

Laparoscopic Resection of Gastric Dieulafoy Lesion Following Preoperative Tattooing

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Following the early description of Dieulafoy lesions in 1898 by the French surgeon Dieulafoy as *exulceratio simplex*, we know today that these lesions are submucosal, “calibre-persistent” arteries that ultimately protrude through a minute 2–5 mm mucosal defect, leading to massive, recurrent gastrointestinal bleeding [1]. The management of Dieulafoy lesions has changed over the years. Today, instead of radical total or subtotal gastrectomies, bleeding from these lesions is mostly managed endoscopically with excellent results [2]. At times, however, multiple endoscopies are required to diagnose this entity, which is inherently difficult to recognize especially when bleeding is inactive. In 90% of cases hemostasis can be achieved by endoscopic maneuvers, but despite the high success rate they might fail to resolve the bleeding lesion, necessitating a surgical approach [2].

Minimally invasive surgery has been shown to play a greater role in the surgical management of Dieulafoy lesions that fail endoscopic treatment. In combination with intraoperative endoscopy used for localization, laparoscopic wedge resection of the lesion has been successfully performed [3]. Alternatively, the source of bleeding can be marked preoperatively with Indian ink to clearly demarcate

the suspected site of lesion for the surgeon [4].

PATIENT DESCRIPTION

A 69 year old man was admitted to the hospital because of melena and anemia with hemoglobin of 7.9 g/dl. Ten months earlier he was admitted to a different hospital because of upper gastrointestinal bleeding. Esophagogastroduodenoscopy revealed a gastric ulcer with a visible telangiectatic bleeding vessel, and the diagnosis of Dieulafoy lesion was made. The bleeding was controlled by an endoscopic clip; biopsies were negative for malignancy. Nine months later, the upper gastrointestinal bleeding recurred and resulted in three admissions and treatment with six units of blood. A small duodenal ulcer was detected by upper endoscopy and he was treated with proton-pump inhibitor. A test for *Helicobacter pylori* was negative; blood gastrin levels were mildly elevated (236 pg/ml, normal 13–115 pg/ml).

The patient was re-admitted this time with tarry stools and decreasing hemoglobin levels, with no hemodynamic compromise. Repeat esophagogastroduodenoscopy revealed a small ulcer in the fundus of the stomach along the greater curvature, with an adjacent clip and a small blood clot on it, but with no active bleeding [Figure A]. The lesion was marked endoscopically by Indian ink injection in preparation for surgery. The patient was taken to the operating room with the diagnosis of recurrent intermittent bleeding from the same lesion diagnosed 10 months earlier. Under general anes-

thesia he was placed in a supine position, legs apart, and surgery was performed via a supraumbilical port for the laparoscope and two lateral working ports. The Indian ink stain clearly demarcated the area of interest at about the upper third of the greater curvature. The greater curvature was dissected in this area, and a suture was placed to raise the marked spot. A wedge resection of the marked lesion was accomplished using a linear cutting stapler [Figure B].

The patient tolerated the procedure well, resumed an oral diet on postoperative day 1 and was discharged on postoperative day 3. There was no recurrent bleeding during the next 6 months of follow-up. The final pathology report confirmed the diagnosis of a vascular structure in a gastric ulcer, consistent with Dieulafoy lesion within the resected specimen [Figure C and D].

COMMENT

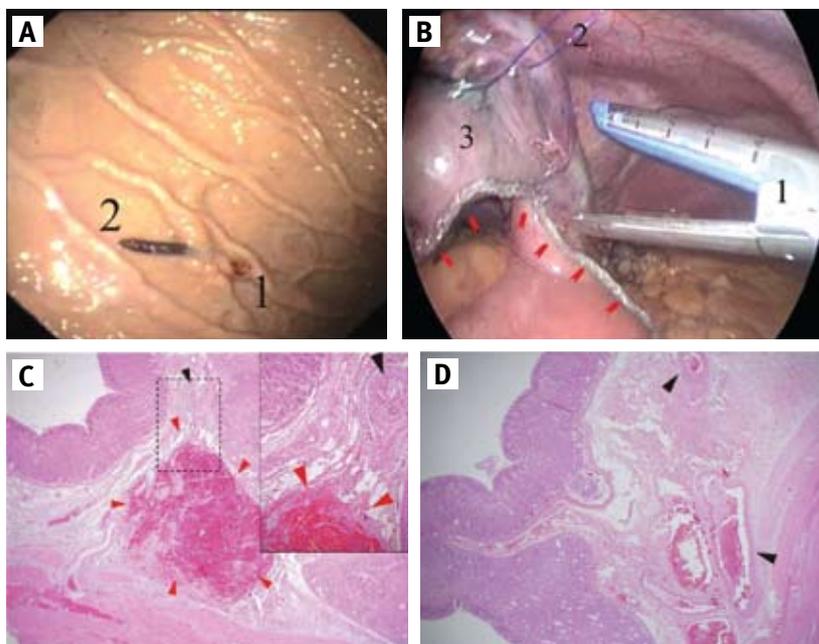
Dieulafoy lesion is an uncommon cause of gastrointestinal bleeding and mostly affects the proximal stomach (74%) [2]. Endoscopy is the gold standard for both diagnosis and treatment, but it must be emphasized that a Dieulafoy lesion can be easily overlooked.

