Eosinophilic gastroenteritis observed by double balloon enteroscopy and endoscopic ultrasonography in the whole gastrointestinal tract

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Abstract

Eosinophilic gastroenteritis is a chronic inflammatory disorder of the gastrointestinal tract characterized by the infiltration of eosinophils. It is a rare disease. There are no reports in the history of eosinophilic gastroenteritis being consecutively observed in the whole gastrointestinal tract by esophagogastroduodenoscopy (EGD), double-balloon enteroscopy (DBE), and endoscopic ultrasonography (EUS). A 66-year-old woman was admitted to our hospital because of abdominal pain and diarrhea. Laboratory findings included peripheral eosinophilia and a high serum immunoglobulin E level. We observed the whole gastrointestinal tract by EGD, DBE (antegrade and retrograde approaches), and EUS. DBE showed slightly edematous and reddish mucosa in the jejunum, ileum, and ascending colon, respectively. EUS in all portion of the gastrointestinal tract demonstrated almost normal five-layered structure without ascites. Histologic examination of the biopsy specimens from the stomach, duodenum, jejunum, ileum, colon and rectum revealed eosinophilic infiltration. No evidence of parasites, granulomas, malignancy, vasculitis or embolism was founded in any of the biopsy specimens. The patient was diagnosed with eosinophilic gastroenteritis with predominant mucosal layer form. She was treated with oral corticosteroid, and her symptoms subsided. To the best of our knowledge, this is the first case of eosinophilic gastroenteritis in which the whole gastrointestinal tract was consecutively observed by EGD, DBE, and EUS. (Acta gastroenterol. belg., **2008**, 71, **418-422**).

Key words : eosinophilic gastroenteritis, double-balloon enteroscopy, endoscopic ultrasonography.

Introduction

Eosinophilic gastroenteritis is a rare and chronic inflammatory disorder of the gastrointestinal tract characterized by the infiltration of eosinophils (1,2). The diagnosis is suggested by clinical history and peripheral eosinophilia, and is confirmed by eosinophilic inflammatory infiltration upon histological examination (3). Histological diagnosis is made by endoscopic biopsy (4). Previous studies have shown that eosinophilic gastroenteritis is found in the esophagus, stomach, small intestine and colon (1-6). However, there have been no endoscopic investigations of the entire gastrointestinal tract in patients with eosinophilic gastroenteritis, let alone double-balloon enteroscopy (DBE) and endoscopic ultrasonography (EUS). The following report describes a patient with eosinophilic gastroenteritis whose entire gastrointestinal tract was consecutively observed by esophagogastroduodenoscopy (EGD), DBE and EUS.

Case report

A 66-year-old woman was admitted to our hospital because of abdominal pain and diarrhea. Abdominal pain occurred intermittently with variable duration. Watery diarrhea occurred in an average of six times a day. She reported no fever, nausea or vomiting, and no travel history. There was no personal or family history of bronchial asthma, urticaria, hay fever, atopic dermatitis, or drug antigens. However, diarrhea had often occurred upon eating peaches. On physical examination, the abdomen was soft and slightly distended with no tenderness. Palpation revealed no mass.

Laboratory examination revealed a white cell count of 9370/mm^3 with 20.8% eosinophils and hemoglobin of 11.7 g/dL. Platelet count, biochemistry and tumor markers (including carcinoembryonic antigen (CEA), carbohydrate antigen 19-9 (CA19-9)) were all within normal range limits. Serum immunoglobulin E (IgE) level was increased (487 IU/ml, reference level < 250 IU/ml). The antigen-specific IgE level (radioallergosorbent test, RAST) was positive for peaches. Stool specimens were negative for occult blood, parasites and ova. Abdominal echo examination revealed no significant findings.

EGD showed multiple erosions in the antrum. The bulb and second portion of the duodenum appeared mildly reddened. There were no significant findings in the esophagus. DBE (antegrade approach : 57 min ; retrograde approach : 57 min) revealed slightly edematous and reddish mucosa in the jejunum and ileum (Fig. 1a). DBE also showed edematous mucosa from the ascending colon to the rectum (Fig. 1b). No ulceration, mass or parasites were found. We performed EUS using a 15-MHz ultrasound catheter probe to reddish mucosa of jejunum, ileum, colon and rectum in two or three places.

