Oncology, Nuclear Medicine and Transplantology

Case Report

Combined Endoscopic Treatment of Gastric Arterio-Venous Malformation

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Abstract:

Gastric antral vascular ectasia (GAVE), also known as "watermelon stomach," is a rare but clinically significant cause of chronic anemia and upper gastrointestinal bleeding, particularly in elderly patients. Although uncommon, GAVE considerably affects quality of life due to recurrent bleeding, frequent hospitalizations, and the need for blood transfusions. Diagnosis is typically based on endoscopic findings, characterized by red, radiating streaks from the pylorus or multiple punctate angioectasias in the antrum. Therapeutic approaches include various endoscopic methods, most notably argon plasma coagulation (APC) and endoscopic band ligation (EBL), each with specific advantages and limitations. Recent studies have emphasized the benefits of combining these two modalities to achieve more effective and durable hemostasis.

This case report presents a 79-year-old female patient with GAVE syndrome, manifested by chronic iron-deficiency anemia. Initially, the patient underwent APC, which provided temporary improvement but failed to achieve complete resolution. On follow-up endoscopy, persistent angioectatic lesions prompted a second-stage procedure using a combined treatment strategy: three elastic bands were applied to the most prominent vascular areas, followed by APC on residual superficial lesions. Over the next three months, the patient underwent regular endoscopic surveillance and laboratory monitoring. Follow-up assessments revealed significant clinical and endoscopic improvement, including normalization of hemoglobin levels and regression of vascular malformations, with no signs of recurrent anemia or bleeding.

This clinical case highlights the effectiveness and safety of combined endoscopic therapy using EBL and APC in patients with refractory or recurrent GAVE. The synergistic action of both techniques allows for comprehensive treatment of both superficial and deeper vascular lesions, improving long-term outcomes and reducing the need for repeated interventions. Combined therapy may be considered the treatment of choice in complex GAVE cases, offering a promising strategy in routine endoscopic practice.

Keywords: Gastric Antral Vascular Ectasia; Chronic Anemia; Endoscopy; Gastrointestinal Bleeding; Argon Plasma Coagulation

Introduction

Gastrointestinal bleeding (GIB) is one of the leading causes of emergency hospitalization and remains a pressing issue in clinical gastroenterology. Among non-variceal sources of bleeding, gastric antral vascular ectasia (GAVE syndrome) is a rare yet clinically significant condition that predominantly affects older adults. According to various authors, GAVE accounts for approximately 4% of all non-variceal upper gastrointestinal hemorrhages [1].

GAVE may present with episodes of acute blood loss or as chronic iron-deficiency anemia with positive fecal occult blood testing. This condition substantially impairs patients' quality of life and increases the need for repeat hospitalizations and blood transfusions [2].

The typical endoscopic appearance includes red streaks radiating from the pylorus (the "watermelon stomach" sign) or multiple punctate angioectasias creating a "honeycomb" pattern. The diagnosis is confirmed by esophagogastroduodenoscopy (EGD), and in uncertain cases by histology demonstrating vascular ectasia, thrombosis, spindle-cell proliferation, and fibro-hyalinosis.

Several endoscopic modalities are used in the treatment of GAVE. Argon plasma coagulation (APC) is the most common technique for ablating superficial vessels. An alternative is endoscopic band ligation (EBL), which can effectively target deeper vessels. In recent years, combined EBL and APC has been actively discussed as a strategy to achieve more durable hemostasis and reduce recurrence rates [3].

Case Report

Patient K., born in 1945, presented with chronic anemia and chronic erosive gastritis and was referred for EGD prior to elective coronary angiography. At the first examination, the endoscopist interpreted GAVE as distal erosive gastropathy. At a follow-up examination on September 1, 2025 (note: this date precedes subsequent 2024 events in the timeline and may require correction), after treatment for gastric erosions, another endoscopist diagnosed arteriovenous malformation of the antrum ("watermelon stomach," i.e., GAVE syndrome) based on the characteristic macroscopic appearance (Fig. 1).

