig. 1994;85391-3
13. Casella R, Ritmann WW,Meir R, Wegmann W, Widmer MK, Hunger T. signet ring cell carcinoma of Vater's papilla: a very rare malignancy [article in German with English abstract] Helv Chir Acta. 1994;60:987-90
14. Nabeshima S, Kishibara Y, Nabeshima A, Yamaga S, Kinjo m, Kashiwag S. Poorly differentiated adenocarcinoma with signet ring cell of the Vater's Ampulla, without jaundice but with disseminated carcinomatosis [article in Japanese with English abstract] Fukuok Igaku Zasshi. 2003;94235-40
15. Parkhomenko G, Grunko VA, Kozlov AL. Signet ring cell carcinoma of Brunner's glands. [article in Russian with English abstract] Arkh Patol. 1990;52:55-8
16. Ooi BS, Ho YH, EU KW, Seow ChoenF. Primary colorectal signet ring cell carcinoma in Singapore. ANZ J Surg 2001; 71 703-6
17. Weiss NS, Yang CP: incidence of histologic type of cancer of the small intestine. J Natl Cancer Inst 1987,78:653-6
18. Delanouit T, Neczyporkno F, Limburg P, Erlichman C: Pathogenesis and risk factors of small bowel adenocarcinoma: A colorectal sibling: Am J Gastroenterol 2005;100:703-710
19. Yamammoto H, Kita H, Sunada K, Hayashi Y, Sato H, Yano T. Clinical outcomes of double-balloon endoscopy for the diagnosis and treatment of small-intestinal disease. Clin Gastroenterol Hepatol. 2004;2:1010-6