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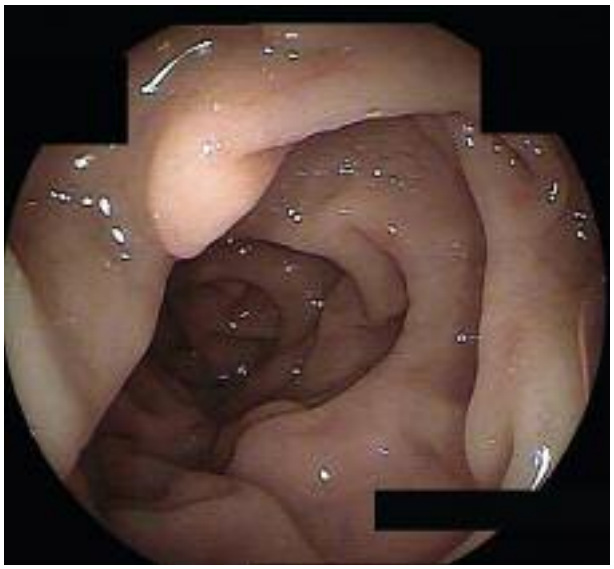

Fig. 1a. — DBE showed slightly edematous and reddish mucosa in jejunum.

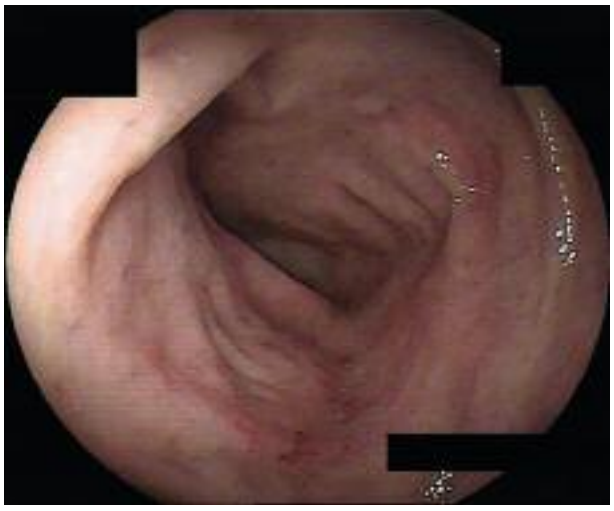

Fig. 1b. — DBE revealed edematous mucosa in the ascending colon.

EUS demonstrated an almost normal five-layered structure without ascites (Fig. 2).

We performed endoscopic biopsy from reddish mucosa in the stomach, duodenum, jejunum, ileum, ascending colon and rectum during procedures. Histological examination of the biopsy specimens from all parts of the gastrointestinal tract revealed eosinophilic infiltration in the epithelium and lamina propria (number of eosinophil / field ?) (Fig. 3a-f). No evidence of parasites, granulomas, malignancy, vasculitis or embolism was identified in any of the biopsy specimens.

The patient was treated with oral corticosteroids (prednisolone 20 mg/day). Prednisolone was gradually tapered to 5 mg in the following 4 weeks. Her symptoms subsided within the first week, with progressive normalization of the white cell and eosinophil counts. She relapsed, however, after prednisolone was reduced from 10 to 5 mg. Prednisolone was increased again to 15 mg and oral sodium cromoglicate 400 mg/day was administered. The dosage of prednisolone was gradually tapered to 2.5 mg in the subsequent 4 weeks. Prednisolone 7.5 mg/day and sodium cromoglicate 400 mg/day were maintained, and the serum IgE level returned to normal limits. She has experienced no recurrence during the follow-up period of 20 months.

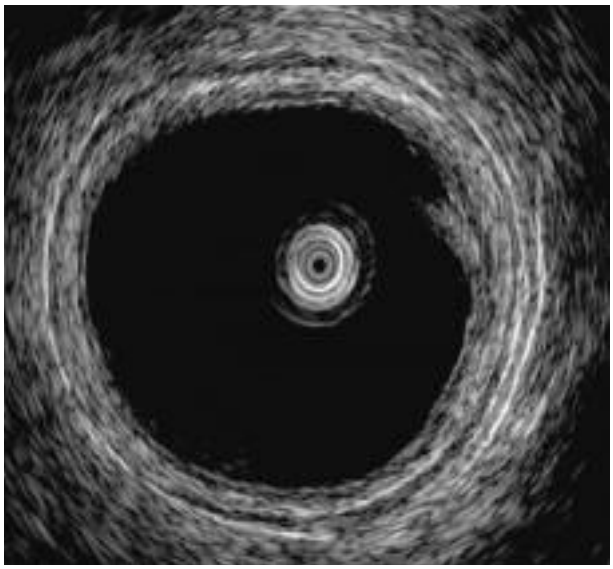

Fig. 2. — EUS demonstrated an almost normal five-layered structure without ascites.

