CASE REPORT

Diaphragm-like Stricture in the Duodenum in a Patient with Systemic Sclerosis: Unrelated to Non-steroidal Anti-inflammatory Drug Use

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Abstract

A 59-year-old Japanese woman was diagnosed in 1998 with systemic sclerosis (SSc). The patient presented with a one-month history of postprandial vomiting prior to hospitalization. The patient underwent esophago-gastroduodenoscopy which revealed a diaphragm-like stricture in the second part of the duodenum in January 2004. Unexpectedly, the patient had not used NSAIDs for any long period of time. Retrospective endoscopic findings from 2000 showed the presence of duodenal circular erosions at the same site. This is the first report of a patient diagnosed with SSc who also presented with endoscopic evidence of a stricture of the duodenum, unrelated to NSAIDs.

Key words: systemic sclerosis, stricture, duodenum

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Introduction

Systemic sclerosis (SSc) is a disease of uncertain cause that is characterized by widespread collagen deposition, resulting in tissue fibrosis (1). Cutaneous involvement can be restricted to the face and distal extremities, or it can be diffuse in nature. The prognosis for patients with diffuse cutaneous disease is generally worse because of frequent renal, cardiac and pulmonary involvement. Small bowel manifestations have been reported in up to 50% of cases (2). Patients generally present with symptoms of nausea, vomiting and abdominal bloating that may be caused by either delayed gastric emptying or small bowel hypomotility. Hypomotility from smooth muscle atrophy and fibrosis leads eventually to stasis, dilatation and pseudo-obstruction (3). We describe the first case of a SSc patient with a stricture, unrelated to non-steroidal anti-inflammatory drugs (NSAIDs), of the second part of the duodenum.

Case Report

A 59-year-old Japanese woman was diagnosed in 1998 with SSc (at age 54) when she presented with Raynaud’s phenomenon, heartburn, belching and progressive skin thickening of the chest and upper arms. SSc was confirmed by skin biopsies. In 2000, two years after diagnosis, the patient was diagnosed with pulmonary fibrosis, at which time she visited Juntendo University Hospital for management of SSc.

Esophago-gastroduodenoscopy examination, performed for her heartburn, showed the presence of reflux esophagitis and duodenal circular erosions in the second part of duodenum (Fig. 1A). At this time, the endoscope passed easily. Histological examination of duodenal biopsy samples showed erosive inflammation. GERD (gastroesophageal reflux disease) improved with proton-pump inhibitor medication, and the heartburn resolved. SSc was treated with a 500 mg daily dose of penicillamine, which resulted in regression of generalized skin thickening. NSAIDs were not used to treat her disease at this time.

In 2004, three years after the last esophago-gastroduodenoscopy examination, she was hospitalized with a one-month history of postprandial nausea and vomiting. She also complained of heartburn, belching, cough, dyspnea on effort, and weight loss of approximately 3 kg, although no di-
Figure 1. (A): Endoscopic view three years before surgery showed a duodenal circular erosion in the second part of the duodenum. (B): Endoscopic view showed the presence of a circular duodenal membranous stricture with fold convergencies in the second part of the duodenum.

Figure 2. Upper gastrointestinal tract X-ray revealed a short segment of smooth stenosis in the second part of duodenum.

arrhea, constipation, high temperature or melena was observed. Basilar vesicular rales were audible in both lung fields. Chest radiography and CT scan revealed pulmonary fibrosis. A blood examination disclosed a white blood cell count of 5,100/mm³, hemoglobin at 11.9 g/dl, platelet count of 27.4×10⁹/mm³, total protein at 7.9 g/dl, albumin at 4.2 g/dl, gastrin at 78 pg/ml, KL-6 at 661 U/ml, ANA (antineutile antibody) 1:40 with a speckled pattern, and a positive interaction with a centromere antibody. In contrast, no interactions with antibodies to Scl-70, Jo-1, RNP, double-stranded DNA and SSA were detected. Esophago-gastroduodenoscopy examination showed the presence of a circular duodenal membranous stricture with fold convergencies in the second part of duodenum (Fig. 1B). The endoscope did not pass the stricture, although no ulcerative lesions or tumor were observed. An upper gastrointestinal tract X-ray series showed a web at the same site (Fig. 2). No stenotic or ulcerative regions were observed in other parts of the small intestine but distention with barium stasis was seen, which was diagnosed by radiography of the small intestine. A highly dilated stomach was observed, and images following barium enema showed normal features.

Following longitudinal laparotomy of the upper abdomen, partial resection of duodenum (3×3 cm) and stricturoplasty at the duodenum was performed. The stricture was found to be soft and membranous. By histology, the muscularis propria was replaced extensively by fibrosis, particularly in an inner coat throughout the resected specimen. The strictured region showed inflammation and bleeding in the mucosa and submucosa (Fig. 3).

