CASE REPORT

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Duodenal Ulcer Induced by Hem-o-Lok clip after Reduced Port Laparoscopic Cholecystectomy

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ABSTRACT

The patient was a 66-year-old woman who had undergone laparoscopic cholecystectomy (Lap-C) secondary to chronic cholecystitis status post endoscopic choledocholithotomy 13 months previously. During surgery, Hem-o-Lok clips were used to control the cystic duct and the cystic artery. Due to the presence of extensive adhesions of the cystic duct and surrounding tissue, the surgeons had difficulty in debriding the area. Thirteen months after Lap-C, the patient underwent a screening esophagogastroduodenoscopy (EGD), which demonstrated clip appearance at the inferior wall of the first part of the duodenum. In the EGD, duodenal erosions and edema were observed around the clip. We appreciated that endoscopic clip removal would be difficult because of the presence of severe adhesions and inflammation of the duodenal bulb. On clinical examination of the patient, no major abnormalities or physical findings were noted. Therefore, we decided not to attempt to remove the clip. The patient was treated with an oral proton pump inhibitor to prevent extensive duodenal mucosal injury. Two months later, we repeated the EGD, which revealed that the clip was no longer present, and the duodenum was covered with normal mucosa surrounding the scar.

Key words: duodenal ulcer, Hem-o-Lok clip, laparoscopic cholecystectomy, surgical clip.

Abbreviations: EGD: esophagogastroduodenoscopy; Lap-C: laparoscopic cholecystectomy; PPI: proton pump inhibitor.

INTRODUCTION

Laparoscopic cholecystectomy (Lap-C) is the gold standard surgical procedure for patients with cholecystolithiasis, resulting in good cosmetic effect and rapid recovery [1]. Laparoscopic cholecystectomy has a less than 3% overall complication rate [2]. In this operation, surgical clips are used to control the cystic duct and the cystic artery. Clip use in Lap-C is considered safe and effective. However, the wide use of metallic surgical clips in Lap-C has led to a variety of complications [3-5], which, while infrequent, are potentially fatal, and should be given due consideration by the medical professionals.

The Hem-o-Lok clip (Weck Surgical Instruments, Research Triangle Park, NC, USA) has been a useful alternative to metallic surgical clips [6]. This non-absorbable polymer-locking clip is inert, nonconductive, and compatible with computed tomography (CT) scan and magnetic resonance imaging. The lock engagement feature and the presence of teeth within the jaws provide enhanced security. During Lap-C operations, Hem-o-Lok clips have become a typical choice to control the cystic duct and vessels [7]. However, we noticed that the use of Hem-o-Lok clips in Lap-C has led to some complications as well. The purpose of this case presentation is to relay our experience with a clinical case that resulted in Hem-o-Lok clip migration to the duodenum13 months after reduced port Lap-C. We will report the case together with the relevant literature review.

CASE REPORT

Our patient was a 66-year-old Japanese woman who underwent reduced port Lap-C due to chronic cholecystitis status post endoscopic choledocholithotomy performed at our hospital 13 months previously. Hem-o-Lok clips were used to control the cystic duct and the cystic artery during the procedure. Due to extensive adhesions of the cystic duct and the surrounding tissue, the surgeons had difficulty in debriding

the adhesions. However, the patient was asymptomatic after Lap-C and was being followed up as an outpatient. Thirteen months post Lap-C, the patient underwent a screening esophagogastroduodenoscopy (EGD) (Olympus videoscope GIF-H290, Japan), which demonstrated a clip appearance at the inferior wall of the first part of the duodenum. During the EGD, duodenal erosions and edema were observed around the clip (Fig. 1a). Abdominal CT revealed that the clip had migrated to the duodenal bulb and both the duodenal bulb and liver bed exhibited adhesions in the hepatic portal region due to previous inflammation of the gallbladder (Fig. 1b). We appreciated that endoscopic removal of the clip would be difficult secondary to the presence of severe adhesions and inflammation of the duodenal bulb. No major abnormalities were noted on clinical examination of the patient. As she was asymptomatic, we decided not to attempt to remove the clip. She was treated with an oral proton pump inhibitor (PPI) to prevent extensive duodenal mucosal injury. The patient was well after the exposed surgical clip was identified and treated. Two months later, we repeated the EGD. The second EGD revealed that the clip had disappeared from the duodenum, and the duodenum was covered with normal mucosa surrounding the scar (Fig. 2a). Abdominal CT confirmed the disappearance of the clip and we concluded that the clip had passed naturally (Fig. 2b).