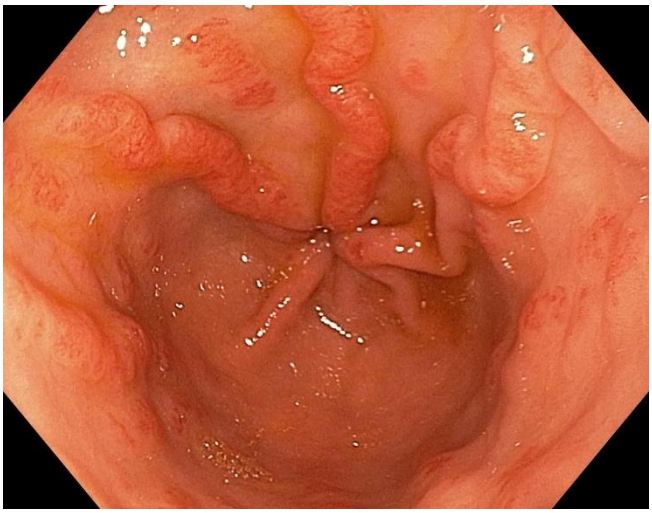


Figure 1. Endoscopic appearance of an arteriovenous malformation of the stomach ("watermelon stomach," GAVE syndrome).

On September 19, 2024, the patient was electively admitted with a diagnosis of GAVE syndrome to the Surgical Department of the National Research Oncology Center (NROC). On admission, the complete blood count dated September 13, 2024 showed: leukocytes 4.8 g/L, hemoglobin 98 g/L, platelets 243 g/L, erythrocytes 3.5 g/L, hematocrit 37.4%, ESR 27 mm/h.

On September 20, 2024, APC of gastric vascular malformations was performed. On September 23, 2024, the patient was discharged in satisfactory condition with a recommendation for repeat endoscopy in one month.

Exactly one month later, on October 21, 2024, a control EGD was performed at the patient's local clinic, revealing multiple gastric erosions and ulcers; treatment by a gastroenterologist was recommended.

On November 17, 2024, a further control EGD demonstrated small foci of angioectasia in the pyloric canal, decreased in number compared with prior examinations. A second-stage inpatient treatment for angioectasias at NROC was recommended.

On December 4, 2024, the patient was electively re-admitted to the Surgical Department of NROC. On admission, the CBC dated November 26, 2024 showed: hemoglobin 103 g/L, leukocytes 4.67/L, erythrocytes 3.76/L, platelets 192/L, ESR 15 mm/h. On December 5, 2024, combined endoscopic treatment of arteriovenous malformations of the antral mucosa was performed: three ligating bands were applied to mucosal areas with angioectasias, followed by APC of the remaining abnormal zones (Fig. 2). On December 9, 2024, the patient was discharged in satisfactory condition.

