



# A double-channel cap-assisted closure of a gastric defect after endoscopic submucosal dissection

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**Abstract:** Endoscopic submucosal dissection (ESD) has been widely accepted as a standard of care for early gastric cancer (EGC). However, post ESD bleeding is one of the adverse events after ESD procedure, particularly for patients with antithrombotic therapy. A 73-year-old male underwent ESD for EGC located on the anterior wall of upper gastric body. We closed the large mucosal defect after ESD because he was taking cilostazol (100 mg/day) for ischemic heart disease. Endoscopic closure of the mucosal defect was successfully performed with endoclips and two endoloops using a standard single accessory channel gastroscop with a double-channel cap-assisted. A second look endoscopy, 4 days after ESD, demonstrated sustained closure of the post ESD defect. He was discharged 7 days after ESD without post ESD bleeding. This method is technically useful for closure of large mucosal defects in difficult locations after gastric ESD.

**Keywords:** Impact shooter; endoscopic submucosal dissection (ESD); endoscopic closure; early gastric cancer (EGC)

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## Introduction

Recently endoscopic submucosal dissection (ESD) has been widely accepted as a standard of care for early gastric cancer (EGC), which has little risk of lymph-node metastasis, because ESD allows for high *en-bloc* resection rates with minimal invasiveness (1). However, post ESD bleeding is one of the adverse events after ESD procedure, particularly for patients with antithrombotic therapy (2). Most post ESD bleeding can be controlled by endoscopic hemostasis, however, sometimes massive gastrointestinal bleeding with hemorrhage shock can occur (3,4), so it is clinically important to prevent delayed bleeding, especially in at-risk patients.

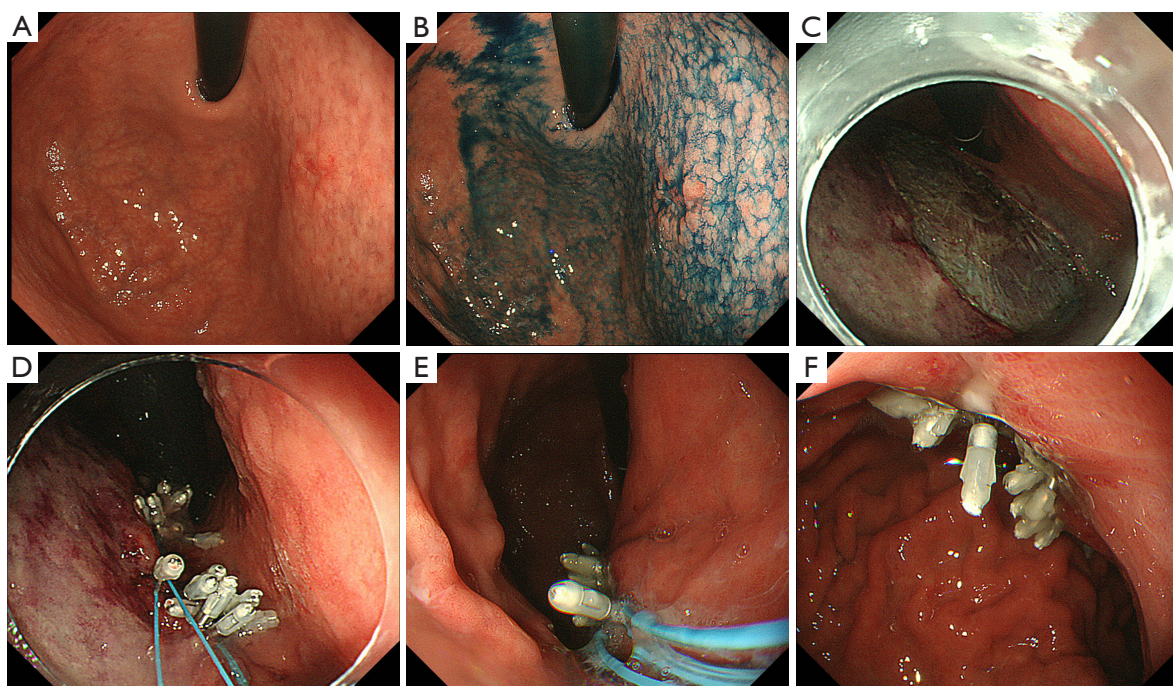
The prophylactic closure of mucosal defects after endoscopic resection is attempted to prevent postoperative bleeding. According to previous reports, some closure methods reported are endoloop (5), 8-ring (6) and loop clip (7), but these methods require specialized equipment.

