



Case report

Endoclip migration after laparoscopic splenectomy combined with pericardial devascularization: Case report and literature review

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ABSTRACT

Introduction and importance: Endoclip migration (ECM) after laparoscopic splenectomy combined with pericardial devascularization (LESD) is a rare and dangerous postoperative complication. The emergence of such cases led to our consideration of the timing of use of nonabsorbable endoclips.

Case presentation: This case report describes a patient with cirrhosis and portal hypertension who underwent LESD. Two years after the operation, an endoclip was found in the fornix of the fundus of his stomach by gastroscopy.

Clinical discussion: A 66-year-old male patient had a history of liver cirrhosis for 9 years. Two years prior, LESD was performed on this patient in our hospital. This time, due to 'repeated black stool for 1 month, and hematemesis 1 time', the patient was admitted to the hospital. A diagnosis of 'liver cirrhosis with esophageal and gastric variceal bleeding' was considered. Gastroscopy revealed a fundal foreign body, and upon review of the patient history, the foreign body was found to be a nonabsorbable endoclip.

Conclusion: Foreign literature has reported cases of biliary endoclip migration after laparoscopic cholecystectomy, but no cases of ECM after LESD have been reported. For such cases, we should consider the timing of the application of nonabsorbable endoclips during vascular devascularization to avoid ECM after the operation. In addition, we should also comprehensively evaluate whether the ectopic endoclips should be removed.

1. Introduction and importance

LESD is an effective method for the treatment of portal hypertension [1,2]. It can effectively reduce the probability of portal hypertension, active variceal bleeding, and ascites and improve the survival rate of patients [3]. At present, this minimally invasive surgery has been widely used in China. The postoperative complications that may be caused by this operation include bleeding, perforation, thrombosis, etc. In addition, rare complications, such as postoperative ectopic unabsorbable endoclips, may also occur. We present an interesting case in which an endoclip migrated to the fornix of the fundus of the stomach. During the operation, due to the need for hemostasis, the patient received nonabsorbable endoclips for the peripheral blood vessels of the cardia. Over time, with the peristalsis of the esophagus and physical activity of the patient, a nonabsorbable endoclip migrated to the fundus of the

stomach. This case report has been reported in line with the SCARE 2020 criteria [4].

2. Case presentation

A 66-year-old man with no apparent cause of hematemesis, exhibited hematemesis of red blood, with a volume of approximately 20 ml, accompanied by black stools several times over the past month. Physical examination showed anemia, pale skin, and mucous membrane. History was negative for alcoholism, cardiovascular disease and his family history was negative for chronic diseases. The patient's medication history was taking the oral proton pump inhibitor. At this admission, the patient underwent gastroscopy with the following findings (Fig. 1): 1. esophageal varices (CB, R-C (+), F2, LMI, LG-C), gastric varices; 2. portal hypertensive gastropathy; 3. foreign body in the fundus of the stomach.

Abbreviations: LESD, laparoscopic splenectomy combined with pericardial devascularization; ECM, endoclip migration; EVL, endoscopic sclerotherapy; EIS, endoscopic ligation; IVR, interventional radiology; TIPS, transjugular intrahepatic portosystemic shunt; B-RTO, balloon occlusion retrograde venous occlusion.

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In 2014, this patient underwent endoscopic variceal ligation (EVL) in another hospital. In May 2018, he underwent LESD in our hospital due to cirrhotic portal hypertension by senior trainees with 10 years of surgical specialty training. The surgical records were as follows: pericardial devascularization after splenectomy, starting from the no-vessel area at the intersection of the left and right omentum arteries, the ligaments of the spleen and stomach were dissociated upward along the great curvature of the stomach, and the short blood vessels of the stomach were processed one by one until the body and fundus of the stomach were completely dissociated. The large curvature of the stomach was opened laterally to the upper right, and the venous branch from the upper edge of the pancreas to the posterior wall of the gastroesophageal fundus was ligated. The gastric lesser curvature was freed from the pyloric notch ligation of the right gastric artery and vein, along with upward ligation of the lesser curvature; next, cut left gastric artery and coronary vein from the branch of the gastric wall to upper cardia with endoclips.

After the operation, the patient received nutritional support and gastric acid suppression, and his recovery was uneventful and satisfactory. Three months later, the patient underwent gastroscopy, the report shows (Fig. 2a): 1. ESOPHAGEAL varices (CB, R-C (+), F3, LSMI, LG-C); 2. portal hypertensive gastropathy. By comparing the patient's gastroscopy images at three months and two years after surgery (Fig. 2), the foreign body was considered to be caused by nonabsorbable endoclip ligation of the varicose blood vessels around the fundus, cardia, or lower esophagus. The location of the endoclip should have been at the stump of the blood vessel clipped outside the gastric cavity, but it was migrated to the gastric fundus in the gastric cavity.

