

## Endoscopic Laser Treatment of Dieulafoy's Lesion

Byung Sub Park, M.D., Jong Do Choi, M.D., Il Jun Lee, M.D., Jung Woo Noh, M.D.,  
Woo Joong Kim, M.D. and Kyu Sung Rim, M.D.

*Department of Internal Medicine, College of Medicine, Hallym University, Seoul, Korea*

*Dieulafoy's disease is a distinctive arteriovenous malformation of the stomach, which presents with massive or recurrent gastrointestinal bleeding.*

*A case of Dieulafoy's disease in an adult female, in which an endoscopic Nd: YAG (neodymium: yttrium aluminum garnet) laser was used successfully in controlling bleeding, is presented here.*

Key Words: Dieulafoy's lesion, Nd: YAG laser

### INTRODUCTION

Following the introduction of fiberoptic endoscopy, the source of bleeding can now be identified in between 80 and 95 per cent of all patients presenting with upper gastrointestinal hemorrhage. The remaining patients present a particularly difficult problem in management. One cause of bleeding in this group is a Dieulafoy's lesion.<sup>1)</sup>

The disease appears to be a large tortuous submucosal artery which usually develops in the stomach and is a rare cause of massive gastrointestinal hemorrhage.<sup>1,2)</sup>

The diagnostic method of choice is now considered to be a gastroscopy which can be easily performed instead of doing the angiography. In the past, surgical intervention has been the therapy of choice in most reported cases, but laser treatment has been introduced recently as a new effective alternative method.<sup>3)</sup>

We report a case in which endoscopic laser photocoagulation was used successfully in the management of this lesion.

### CASE

A 55-year old female patient who had had a subtotal gastrojejunostomy seven years ago because of peptic ulcer was admitted to the local hospital on July 9, 1986 complaining of hematemesis, dizziness,

and epigastric pain. Iced saline gastric lavage was done for massive hematemesis and two units of packed red blood cells and one unit of whole blood were given but massive bleeding continued. The patient was transferred to the Kang Nam Sacred Heart Hospital for further management.

Physical examination disclosed pallor. The blood pressure was 130/70, the pulse 140 beats per minute and the temperature 37.2°C. Distention of the neck veins was minimal. The lungs were clear on auscultation. The heart was not enlarged and no murmurs were audible. Examination of the abdomen was negative. Rectal examination revealed the presence of dark red stool.

The packed cell volume was 25 per cent and the leukocyte count was 14300 per cubic millimeter. Urinalysis revealed no abnormalities. An electrocardiogram showed sinus tachycardia. Chest film showed no abnormal finding. Laboratory data were as follows: total protein 4.0 g/dl, albumin 2.3 g/dl, GOT 16 IU/l, GPT 12 IU/l, cholesterol 68mg/dl, blood urea nitrogen 21.0 mg/dl, creatinine 0.6 mg/dl, sodium 135mEq/l, potassium 4.1 mEq/l, chloride 100 mEq/l, calcium 7.1 mg/dl, and phosphorus 2.8 mg/dl.

After admission, nasogastric tube lavage was done, which revealed coffee ground material and later bright red blood. As the patient became hypotensive and pale during the nasogastric tube irrigation, she was given 4 units of packed red blood cells, and 2 units of fresh frozen plasma. After the blood pressure had been stabilized by transfusion and iced saline gastric lavage, emergency fiberoptic gastroscopy was performed. The stomach was in the state of subtotal gastrectomy with gastroje-

Address reprint requests: Byung Sub Park M.D., Department of Internal Medicine, Hallym University Hospital, Seoul, 156-020, Korea

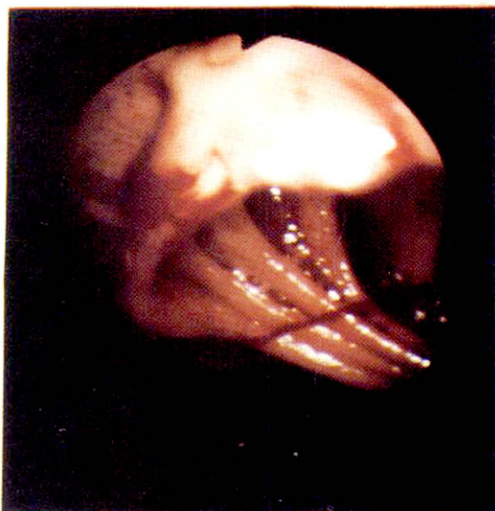


Fig. 1. Bleeding from the exposed vessel is noted at the anastomotic area.

