Endoscopic YAG laser treatment of watermelon stomach (gastric antral vascular ectasia) in patients with systemic sclerosis

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Key words: Scleroderma, progressive systemic sclerosis, CREST syndrome, watermelon stomach, gastric antral vascular ectasia.

Abstract

Objective

Gastric antral vascular ectasia (GAVE) has been recognized as a rare but important cause of chronic iron deficiency anemia. A number of reported patients were found to have evidence of autoimmune disorders or connective tissue diseases. We carried out this study in order to determine the clinical, endoscopic, and pathologic features in a large series of patients with systemic sclerosis (SSc) who were diagnosed with GAVE. We also determined the response to YAG laser treatment for chronic blood loss in these patients.

Methods

A retrospective chart review of 20 cases diagnosed over an 11-year period, with diagnoses of both SSc and GAVE.

Results

Twenty patients with SSc presented with prominent anemia and were diagnosed with GAVE. Treatment with endoscopic laser therapy was successful in preventing surgery for bleeding in GAVE in 85% of cases.

Conclusions

GAVE should be considered in patients with SSc who develop chronic iron deficiency anemia. YAG laser treatment can be useful in the treatment of chronic blood loss anemia in SSc patients with GAVE.

Introduction

Since 1984, gastric antral vascular ectasia (GAVE), also referred to as watermelon stomach, has been recognized as an uncommon cause of chronic blood loss anemia (1). Many patients diagnosed with GAVE have been found to have associated autoimmune conditions including pernicious anemia, hypothyroidism, and primary biliary cirrhosis, as well as symptoms suggesting connective tissue disease (2). Among these disorders, systemic sclerosis (SSc) has been identified in patients with GAVE (3-5). We reviewed our cases of SSc who had definite watermelon stomach in order to determine the clinical, endoscopic, and pathologic features of patients diagnosed with both disorders. The treatment of affected patients was also reviewed and is presented.

Patients and methods

A computerized search of medical records for diagnoses of GAVE and SSc, including the diagnoses of scleroderma and CREST syndrome (calcinosis, Raynaud’s, esophageal dysfunction, sclerodactyl and telangiectasias), at Mayo Clinic was carried out for the 11-year period of 1987 through 1997. The medical records of patients diagnosed with both disorders were identified and reviewed. The diagnosis of SSc was made by physician diagnosis. All patients fulfilled accepted criteria (6). SSc was clinically classified as having either limited or diffuse cutaneous involvement based on the definitions of Leroy (7). The endoscopic and biopsy findings in these patients were reviewed to confirm the diagnosis of GAVE (1). The presence of antinuclear antibodies was determined by indirect immunofluorescence on Hep-2 cells. Anti-centromere antibodies were also detected in this fashion. The presence of antibodies to Scl-70 were determined by ELISA. The clinical and laboratory features of affected patients were extracted from the records.

Laser treatment was performed using the Neodymium yttrium-aluminum-garnet (Nd:YAG) laser. The entire affected area of the stomach was treated at each session. The power setting for photocoagulation averaged 40 W and the pulses were delivered at a duration of 0.5 seconds. The entire area was painted until a white eschar appeared. Patients returned at one-month intervals for a mean of 3 sessions. The number of laser sessions was counted and the results of treatment were determined by subsequent measurement of hemoglobin and, in some cases, repeat endoscopic examination.

Results

Patient demographics

Twenty patients were identified who fulfilled the criteria of both SSc, limited or diffuse type, and GAVE. The demographic and clinical features of these patients are shown in Table I. The group was composed of 16 females and 4 males. The median age of the patients at the time of the diagnosis of GAVE was 60 years with a range of 40 to 78 years. At the time of the diagnosis of GAVE,
the median duration of the clinical diagnosis of SSc was one year. The disease was present at the time of diagnosis of GAVE for 2 years or less in 15 of the 20 patients.