3. Clinical discussion

According to Cheng Z et al [5], the common complications of LESD include portal vein thrombosis, variceal rebleeding, gastric perforation, pancreatic fistula, pulmonary infection, pleural effusion, incision

complications, etc. Hamid et al. [6] reported late biliary endoclip migration after laparoscopic cholecystectomy. However, to date, there have been no reports of LESD secondary ECM to the fundus of the stomach. This report seems to be the first case report of ECM after LESD.

Hypersplenism and esophageal varices are common complications of liver cirrhosis, accounting for approximately 24–80% of cases [7]. The mortality rate of esophageal variceal bleeding within 6 weeks is approximately 20% [8]. Endoscopic sclerotherapy or ligation (EVL, EIS) is the first choice for esophageal and gastric varices [9], followed by interventional radiology (IVR), such as transjugular intrahepatic portosystemic shunt (TIPS) and balloon occlusion retrograde venous occlusion (B-RTO) [10,11]. However, when endoscopic treatment cannot control bleeding, surgical intervention is needed.

In 1998, Hashizume et al. [12] first reported the use of LESD in the treatment of portal hypertension. Related reports suggested that the advantages of pericardial devascularization were simple, effective, and worthy of recommendation for patients requiring surgical treatment. LESD had an obvious hemostatic effect and a low risk of recurrent bleeding. LESD could also effectively treat esophageal and gastric variceal bleeding caused by cirrhosis [13–15]. In addition, LESD had a remarkable therapeutic effect on hypersplenism and could improve liver function in patients with cirrhosis and portal hypertension. LESD is suitable for cirrhotic patients with portal hypertensive bleeding and hypersplenism, thrombotic thrombocytopenia, splenomegaly, poor liver function, impaired coagulation factors, and collateral circulation [16]. This operation is mainly used for patients with esophageal variceal bleeding, especially those who have failed nonsurgical treatment. Surgical contraindications include Child C liver function, underlying diseases with intolerance of general anesthesia intubation and pneumoperitoneum, acute upper gastrointestinal bleeding, unstable vital signs, and urgent rescue [17].

During pericardial devascularization, the ligation and devascularization of blood vessels should be performed close to the gastric wall and cardia. The varicose blood vessels around the posterior wall of the

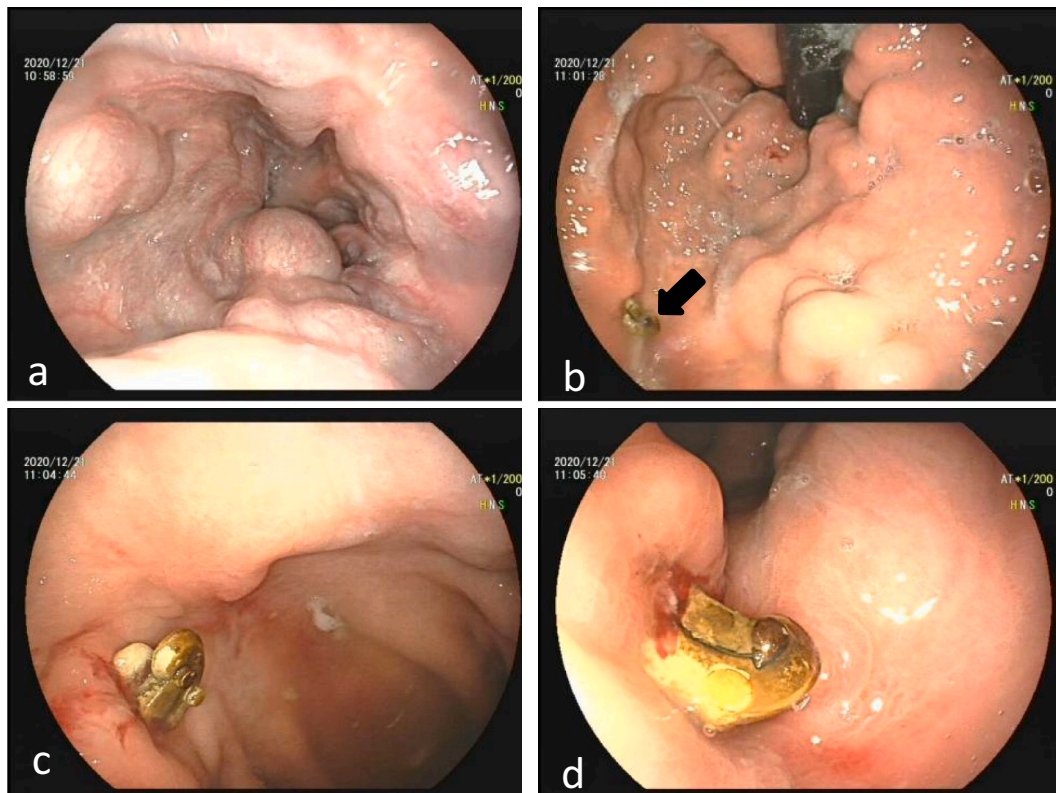


Fig. 1. a. Esophageal varices; b. gastric varices: the arrow points to the migrated endoclip; c. migrated endoclip; d. amplification of the migrated endoclip.