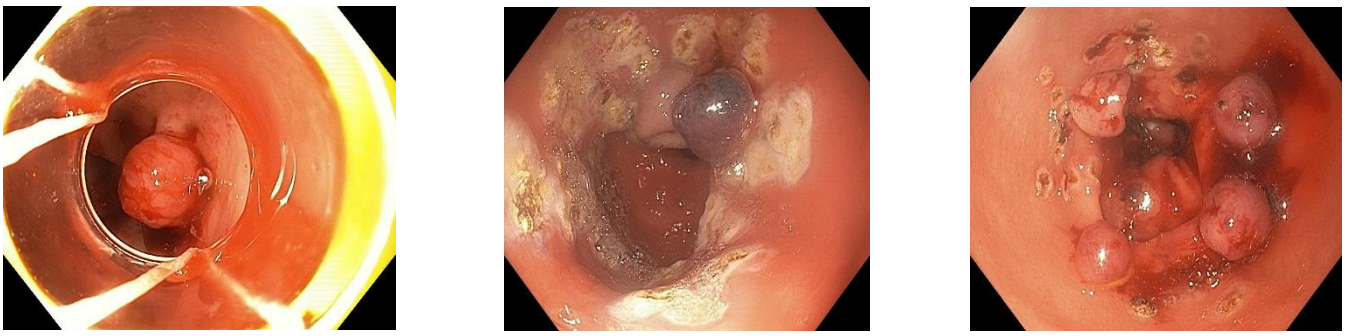
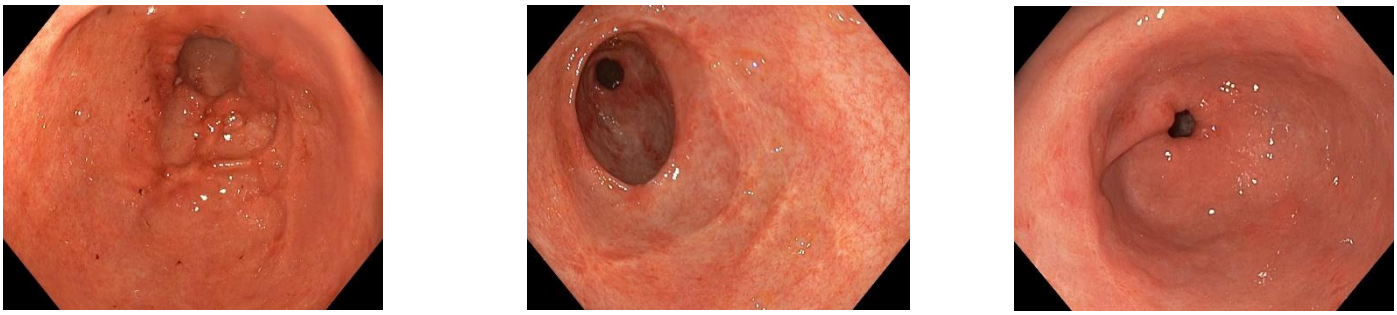


Figure 2. Steps of endoscopic band ligation and argon plasma coagulation for arteriovenous malformations of the gastric mucosa.

On January 5, 2025, a control EGD showed the following endoscopic findings: the distal gastric mucosa was smooth, pale, atrophic, with numerous small flat erosions; residual foci of mucosa with arteriovenous malformations were visualized; four ulcerative defects measuring 0.4 × 0.3 cm were identified in the pyloric canal, with fibrin-covered bases after prior endoscopic ligation (Fig. 3a).

At follow-up on March 11, 2025, flat, stellate scars were observed at the sites of prior ulcers, with a few pale angioectatic foci in the pyloric canal (Fig. 3b). The CBC dated March 9, 2025 showed: hemoglobin 129 g/L, leukocytes 4.5/L, erythrocytes 3.8/L, platelets 220/L, ESR 10 mm/h.

On March 30, 2025, serial control EGD revealed delicate scarring of the distal gastric mucosa without overt vascular malformations (Fig. 3c).



a b c

Figure 3. Endoscopic findings over time: (a) one month after combined endoscopic therapy; (b) two months after therapy; (c) three months after therapy.

Based on serial EGD and laboratory results, dynamic observation was recommended. Over three months of follow-up, no evidence of anemia was detected. The course of the disease is summarized in Table 1.

Discussion

Endoscopic ligation (EL) operates on the principle of applying elastic bands to pathologically altered vessels. This induces mechanical compression, ischemia, and subsequent replacement by fibrous tissue. The method specifically targets deeper vascular structures, which can be the source of recurrent bleeding. Literature data suggest a lower recurrence rate with EL compared to argon plasma coagulation (APC), as well as a reduced need for repeat procedures.

Nevertheless, EL has certain technical limitations. In some instances, the antral gastric mucosa cannot be adequately drawn into the ligator cap, especially in cases of pronounced scarring or atrophy, which can diminish the method's effectiveness [4].

Argon plasma coagulation (APC) remains a convenient and safe method for superficial vascular ablation, allowing for the treatment of broad areas of affected mucosa. However, in some cases, particularly with deep or recurrent lesions, the effectiveness of APC is limited.

The combined application of EL and APC allows for overcoming the limitations of each method due to their complementary actions. EL addresses deep angioectasias, while APC targets superficial lesions. According to modern meta-analyses, this combined

approach yields more stable clinical outcomes, reduces the need for blood transfusions, and decreases the number of repeat interventions [5].