For example, the endoloop method requires a double channel endoscope (GIF-2TQ260M; Olympus, Tokyo, Japan) that is not commonly available, particularly in the West.

The impact shooter (TOP Co, Tokyo, Japan) is an innovative device consisting of a transparent hood with a catheter fitted to a standard scope. It forms a second accessory channel on the outside of the scope and allows use of a standard endoscope as double channel endoscope. It is typically used for tissue retraction during ESD (8). We believed that the impact shooter could also be useful for closure of large mucosal defects in difficult location after ESD, using a standard gastroscop. Herein, we report the details of our closure technique using impact shooter for post gastric ESD defect.

## Case presentation (Figure 1)

A 73-year-old male underwent esophagogastroduodenoscopy



**Figure 1** Endoscopic image. (A) White light endoscopy showed a 20-mm adenocarcinoma at anterior wall of upper gastric body; (B) chromoendoscopy with indigocarmine dye demonstrated distinct margin; (C) ESD was performed, and large post ESD defect with approximately 50 mm in size; (D) complete closure with endoclips and endoloops using impact shooter; (E, F) a second look EGD demonstrated sustained complete closure of post ESD defect. ESD, endoscopic submucosal dissection; EGD, esophagogastroduodenoscopy.



**Figure 2** An endoclclip through the accessory channel of endoscope (10). We connect impact shooter to standard scope (GIF-Q260J; Olympus, Tokyo, Japan). The hood fixed with top of endoscopy, and another part fixed with endoscopy at several points. Available online: <http://www.asvide.com/article/view/24270>

(EGD) for screening for gastric cancer at outside institution, and a gastric lesion was detected. He was taking cilostazol (100 mg/day) for ischemic heart disease.

Preoperative EGD was performed in our institution.

Antiplatelet therapy was continued based on Japanese guideline (9). The lesion was seen as depressed area 20 mm in size with slightly marginal elevation located at anterior wall of upper gastric body near the cardia (*Figure 1A*). Chromoendoscopy with indigo carmine enhanced the margin of the lesion (*Figure 1B*). The biopsy specimen revealed moderately differentiated adenocarcinoma. ESD was performed for this lesion, and *en-bloc* resection was achieved without perforation.

A large post ESD mucosal defect was seen, and size was approximately 50 mm in diameter (*Figure 1C*). First, we attached the impact shooter to a standard endoscope (GIF-Q260J; Olympus, Tokyo, Japan). Next, we inserted the endoloop through the impact shooter, and an endoclclip through the accessory channel of endoscope (*Figure 2*). We grabbed the endoloop with the endoclclip and then used the endoclclip to anchor the endoloop to the gastric mucosa. Several clips are required to performed complete the closure. Additional endoclclips were used to fix the endoloop along the edge of the mucosal defect (*Figure 3*). As a result, complete closure was achieved with two endoloops (*Figure 1D*). A second look EGD, 4 days after ESD,



**Figure 3** Additional endoclips were used to fix the endoloop along the edge of the mucosal defect (11). We hooked the endoclip onto the endoloop and then used the hooked endoclips to anchor the endoloop. Several clips and two endoloops are required to performed complete closure.

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demonstrated sustained complete closure of post ESD defect (Figure 1E,F). He was discharged 7 days after ESD without post ESD bleeding.

Histopathological examination showed well differentiated adenocarcinoma 15 mm in size confined to mucosa with negative vertical and horizontal margins, without lymphovascular invasion, consistent with curative resection.

## Discussion

We successfully demonstrated our new technique for closure of mucosal defects after gastric ESD with the use of impact shooter. Oda *et al.* reported that delayed bleeding after ESD is 5.7% (4). Koh *et al.* reported that antithrombotic drugs are risk factors for delayed bleeding after gastric ESD (12).

Complete closure of mucosal defect after ESD has a potential to prevent post ESD bleeding. However, complete closure of gastric mucosa is difficult because of the thicker gastric mucosa, compared to other areas of the gastrointestinal tract (esophagus, colon and duodenum). Delayed bleeding rates of gastric ESD is higher than colon ESD (4,13), and sometimes massive gastrointestinal bleeding with hemorrhagic shock can occur, so complete closure is necessary for closure of gastric mucosal defect in at risk patients.