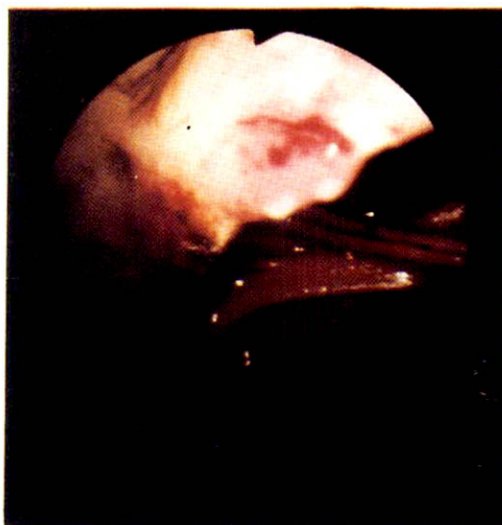


Fig. 2. After laser therapy, the bleeding spots turned to black due to coagulation necrosis.

junostomy. In the anastomotic area (at the jejunal side), a small vessel was exposed where some bleeding was noticed (Fig. 1). After the lesion was injected with epinephrine, a laser was used to photocoagulate the lesion. Multiple applications using a power setting of 60 watts and a duration of 0.5 sec were applied around and later to the center of the lesion and the bleeding was stopped (Fig. 2).

After laser therapy, the patient was under the fasting state for 2 days and treated with cimetidine and antacid. For two days, melena was presented. Then, a liquid diet was started and the patient's general condition was improved during admission. She was discharged 10 days after laser therapy in good condition.

## COMMENT

Dieulafoy's lesion also known as exulceratio simplex and submucosal arterial malformation, was first described in 1884 by Gallard and later characterized by the French surgeon George Dieulafoy in 1986.<sup>2,3)</sup>

The lesion appears to an abnormally large gastric submucosal artery which ruptures into the stomach causing massive intragastric bleeding. The underlying etiology is not clear but seems to be distinct from peptic ulcer disease or any other gastric mucosal pathologic finding.<sup>4)</sup> This lesion has been described in the stomach, jejunum, and recently in the colon.<sup>5)</sup> The lesion occurs mostly in male patients and may occur at both extremes of age, but the average is about 50 years. Heavy smoking and alcohol intake seem to be common antecedent factors. The patients may or may not have a previous history of dyspepsia.<sup>4)</sup>

The lesion is typically situated high in the fundus, most often close to the lesser curvature or in the posterior wall, but may occur elsewhere in the stomach.<sup>4,6)</sup>

The macroscopic features appear to be a small mucosal erosion, usually about a few millimeters in diameter lying in healthy surrounding mucosa. Through this mucosal defect protrudes a ruptured submucosal artery which may be thrombosis or actively spurting blood. The tortuous abnormal vessel may also pulsate in the submucosa, and reveal a microaneurysm, which can rupture through the mucosa.<sup>3,4)</sup>

A likely pathogenesis is that the strong pulsations of a large tortuous submucosal artery may mechanically damage the overlying mucosa and induce ulceration. The exposed arterial wall may consequently be eroded by bowel contents. This is supported by the fact that there are no ulcerations other than the one directly over this enlarged artery. The ulceration seems to be secondary to the isolated vascular anomaly. The resultant bleeding seems always to be massive, which may be due to the fact that the defect is tangential to the lumen and effective hemostasis by vascular contraction or throm-

basis is unlikely.<sup>5)</sup>

Dieulafoy's lesion must be distinguished from other gastric vascular abnormalities, which may similarly cause gastric hemorrhage, such as vascular neoplasm, hereditary hemorrhagic teleangiectasis (Rendu-Weber-Osler syndrome), pseudoxanthoma elasticum, blue rubber bleb nevus syndrome, angiodysplasia, and aneurysms of pathologic arteries.<sup>4)</sup> Some important differential points are as follows: In Rendu-Weber-Osler syndrome, vascular neoplasm, pseudoxanthoma elasticum, and blue rubber bleb nevus syndrome, positive family history or skin manifestation usually accompanies the gastric lesion.<sup>7)</sup> Angiodysplasias are endoscopically described as patched reddened areas or cherry-red spots, but definite diagnosis depends on the biopsy findings.<sup>8)</sup>