The patient’s clinical course after the operation was satisfactory. Postoperatively, she has maintained a normal diet and has shown no symptoms of bowel obstruction for three years. However, endoscopic findings of this site one year after surgery (2005) revealed development of a new circular erosion at oral side of anastomosis (Fig. 4A). Since that
Figure 3. Photomicrographs of a specimen resected from the duodenum. (A): The strictured region showed inflammatory cell infiltration and bleeding in the mucosa and submucosa. (H&E original magnification 20×). (B): The muscularis propria was replaced extensively by fibrosis, particularly in the inner coat (H&E original magnification 20×).

Figure 4. (A): Endoscopic view one year after surgery showed a circular erosion in the second part of the duodenum. (B): Endoscopic view three years after surgery showed a duodenal circular erosion with fold convergencies. The intestinal lumen narrowed gradually.

time, the erosion gradually narrowed, resulting in formation of a stricture by three years after the operation (Fig. 4B). The stricture may require further treatment in the future.

Discussion

SSc is a systemic disease that involves the gastrointestinal tract in as many as 90% of cases. Esophageal involvement is the most common, with reports varying from 50% to 90% (4). The small bowel is the next most common site of involvement, and colonic and gastric findings occur infrequently. Collagen deposition in muscular layers can lead to muscle atrophy and fibrosis, resulting in hypomotility with intestinal pseudo-obstruction, bacterial overgrowth and malabsorption. Barium examination of the small bowel routinely shows intestinal dilatation, prolonged transit, jejunal diverticula, and flocculation of barium. The hide-bound sign can be seen as a consequence of fibrosis of the inner circular muscular layer. As the circular layer becomes fibrotic, the longitudinal layer contracts, which results in stacking of the valvulae conniventes (5). Upper gastrointestinal tract X-ray series generally identify duodenal membranous strictures in the second part of duodenum, however other portions are also prone to dilatation. In this case, the clinical course, laboratory data and histological findings all were consistent with a diagnosis of SSc.

Esophageal dysmotility in SSc (6) leads to esophageal stricture and Barrett’s esophagus (7). Pyloric (8, 9) and colonic (10-14) strictures, which are rare, have been reported in two and in five cases, respectively. Duodenal stricture is a rare complication of SSc, as this is the first report of a patient with SSc accompanied by stricture of the duodenum. Endoscopic findings of small intestine strictures are similar to “diaphragm disease”, a rare condition in patients taking NSAIDs, described by Lang et al (15). “Diaphragm disease” is characterized by the presence of multiple, thin, diaphragm-like septa that cause narrowing of the intestinal lumen to a pinhole. These diaphragm-like strictures of the gastrointestinal tract are generally related to long-standing intake of NSAIDs (16-20). Macroscopically, the lesions are thin, concentric, diaphragmatic, septa-like strictures that produce variable luminal occlusion. Characteristic histologic abnormalities are localized to submucosal fibrosis. Although the pathogenic mechanism leading to such lesions is un-
known, these diaphragms can be the end result of a process that begins with circumferential ulceration induced by NSAIDs (21, 22). This patient was treated with oral intake of penicillamine. Penicillamine is a chelating agent. It is used to remove excess copper associated with Wilson’s disease. In addition to chelation of heavy metals, it suppresses the cross-linking of collagen by formation of a thiazoline bond with the aldehyde group of collagen (23, 24). Therefore, it is also used to treat severe rheumatoid arthritis and SSc. Despite these beneficial properties, the frequency of side effects is one-third of its users (25). However, gastrointestinal complications are not so numerous and gastrointestinal ulcers and strictures caused by penicillamine have not been reported.

In the case reported here, submucosal fibrosis, as well as fibrosis of the inner coat of the muscularis propria, was identified. There also was extreme infiltration of the submucosal layer of the strictured region by inflammatory cells. However, the patient claimed no prolonged use of NSAIDs, except for temporary relief from common cold symptoms or headache. The patient’s history, general condition and laboratory findings, as well as pathologic examination of the lesions, excluded other potential causes of duodenal strictures, such as ischemia, Crohn’s disease, tuberculosis, eosinophilic enteritis, chronic nonspecific multiple ulcers of small intestine (26), Zollinger-Ellison syndrome and malignant neoplasms. Although the mechanism for formation of the membranous duodenal stricture is unknown in this case, we hypothesize that stagnation of food and digestive juices caused by small intestine hypomotility may have contributed to the formation of circular erosions and stricture. This is the first report of a patient with clearly diagnosed SSc accompanied by endoscopic evidence of a duodenal stricture unrelated to NSAIDs. Thus, stricture of the gastrointestinal tract might be classified as a new clinical feature of SSc.

References


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