In 12 patients SSc was typical of the limited cutaneous disease subset. The anticientromere antibody was positive in 7 of these patients and negative in 3 patients. Diffuse cutaneous disease was present in 8 patients. The anti-Scl-70 antibody was positive in 1 of 4 patients tested. The duration of SSc did not differ between patients with diffuse and those with limited cutaneous disease. Cutaneous telangiectasias were present in 15 of 20 patients.

**Laboratory investigations**

Nineteen patients presented with anemia which was associated with low serum iron and ferritin and stools which tested positive for blood. Five patients gave a history of melena. The median duration of the anemia was one year. The median hemoglobin was 6.6 g/dl with a range of 4.1 to 11.5 g/dl. Fifteen patients required blood transfusion because of the severity of the anemia. The median number of units transfused in these patients was 13 units (range 2-30 units). The patient without anemia was diagnosed with GAVE at the time of endoscopy which was performed to examine the esophagus.

**Endoscopic findings**

The endoscopic findings at diagnosis were characteristic of GAVE in all patients. These findings included multiple raised or flat friable erythematous streaks which radiated proximally from the pylorus. The diagnosis of GAVE was made on the basis of these endoscopic findings in 10 patients. In the other 10 patients, biopsies revealing the typical histopathologic findings were confirmatory. There were no differences in the clinical features in those patients with and without biopsy confirmation of the lesion. Earlier endoscopic examinations had been carried out elsewhere because of anemia in 16 patients, and the findings of GAVE were not recognized at endoscopy in 11 of these patients. These earlier endoscopic findings were thought to represent nonspecific gastritis in 6 patients, atrophic gastritis in 2, and angiodysplasia or telangiectasia in 3. A right hemicolecction had been performed in one patient who was thought to have been bleeding from angiodysplasia of the colon and was subsequently found to have GAVE.

The findings of GAVE were confined to the antrum in 16 patients, but 4 patients had disease in other locations as well. Localized involvement was present in the cardia of the stomach in 3 patients, within a diaphragmatic hernia in 2 patients, and within the pylorus in 1 patient. Arteriovenous malformations (AVMs), distinct from GAVE, were present in the colon in 5 patients, in the duodenum in 2 patients, and in the duodenum and jejunum in 1 patient. Atrophic gastritis was identified in 6 patients. Pernicious anemia had been diagnosed in 6 patients. Evidence of chronic liver disease, determined by physical examination, liver function tests and CT scanning, was present in 5 patients, including 2 patients with primary biliary cirrhosis. No patient had endoscopic findings suggestive of portal hypertensive gastropathy (8, 9).

**Laser treatment**

Treatment of GAVE was initiated with

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**Table I.** Patient demographics and clinical features.

<table>
<thead>
<tr>
<th>Pt. no.</th>
<th>Age (yrs.)</th>
<th>Sex</th>
<th>Duration of SS (yrs.)</th>
<th>Subset of SS</th>
<th>ANA antibody</th>
<th>SS duration of bleeding (mos.)</th>
<th>Units of blood transfused</th>
<th>Hemoglobin (gm/dl)</th>
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<td>1</td>
<td>52</td>
<td>F</td>
<td>1</td>
<td>limited</td>
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<td>centromere</td>
<td>60</td>
<td>0</td>
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<td>M</td>
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<td>negative</td>
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<td>24</td>
<td>19</td>
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<tr>
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<td>55</td>
<td>F</td>
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<td>diffuse</td>
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<td>negative</td>
<td>positive</td>
<td>6</td>
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<tr>
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<td>40</td>
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<td>centromere</td>
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<td>centromere</td>
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<td>F</td>
<td>&gt; 1*</td>
<td>limited</td>
<td>negative</td>
<td>centromere</td>
<td>?</td>
<td>Multiple</td>
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<tr>
<td>9</td>
<td>64</td>
<td>F</td>
<td>&gt; 1</td>
<td>limited</td>
<td>positive</td>
<td>negative</td>
<td>18</td>
<td>Multiple</td>
</tr>
<tr>
<td>10</td>
<td>62</td>
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<td>negative</td>
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<td>28</td>
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<tr>
<td>11</td>
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<tr>
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<td>negative</td>
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<tr>
<td>18</td>
<td>77</td>
<td>F</td>
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* > 1: more than 12 months and less than 2 years.
GAVE is an uncommon disorder of the gastric antrum responsible for chronic gastrointestinal blood loss. The recognition of GAVE as a distinct disorder came in 1984 with a report of 3 cases with characteristic endoscopic and histologic features (1). Endoscopically, GAVE is characterized by the presence of multiple, linear, friable erythematous streaks on the gastric antral mucosa which radiate proximally from the pylorus. Because the endoscopic appearance of the lesion was reminiscent of the stripes on the outer surface of a watermelon, Jabbari coined the term ‘watermelon stomach’ to describe the disorder (1). While GAVE involves the gastric antrum, similar lesions may be found in other locations including the gastric cardia and within diaphragmatic hernias (2). In that same study 5 patients (11%) had numerous diffuse scattered mucosal lesions (2).

