

# Is there a need to shield ulcers after endoscopic submucosal dissection in the gastrointestinal tract?

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**submitted** 17. March 2015  
**accepted after revision**  
23. March 2015

## Bibliography

**DOI** <http://dx.doi.org/10.1055/s-0034-1392032>  
Endoscopy International Open  
2015; 03: E152–E153  
© Georg Thieme Verlag KG  
Stuttgart · New York  
E-ISSN 2196-9736

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Endoscopic submucosal dissection (ESD) is accepted as a less invasive method of local resection of gastrointestinal tract neoplasia with a negligible risk of lymph node metastasis. ESD facilitates en bloc resection even in patients with larger or ulcerated lesions, thereby preserving the organ and improving the patient's quality of life compared with surgery. However, it is associated with various complication risks such as bleeding, perforation, and stricture formation. The ESD procedure was originally developed for early gastric cancer in the mid-1990s. Several technical refinements have been made in recent years and its indications have expanded to other organs and several clinical conditions. Consequently, several specific complications have arisen and need to be addressed.

In this issue of *Endoscopy International Open*, Takao et al. report the healing process of ESD-induced ulcers treated by the endoscopic application of polyglycolic acid (PGA) sheets with fibrin glue in a porcine model [1]. The PGA sheet is a biodegradable material that can be hydrolyzed in vivo and absorbed within approximately 15 weeks. Fibrin glue is a tissue adhesive composed of human fibrinogen and thrombin. The combined use of PGA sheets and fibrin glue has already been applied in many surgical fields with several reports on their safety and efficacy [2–5]. However, there have been few reports on the endoscopic application of PGA sheets with fibrin glue for post-ESD ulcers in the gastrointestinal tract [6–11]. In this animal study reported by Takao et al., this tissue shielding technique has been safely applied to post-ESD ulcers [1].

Tissue shielding using PGA sheets and fibrin glue might be useful for the prevention of several specific complications associated with ESD. First, it can be applicable for the prevention of delayed perforation after duodenal ESD as Takimoto et al. and Doyama et al. have reported in small case series [6,7]. Delayed perforation after duodenal

endoscopic resection occurs in 6% of cases which is significantly higher than for any other site in the gastrointestinal tract because of the thin duodenal wall and direct exposure of the post-ESD ulcer to bile and pancreatic juices [12]. In addition, delayed perforation in the duodenum can be fatal and hence effective prophylactic therapy is imperative. Second, tissue shielding using PGA sheets and fibrin glue can also be applicable for the prevention of stricture formation after esophageal ESD as Iizuka et al. and Sakaguchi et al. have reported with promising results [8,9]. A mucosal defect occupying more than three-fourths of the circumference is a risk factor for stricture formation with the frequency of stricture after such esophageal ESD reported to be 66–92% [13,14]. Esophageal strictures can require multiple endoscopic dilations which can cause a substantial decrease in the patient's quality of life. Although the efficacy of local injection and oral administration of steroids has been reported for the prevention of post-ESD strictures [14,15], these methods involve a risk of severe adverse effects such as delayed perforation and serious infections [16,17]. Third, Tsuji et al. reported a pilot study of the shielding method with PGA sheets and fibrin glue for the prevention of delayed perforation and bleeding after colorectal ESD [10]. Delayed perforation is a serious complication because it often requires emergency surgical intervention. However, the necessity of this preventive shielding method in the colon may be limited compared to other sites (duodenum and esophagus) at the current time, considering the low incidence of delayed perforation after colorectal ESD, which is reported to be 0.4% [18]. Fourth, patients receiving antithrombotics including antiplatelet and anticoagulant medications are also possible candidates for the shielding method with PGA sheets and fibrin glue to prevent delayed bleeding after gastric ESD. As the proportion of the elderly in society has increased, the number of patients re-

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ceiving antiplatelet and/or anticoagulant medications has also been increasing. A recent study reported that delayed bleeding was significantly higher in patients with single (15.5%, 9/58) or dual antiplatelet therapy (35.5%, 11/31) than in patients without any antiplatelet therapy (6.1%, 16/261) [19]. Oral anticoagulants are replaced with heparin (heparin bridging therapy) before high risk endoscopic procedures. However, a high incidence of delayed bleeding was also reported in patients on heparin bridging therapy (37.5%, 9/24) [20].

In addition, tissue shielding can be applicable for the management of delayed perforation after ESD of early gastric cancer. Delayed perforation after gastric ESD is a rare complication so it is impractical to prophylactically shield post-ESD ulcers after every procedure. Although perforation during gastric ESD can be treated conservatively using endoscopic clips, emergency surgical intervention is frequently required for delayed perforation. Ono et al. reported a successful application of PGA sheets for delayed perforation after gastric ESD [11].

ESD should be safe, effective, and suitable in a variety of clinical situations. Consequently, the shielding method using PGA sheets and fibrin glue is a promising method for the prevention and management of several specific complications related to ESD although, so far, there have only been case reports or small case series. Regarding the technical aspects at the current time, it is still challenging to deliver PGA sheets on post-ESD ulcers because of the location and gravitational influence. Larger prospective studies as well as technical improvements are necessary.

**Competing interests:** None

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