Table 1. Clinical timeline of the case

Date	Event	Notes
01.09.2025	Elective follow-up gastroscopy (EGD) after gastroenterologist-directed therapy for gastric erosions	Initial diagnosis of arteriovenous malformations of the stomach (watermelon stomach, GAVE syndrome) based on characteristic endoscopic appearance.
13.09.2024	Complete blood count (CBC) Leukocytes 4.8 g/L, hemoglobin 98 g/L, platelets 243 g/L, erythrocytes 3.5 g/L, hematocrit 37.4%, ESR 27 mm/h.	Findings support anemia.
19.09.2024	Elective admission to the Surgical Department, National Research Oncology Center (NROC)	Baseline assessment and planning of endoscopic therapy.
20.09.2024	Argon plasma coagulation (APC) of gastric vascular malformations	APC of arteriovenous malformations of the antral mucosa, Soft Coagulation mode, 50 W.
23.09.2024	Discharged in satisfactory condition.	Follow-up gastroscopy is recommended in one month.
21.10.2024	A control gastroscopy was performed at the patient's local municipal polyclinic.	During this procedure, the endoscopist identified multiple erosions and gastric ulcers, leading to a recommendation for gastroenterological consultation and treatment.
17.11.2024	Control Gastroscopy	During a subsequent gastroscopy, minor foci of angioectasias were observed in the pyloric canal region, showing a dynamic reduction in their number. A second stage of treatment for the angioectasias was recommended for inpatient management at the NROC
26.11.2024	Complete Blood Count (CBC)	Hemoglobin: 103 g/L White Blood Cells (WBC): 4.67/L Red Blood Cells (RBC): 3.76/L Platelets: 192/L Erythrocyte Sedimentation Rate (ESR): 15 mm/h
04.12.2024	Planned hospitalization in the surgical department of the NROC	Was arranged for endoscopic treatment
05.12.2024	Combined treatment for arteriovenous malformations of the gastric antrum was performed as planned.	This involved the application of three ligating bands to the mucosal areas with angioectasias, followed by argon plasma coagulation of the remaining altered areas.
09.12.2024	Discharge from Hospital	The patient was discharged in satisfactory condition
05.01.2025	Control Gastroscopy	A control gastroscopy revealed the following endoscopic findings: The mucosa in the distal regions was smooth, pale, atrophic, with numerous small, flat erosions. Foci of mucosal arteriovenous malformations were visualized. Within the pyloric canal, four ulcerative defects, measuring 0.4x0.3 cm, were identified; their bases were filled with fibrin following the previously performed endoscopic ligation.
09.03.2024	Complete Blood Count	Hemoglobin: 129 g/L White Blood Cells (WBC): 4.5/L Red Blood Cells (RBC): 3.8/L Platelets: 220/L (ESR): 10 mm/h
11.03.2024	Control Gastroscopy	During a follow-up examination on March 11, 2025, flat, stellate scars were noted at the sites of the ulcerative defects, with isolated, pale foci of angioectasias in the pyloric canal area.
30.03.2025	Control Gastroscopy	The mucosal lining presented with delicate mucosal scars in the distal segments, without clearly expressed foci of vascular malformations.
From March 11 to Present	Dynamic observation continues at the patient's place of residence.	The patient's overall condition remains unaffected, with no evidence of anemia.

Conclusion

Gastric Antral Vascular Ectasia (GAVE) syndrome is a rare but clinically significant condition associated with chronic anemia and the risk of recurrent bleeding. Endoscopic treatment utilizing both APC and EL is an effective therapeutic tool for this condition. The combination of EL and APC provides a more comprehensive approach to vascular changes, thereby improving clinical outcomes. The presented clinical case demonstrates the high efficacy of this combined approach and confirms its utility in the management of recurrent GAVE. The combined methodology can be recommended as a preferred approach for treating complex and resistant forms of GAVE.

Acknowledgement

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Patients consent: obtained
Disclosures: none

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