A variety of endoscopic maneuvers are successful in controlling hemorrhage. Combination therapy is superior to monotherapy and consists of injection therapy (epinephrine or sclerotherapy) followed by thermal probe coagulation, with permanent hemostasis achieved in 95% of all cases [2]. Hemorrhage can also

[A] Endoscopy showing small ulcer (1) in the fundus of the stomach along the greater curvature with an adjacent clip (2) that had been placed to control gastric bleeding 10 months prior to the patient's current hospitalization. No active bleeding source is visible. **[B]** Surgical treatment of gastric Dieulafoy lesion. Stapler line (arrows) in the process of laparoscopic gastric wedge resection with a linear cutting stapler (1), suspension sutures (2) and remains of the tattoo that demarcated the lesion (3).

[C and D] Pathology results of the resected specimen. **[C]** Recent hemorrhages within the submucosa (red arrows); a few small arteries are seen with cholesterol clefts (black arrow).

[D] Abnormal large proximal muscular arteries within the gastric submucosa (black arrows).



be controlled by mechanical methods such as endoscopic elastic band ligation or hemoclip application, both of which have been successfully used in Dieulafoy lesions [2,5].

Short-term rebleeding of a lesion is common and repeat endoscopic treatment is recommended because hemostasis can be achieved in most patients. However, identification of the lesion is challenging: if bleeding is intermittent, if the bleeding spot is exceedingly small or if a blood clot covers the site, the bleeding site should routinely be marked with dye (Indian ink) to facilitate further endoscopic or surgical localizations.

Angiography may also be used for both localization and therapy by gel-foam embolization of the bleeding vessel. This treatment is an effective option if endoscopic therapy is unsuccessful. Surgery is the last option for patients with uncon-

trolled recurrent bleeding or an unidentified bleeding site. Wide gastrotomy with suture ligation of the involved vessel has largely been abandoned. The current surgical mainstay treatment is local excision or wide wedge resection, even though it is known that mortality in emergency surgery for acute gastrointestinal bleeding is quite high [2].

Minimally invasive surgery such as laparoscopic gastric wedge resection may improve the results of surgical treatment and has the advantages of a shorter hospital stay and faster recovery. However, intraoperative localization of the lesion has been challenging. In the few cases described in the literature, intraoperative gastroscopy was necessary to localize the bleeding site, adding to the duration and complexity of the procedure [3]. Another report describes the successful handling of a case by means of preoperative mark-

ing of the lesion with both Indian ink and an endoscopic clip [4]. Similarly, our technique included preoperative staining of the suspected Dieulafoy lesion with the injection of Indian ink before performing laparoscopic gastric wedge resection.

Laparoscopic gastric wedge resection may be superior to the simple suture of the lesion in patients with refractory bleeding, which is associated with a higher risk of recurrent bleeding [3]. With the use of an endoscopic linear cutter, the resection is simple and safe, especially for lesions along the greater curvature of the stomach. A lesion found closer to the lesser curvature, at the antrum, may require a different resection technique to prevent narrowing of the stomach. If the lesion is located near the gastroesophageal junction, intragastric laparoscopy and manual suturing may be appropriate.

In conclusion, in patients with Dieulafoy lesions, endoscopic hemostasis is still the treatment of choice. However, when endoscopy fails, surgery should be performed to suture or excise the lesion. Laparoscopy, combined with preoperative endoscopic marking of the lesion, allows for an effective and minimally invasive gastric wedge resection, obviating the need for intraoperative endoscopy.

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