Discussion

Eosinophilic gastroenteritis was first described by Kaijser in 1937 (7), and defined as a disorder that selectively affects the gastrointestinal tract, with eosinophil-rich inflammation, in the absence of known causes for eosinophilia (8). The clinical evaluation of eosinophilic gastroenteritis starts with a comprehensive history and physical examination (8). Evaluation for intestinal parasites through examination of stool samples or specific blood antibody titers should be performed. Although extensive attempts have been made to establish a relationship between food allergy and this disease, no definite evidence for this currently exists (9). In this case, stool specimens were negative for parasites and ova. However, diarrhea had often occurred upon eating peaches, and RAST was positive for peaches. In most cases, allergic manifestations and family histories are present (10).

Corticosteroids remain the mainstay of therapy for eosinophilic gastroenteritis, with good symptomatic responses (11). Steroid administration is the most effectivel treatment, with most patients responding. The recommended dose is prednisolone 20-40 mg for 1-2 weeks (6). The dose is then tapered off over several

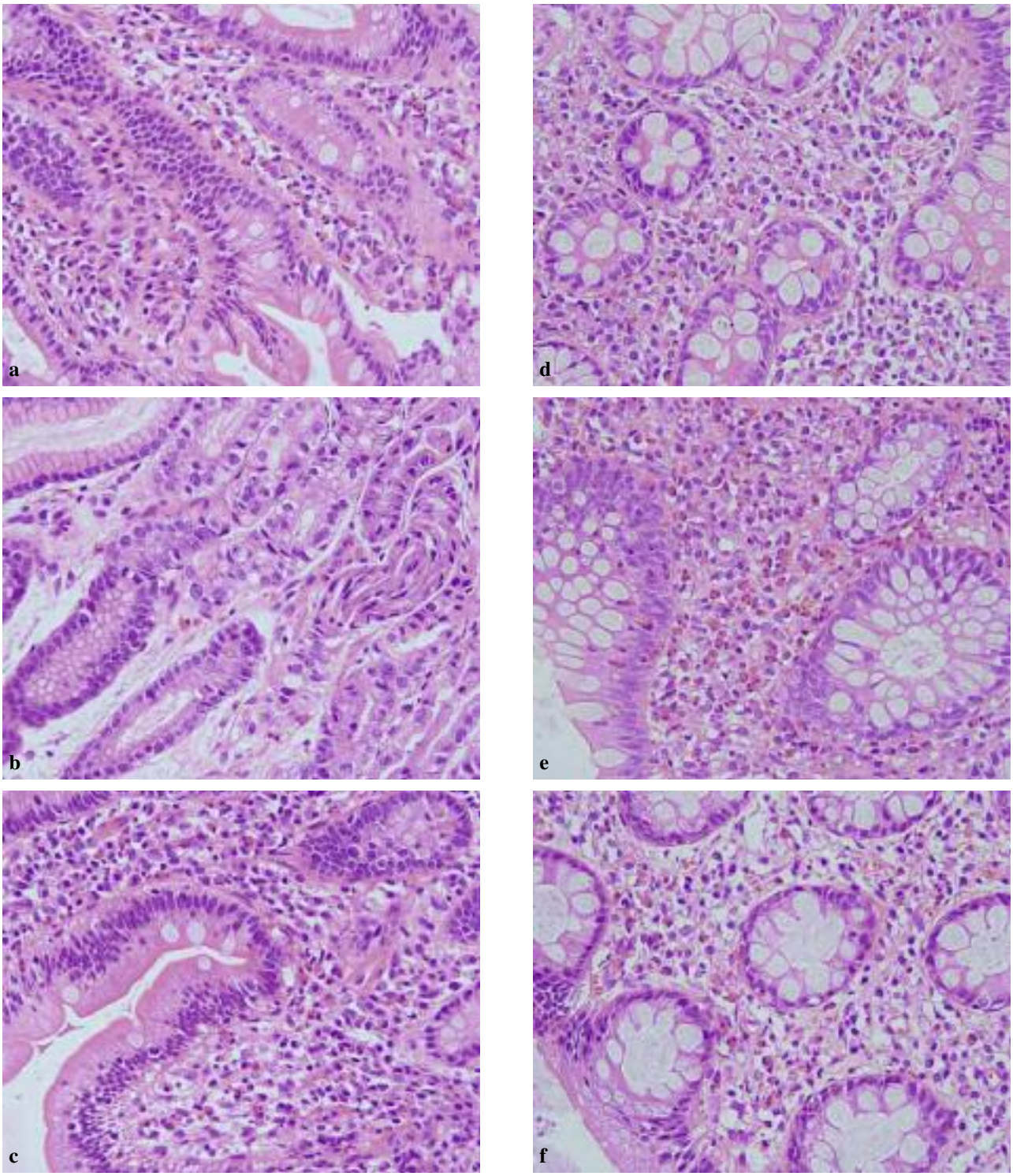

Fig. 3. — Histologic examination of the biopsy specimens from the stomach (a), duodenum (b), jejunum (c), ileum (d), colon (e), and rectum (f) revealed eosinophilic infiltration (hematoxylin and eosin, ×40).

progressive weeks. In this case, therapy with prednisolone was started at 20 mg/day, with tapering of the dosage over 4 weeks. Symptoms and peripheral eosinophilia rapidly resolved within the first week. However, the patient relapsed after prednisolone was reduced from 10 to 5 mg. In previous studies, relapse occurred at steroid tapering, and maintenance therapy was often required (12,13).