DISCUSSION

Surgical clips are routinely used during Lap-C as substitute ligation materials. The incorporation of surgical clips into a duodenal ulcer is a rare occurrence, previously reported in only 11 cases in the English medical literature. We summarized the previous cases of duodenal ulcer related to utilization of surgical clips during Lap-C (Table I).

Ten of the cases with detailed reports are discussed below. In Table I, the review of the literature revealed that the majority of patients were women. The period of time from surgery to migration of the clips to the duodenum ranged from 7 days to 15 years. The main symptoms induced by clip migration were abdominal pain (5/10 cases), gastrointestinal bleeding (2/10 cases), and anemia (2/10 cases). Most previous case reports describe similar symptoms. In the first approach, PPIs were used in 4 cases with a success rate of 50% (2/4 cases), and endoscopic clip removal was performed in 4 cases with a success rate of 75% (3/4 cases). In two patients endoscopic clip removal after treatment with PPIs failed, bringing the total number of cases treated by endoscopic clip removal to six. The preferred device for endoscopic clip retrieval in three cases was biopsy forceps (Table II). Our approach was unusual in that only oral PPI therapy was prescribed after recognition of the exposed clip. We decided that discovery of the migrated clip was incidental as the patient had no symptoms related to the duodenal ulcer. According to a previous report, Wasserberg et al. [8] recommended that once a duodenal ulcer secondary to clip migration is diagnosed, the clip should be endoscopically removed from the ulcer site. They encouraged this approach by comparing their experience in two cases. In one case, initial treatment consisted of high-dose PPIs. Despite treatment, the ulcer continued to penetrate the tissues, resulting in

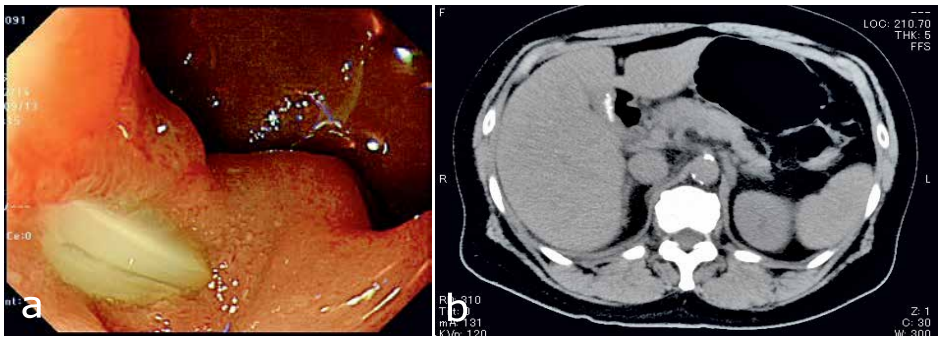

Fig. 1. A screening esophagogastroduodenoscopy (EGD) revealed Hem-o-Lok clip appearance at the inferior wall of the first part of the duodenum; duodenal erosions and edema are observed around the Hem-o-Lok clip (a). Abdominal CT reveals that the Hem-o-Lok clip has migrated into the duodenal bulb (b).

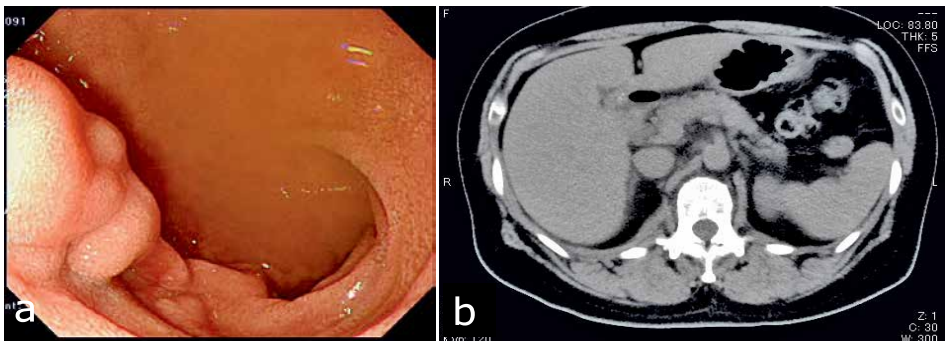

Fig. 2. Two months later, on repeat EGD, endoscopic examination reveals that the clip has disappeared from the duodenum, and the duodenum is covered with normal mucosa surrounding the scar (a). The clip is no longer visible on abdominal CT (b).