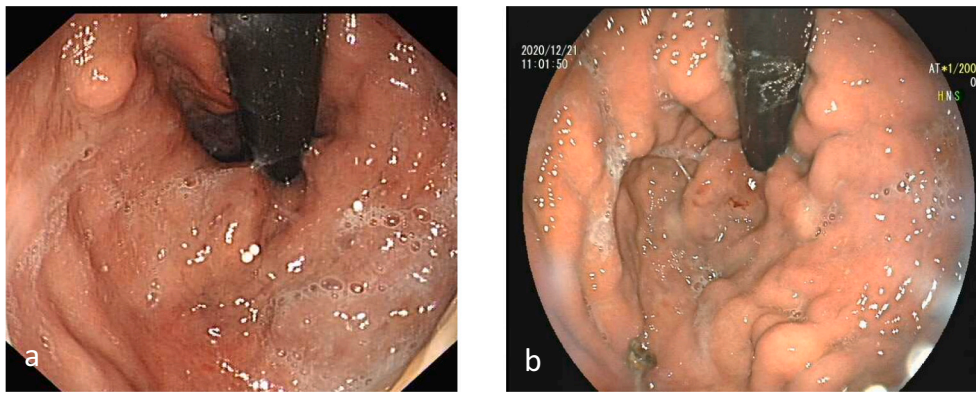


Fig. 2. Comparison of the two images (a. 2018-08-06; b. 2020-12-21) shows that gastric varices worsened in 2020 and foreign bodies appeared in the gastric fundus.

gastric fundus should be ligated or cut off to the cardia with an ultrasonic scalpel, and the tissue and blood vessels between the gastric fundus and the left diaphragm foot should be cut off. Wang et al.'s [18] study found that LigaSure's vascular closure device is safer for segmenting tissues around the distal esophagus and proximal stomach. During the operation, when dissecting and separating the gastric and esophageal branches of the hepatogastric ligament and gastric coronary vein, the blood vessels of the upper esophageal branch were cut off with an ultrasonic scalpel after being clipped with titanium clips at both ends, or it was recommended to directly cut off the varicose blood vessels around the gastric fundus, cardia and lower esophagus with a vascular stapler without the need for endoclips. When devascularization is performed around the cardia and the lower esophagus, especially on the right side, the cardia and esophagus must be operated on closely, and the paraesophageal venous plexus must be protected.

The risk factors for ECM are related to the number of clips, incorrect placement, and insufficient clamping of blood vessels. These factors should be avoided as much as possible during the operation. The mechanism of ECM may be trauma caused by the separation of the stomach and surrounding blood vessels. The poor healing ability of the gastric wall caused by portal hypertensive gastropathy, the decrease in blood supply to the stomach after vasculature reconstruction, poor liver function, and gastric wall edema after surgery hinder the healing of injury, and ischemic necrosis of the gastric wall leads to the insertion of clips into the gastric wall [19]. Coupled with postoperative gastrointestinal peristalsis and posture, clips migrate over time and become incarcerated in the gastric fundus fornix. Therefore, during the operation, the surgeon should be more careful to determine the application time of the endoclips. The varicose blood vessels located in the fundus of the stomach, cardia, and the lower esophagus can be directly ligated and cut to avoid the use of clips. In our case, the patient's ectopic clip does not need to be removed, as removal of the endoclip may lead to gastric perforation. However, to prevent the clip from continuing to migrate or from falling off, follow-up should be regularly performed.

4. Conclusion

LESD is a safe and effective strategy for the treatment of portal hypertension with splenomegaly and esophagogastric varices. When endoclips are used to clip blood vessels and tissues, attention should be given to the location and timing of their application. When there is no need for hemostasis, excessive use of endoclips should be avoided to prevent rare ectopic events after surgery. It is worth noting that this case report is the first case of ECM after LESD thus far. We need to further study the mechanism of such migration and avoid or prevent it.

Ethical approval

Not required.

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Author contribution

Study Concept and Design: Yi Liu.
Data collection: Yi Liu, Ling Fan.
Writing of Paper: Yi Liu.
Critical revision for intellectual content: Yan Fu.

Guarantor

Yan Fu is the guarantor of the work and accepts full responsibility.

Research registration

None.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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Declaration of competing interest

None of the authors have any conflict of interest to declare.

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