The diagnosis of eosinophilic gastroenteritis is based on the histological evaluation of endoscopic biopsy samples, with careful attention to the density, location and characteristics of the eosinophilic infiltration (8).

Previous papers have reported endoscopic findings such as ulcer, redness and edematous mucosa, but not necessarily characterized (3,6,8-10). Therefore, histological examination of biopsy samples is essential (14-15). In this case, the findings of endoscopy were not specific, but biopsy samples showed eosinophils infiltration of the entire gastrointestinal tract.

To demonstrate the infiltration of eosinophils in the small intestine, biopsies of the mucosa are required. DBE, developed by Yamamoto and colleagues in 2001 (16), is a new endoscopic technique that allows for complete visualization and therapeutic intervention through the small intestine. Recently, the usefulness of DBE in the exploration of the small intestine has been reported (17-19). In our experience, DBE has been clinically useful for endoscopic and histological procedures for eosinophilic gastroenteritis involving the small intestine. Pungpapong *et al*. (20) reported that DBE with wireless capsule endoscopy was useful for the prompt and timely diagnosis of eosinophilic gastroenteritis. Chen *et al*. (21) described that a prompt diagnosis of eosinophilic gastroenteritis by DBE could avoid surgical treatment. These reports suggest that DBE is a useful tool for the prompt and timely diagnosis of eosinophilic gastroenteritis involving the small intestine. However, there have been no reports of eosinophilic gastroenteritis being consecutively observed in the whole gastrointestinal tract by conventional endoscopy and DBE. To the best of our knowledge, this is the first case of eosinophilic gastroenteritis that was consecutively observed in the whole gastrointestinal tract by endoscopy, including DBE.

The small intestine is usually explored using push enteroscopy or barium study (3,6). However, these procedures seem to be insufficient for minute observation and diagnosis of eosinophilic gastroenteritis. Push enteroscopy substantially simplifies the methods of examining only the proximal small bowel. Zaman *et al*. (22) reported that the majority of push enteroscopy cases were within the reach of a conventional endoscope. Barium study is easy to perform, but it is difficult to judge the findings because eosinophilic gastroenteritis is not necessarily characterized (3,6,8-10), as in this case. Ruiz Montes *et al*. (23) reported that the findings of eosinophilic gastroenteritis were not specific in barium studies. These previous reports suggest that DBE may replace push enteroscopy or small intestine barium study for the diagnosis of eosinophilic gastroenteritis in the near future.

Klein *et al*. (11) classified eosinophilic gastroenteritis into three types : predominant mucosal, muscle layer, and subserosal forms. In our case, we diagnosed eosinophilic gastroenteritis with predominant mucosal form, because EUS demonstrated an almost normal five-layered structure without ascites throughout the gastrointestinal tract. EUS is reportedly useful for the diagnosis of eosinophilic gastroenteritis, as it can easily demonstrate the characteristic gastrointestinal thickening (4,24,25). Fukuda *et al*. (24) and Andriulli *et al*. (25) reported that EUS was valuable for diagnosing muscular involvement in eosinophilic gastroenteritis with muscular layer form. However, for the mucosal form of eosinophilic gastroenteritis, no previous report exists with regard to EUS findings. In our case, we could not find any abnormalities of the gastrointestinal tract wall using EUS. We speculate that EUS is poorly sensitive in diagnostic of eosinophilic gastroenteritis with predominant mucosal disease. The muscle layer form is characterized by infiltration of eosinophils predominantly in the muscle layer, which leads to thickening of the bowel wall, whereas the subserosal form is characterized by exudative ascites with higher peripheral eosinophilic counts (1). These features are easier to look at with EUS than in the mucosal form. We think that EUS is a useful procedure for classified eosinophilic gastroenteritis in these different types. However, further clinical trials are needed.

In conclusion, we consecutively observed the entire gastrointestinal tract for diagnosis and evaluation of eosinophilic gastroenteritis using EGD, DBE and EUS. We believe that endoscopic observation associated with EUS of the entire gastrointestinal tract will assist further elucidation of eosinophilic gastroenteritis.

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