Table I. Summary of published cases of duodenal ulcer related to surgical clip migration status post laparoscopic cholecystectomy

Author	Publication date	Clip type	Age (y.o.)	Sex	Duration after surgery	Symptoms	First approach	Second approach
Yu SC et al. [10]	1997	Endoclip	60	F	2 months	Pain	Endoscopic removal/F	Oral antacid/S
Nehoda H et al. [11]	1999	Titanium clip	71	ND	1 year	Hemorrhage	Subtotal gastrectomy/S	-
Reis LD [5]	2000	Endoclip	58	F	6 months	Pain and vomiting	PPI/S	-
Yao CC et al. [12]	2001	Endoclip	ND	ND	ND	ND	ND	ND
Heatley MK, Nagarajan DV [9]	2002	Metallic clip	80	F	38 months	Anemia	Endoscopic removal/S	-
Wasserberg N et al. [8]	2003	Metallic clip	84	F	7 days	Melena	Endoscopic removal/S	-
		Metallic clip	68	F	3 months	Pain, dizziness, and melena	PPI/F	Endoscopic removal/S
Samim MM, Armstrong CP [13]	2008	Metallic clip	70	F	15 years	Weight loss, anemia, and GOO	HP eradiation/F	Surgical resection/S
Ray S, Bavishi Y [14]	2011	Endoclip	36	M	15 months	Dyspeptic symptoms	PPI/S	-
Seyyedmajidi M et al. [15]	2013	Hem-o-Lok	41	F	8 months	Pain	Endoscopic removal/S	-
Hsin MC et al. [16]	2015	Metallic clip Hemo-clip	56	F	ND	Pain	PPI/F	Endoscopic removal/S
Our case		Hem-o-Lok	66	F	13 months	None	PPI/S	-

GOO: gastric outlet obstructio; HP: Helicobacter pylori; ND: not described; PPI: proton pump inhibitor; S: success; F: failure

further bleeding. Only after removal of the clip did the patient demonstrate improvement of the ulcer and bleeding [8] on repeat EGD. However, in our experience, aggressive clip removal did not prove necessary and control of mucosal injury and/or bleeding with PPIs remains a valid option if there are no symptoms or warning signs of issues requiring further intervention.

Surgical clips are very rarely found in the base of a duodenal ulcer. As such, we considered three possible factors impacting duodenal ulcer development in these cases. First, the anatomic proximity of the cystic duct ligation site to the duodenum can possibly lead to fistula formation around the clip that extends into the duodenum by rejection-response mechanism. The cystic duct clip may have slowly migrated through the duodenal wall and emerged in the base of the ulcer [9]. Second, severe adhesions and inflammation at Calot's triangle secondary to severe cholecystitis and the post-surgical inflammatory process induced by the metallic clip may cause the clip to move into the duodenum [5]. Third, an undiagnosed pre-existing ulcer may adhere to the gallbladder bed, capturing the clip in the inflammatory process [5, 9]. According to the previous eleven reports, two cases involved bile leakage after surgery, and one case involved difficult dissection of the Calot' s triangle. In our case, Lap-C was complicated by the difficult dissection of Calot's triangle due to severe inflammation. Severe inflammation and/or adhesion of Calot's triangle may be a predictor of possible duodenal ulcer formation with clip migration after Lap-C.

Table II. Summary of clip removal devices in published cases

Reference	Devices	Approach
[10]	Biopsy forceps	Endoscopic removal / F
[9]	Snare	Endoscopic removal / S
[8]	ND	Endoscopic removal / S
[8]	ND	Endoscopic removal / S
[15]	Biopsy forceps	Endoscopic removal / S
[16]	Biopsy forceps	Endoscopic removal / S

GOO: gastric outlet obstruction; HP: helicobacter pylori; ND: not described; PPI: proton pump inhibitor; S: success; F: failure

CONCLUSION

Generally, properly applied surgical clips during basic laparoscopic procedures are a safe option for ligation of the involved tissues. Our case demonstrated the natural passage of a Hem-o-Lok clip without endoscopic or surgical intervention. Thus, it can be effective to passively monitor asymptomatic patients in case of duodenal ulcer related to surgical clip migration after Lap-C. Appropriately applied Hem-o-Lok clips can be safely used, although surgeons must be educated regarding proper application. Complications with this method are rare and Hem-o-Lok is a safe ligation method during Lap-C to control the cystic duct and the vessels.

Conflicts of interest: No conflict to declare.

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