The pathologic features of the disorder, dominated by dilated mucosal capillaries, explain the gross appearance of the lesion as well as its tendency to bleed (1, 10). Patients with GAVE usually present with iron-deficiency anemia secondary to chronic gastrointestinal bleeding (2, 11). Anemia was severe enough to require transfusion in 62% of patients with GAVE in one review (11). Infrequently, patients experience melena or hematochezia (11).

The medical treatment of GAVE has included corticosteroids (1, 12, 13) and combination treatment with estrogen and progesterone (14). Others have been managed with antacids and iron replacement. A number of different types of therapeutic endoscopic treatments have been used in the treatment of GAVE. These have included bipolar cautery (15), heat probe (16), sclerotherapy (17, 18), and laser ablation (2, 19). YAG laser has been utilized in the largest treatment series of 45 unselected patients with favorable results (2). Bleeding in patients with scleroderma in the current series seemed to be less well controlled with laser treatment, suggesting the possibility of more resistant disease. Fifteen of our patients were treated with endoscopic YAG laser coagulation. Bleeding was completely controlled in only 2 patients. In 6 patients, anemia persisted or recurred after treatment but could be controlled medically. Another 2 patients required transfusion as part of their post-endoscopic treatment in order to maintain adequate hemoglobin levels. Three of our patients underwent surgery for uncontrolled bleeding. In 2 of these 3 patients, disease was present in extra-antral locations. Patients reported previously have been treated with surgical antrectomy as the initial therapeutic measure, or after failed treatment with endoscopic measures (1, 2). The most commonly employed surgical technique to treat resistant GAVE has been antrectomy with Billroth I anastomosis, but other procedures have also been employed (11).

A number of reports have called attention to the occurrence of GAVE in SSc (2-5, 20-22). Sixty-two percent of the 45 patients reported by Gostout had findings of associated ‘autoimmune’ disease. These included 6 patients with SSc (22). Raynaud’s phenomenon was present in 14 patients (31%) and sclerodactyly in eight (18%) (2). GAVE has been found in about equal numbers in patients with diffuse and with limited cutaneous SSc. Because GAVE is rare and there are no large prospective endoscopic studies in SSc, the prevalence of GAVE in SS has not been determined. However, because anemia in SSc is not common, GAVE should be a prime consideration in the differential diagnosis of chronic blood loss anemia in these patients. The cause of GAVE is unknown. Histologic similarities to lesions seen at stoma sites and in cases of solitary rectal ulcer syndrome (10) suggest a traumatic etiology. A similar mechanism has been proposed for GAVE lesions seen in association with diaphragmatic hernia (2). A traumatic etiology is supported by the endoscopic visualization of prolapse of antral mucosa during vigorous antral contraction (1, 2, 23). Manometric studies have provided evidence for the occurrence of high amplitude uncoordinated gastric antral contractions in some scleroderma patients (24) which could result in forces theorized to be responsible for GAVE in non-SSc patients. Alternatively, it has been suggested that the lesions of GAVE are part of the spectrum of vascular lesions seen in SSc (3, 5, 25). Telangiectasias have been found...
References