Some favorable results of complete closure of gastric mucosal defect after gastric ESD have been reported (14,15). However, these methods are technically challenging. Abe *et al.* reported complete closure of a gastric ESD

mucosal defect with endoloop and endoclips (16). This method requires a two-channel endoscope to insert both the endoclip and endoloop through accessory channels. Two-channel endoscopes are rarely available in most of countries, particularly in the west, and it is difficult to approach narrow area such as upper gastric body and cardia in retroflexion. Thus, the method with a two-channel scope is not suitable for this case. Therefore, we modified this method by using an impact shooter.

We used the impact shooter as another accessory channel of use of an endoloop. We closed the defect in the almost the same way of previous report using the double channel endoscope. This closure method is a good option for closure of gastric defect mucosa after ESD. Advantages of our method is it is safe and simple and can be performed without a double channel endoscope.

## Conclusions

We reported the details of our closure technique using impact shooter for post gastric ESD defect. This method allowed for complete closure of even large defect at narrow portion without two-channel endoscope.

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## References

1. Gotoda T. Endoscopic resection of early gastric cancer. *Gastric Cancer* 2007;10:1-11.
2. Takeuchi T, Ota K, Harada S, et al. The postoperative bleeding rate and its risk factors in patients on antithrombotic therapy who undergo gastric endoscopic submucosal dissection. *BMC Gastroenterol* 2013;13:136.
3. Takizawa K, Oda I, Gotoda T, et al. Routine coagulation of visible vessels may prevent delayed bleeding after endoscopic submucosal dissection--an analysis of risk factors. *Endoscopy* 2008;40:179-83.
4. Oda I, Gotoda T, Hamanaka H, et al. Endoscopic submucosal dissection for early gastric cancer: technical feasibility, operation time and complications from a large consecutive series. *Dig Endosc* 2005;17:54-8.
5. Matsuda T, Fujii T, Emura F, et al. Complete closure of a large defect after EMR of a lateral spreading colorectal tumor when using a two-channel colonoscope. *Gastrointest Endosc* 2004;60:836-8.
6. Fujii T, Ono A, Fu KI, et al. A novel endoscopic suturing technique using a specially designed so-called "8-ring" in combination with resolution clips (with videos). *Gastrointest Endosc* 2007;66:1215-20.
7. Osada T, Sakamoto N, Ritsuno H, et al. Process of wound healing of large mucosal defect areas that were sutured by using a loop clip-assisted closure technique after endoscopic submucosal dissection of a colorectal tumor. *Gastrointest Endosc* 2013;78:793-8.
8. Motohashi O, Nishimura K, Nakayama N, et al. Endoscopic submucosal dissection (two-point fixed ESD) for early esophageal cancer. *Dig Endosc* 2009;21:176-9.
9. Fujimoto K, Fujishiro M, Kato M, et al. Guidelines for gastroenterological endoscopy in patients undergoing antithrombotic treatment. *Dig Endosc* 2014;26:1-14.
10. Ichijima R, Abe S, Oda I, et al. An endoclip through the accessory channel of endoscope. *Asvide* 2018;5:395. Available online: <http://www.asvide.com/article/view/24270>
11. Ichijima R, Abe S, Oda I, et al. Additional endoclips were used to fix the endoloop along the edge of the mucosal defect. *Asvide* 2018;5:396. Available online: <http://www.asvide.com/article/view/24271>
12. Koh R, Hirasawa K, Yahara S, et al. Antithrombotic drugs are risk factors for delayed postoperative bleeding after endoscopic submucosal dissection for gastric neoplasms. *Gastrointest Endosc* 2013;78:476-83.
13. Saito Y, Uraoka T, Yamaguchi Y, et al. A prospective, multicenter study of 1111 colorectal endoscopic submucosal dissections (with video). *Gastrointest Endosc* 2010;72:1217-25.
14. Goto O, Sasaki M, Akimoto T, et al. Endoscopic hand-suturing for defect closure after gastric endoscopic submucosal dissection: a pilot study in animals and in humans. *Endoscopy* 2017;49:792-7.
15. Kobara H, Mori H, Fujihara S, et al. Outcomes of gastrointestinal defect closure with an over the scope clip system in a multicenter experience: An analysis of a successful suction method. *World J Gastroenterol* 2017;23:1645-56.
16. Abe S, Oda I, Mori G, et al. Complete endoscopic closure of large gastric defect with endoloop and endoclips after complex endoscopic submucosal dissection. *Endoscopy* 2015;47 Suppl 1:E374-5.

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