The diagnosis may need multiple endoscopies, angiography and sometimes laparotomy.<sup>3,4)</sup> Sometimes, it is difficult to detect the bleeding point by endoscopic examination, either because of profuse concurrent hemorrhage or when the examination is performed in an interval between bleeding, because the discrete mucosal defect is overlooked or misinterpreted as a Mallory-Weiss tear.<sup>3,9)</sup> In the case of active bleeding at the time of examination, angiography is a valuable diagnostic tool in demonstrating the lesion.<sup>1)</sup> Pathologic features of Dieulafoy's lesion are well described by Dieulafoy and Goldman.<sup>2,3)</sup> Macroscopically, the lesion consists of a shallow mucosal defect with an eroded, ruptured artery at its center. Histologic finding reveals an abnormally large and tortuous gastric submucosal artery with minimal inflammation. In our case presented here, the macroscopic feature of a visible protruding vessel without any surrounding macroscopic ulceration was virtually diagnostic of Dieulafoy's disease.

The lesion can be at first managed by medical measures, such as cold saline solution lavage or cimetidine, vasopressin by way the celiac artery, selective arterial embolization and repeated endoscopic electrocoagulation.<sup>1,4)</sup> If not controlled, the lesion can be managed by surgical treatment. But as surgical management may be high in risk and grave in postoperative complication, so laser treatment is now recommended. Laser photocoagulation has been used in the treatment of a variety of bleeding gastrointestinal lesions including gastric and

duodenal ulcers, arteriovenous malformations, and Mallory-Weiss tears. It is possible that laser photocoagulation or local cauterization may be effective in this disorder and avoid the need for surgery especially in high risk patients.<sup>4,10)</sup>

In our case, laser photocoagulation was successful in avoiding a high risk operation by elimination of the lesion as documented by repeat endoscopy. There has been no complication for 12 months after discharge. She has remained well in the year. Through the effectiveness of laser therapy, we recommend that laser treatment can be effectively used in the treatment of Dieulafoy's lesion.

## REFERENCES

1. Mortensen NJ, Mountford RA, Davies JD, Jeans WD: *Dieulafoy's disease; a distinctive arteriovenous malformation causing massive gastric hemorrhage. Br J Surg* 70:76, 1983
2. Broberg A, Ihre T, Ryk E, Raaschou-Nielson T: *Ex-ulceratio simplex as conceivable cause of massive gastric hemorrhage. Surg Gynecol Obstet* 154:186, 1982
3. Goldman RL: *Submucosal arterial malformation ("aneurysm") of the stomach with fatal hemorrhage. Gastroenterology* 46:589, 1964
4. Hoffman J, Back H, Jensen H: *Dieulafoy's lesion. Surg Gynecol Obstet* 79:930, 1984
5. Barbier P, Luder P, Trieler J, Ruchti C, Hassler H, Stafford A: *Colonic hemorrhage from a solitary minute ulcer. Report of three cases. Gastroenterology* 88:1065, 1985
6. Okada M, Iida M, Fuchigami T, Ohgushi H, Omae T, Kimura Y, Kiod H: *Submucosal arterial malformation of the stomach diagnosed endoscopically. Gastrointest Endosc* 29:30, 1983
7. Domonkos AN: *Andrews' disease of the skin. 6th ed. p 620, 702. Tokyo, Igaku Shoin Ltd 1971*
8. Nagasako K: *Differential diagnosis of colorectal diseases. 1st ed. p. 160, Tokyo, Igaku Shoin Ltd 1982*
9. Gough MH: *Submucosal arterial malformation of the stomach as the probable cause of recurrent severe hematemesis in a 16 year old girl. Br J Surgery* 64:522, 1977
10. Richter RM: *Massive gastric hemorrhage from submucosal arterial malformation. Am J Gastroenterol* 64:324, 1975