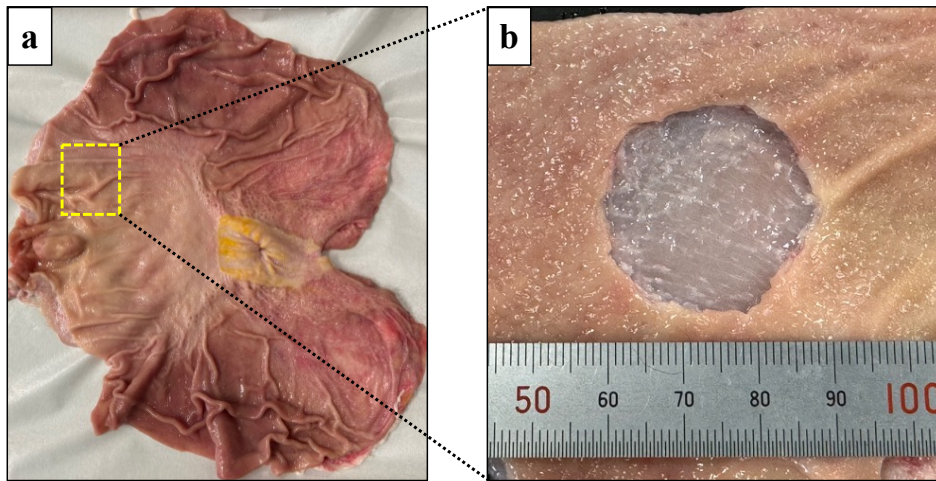


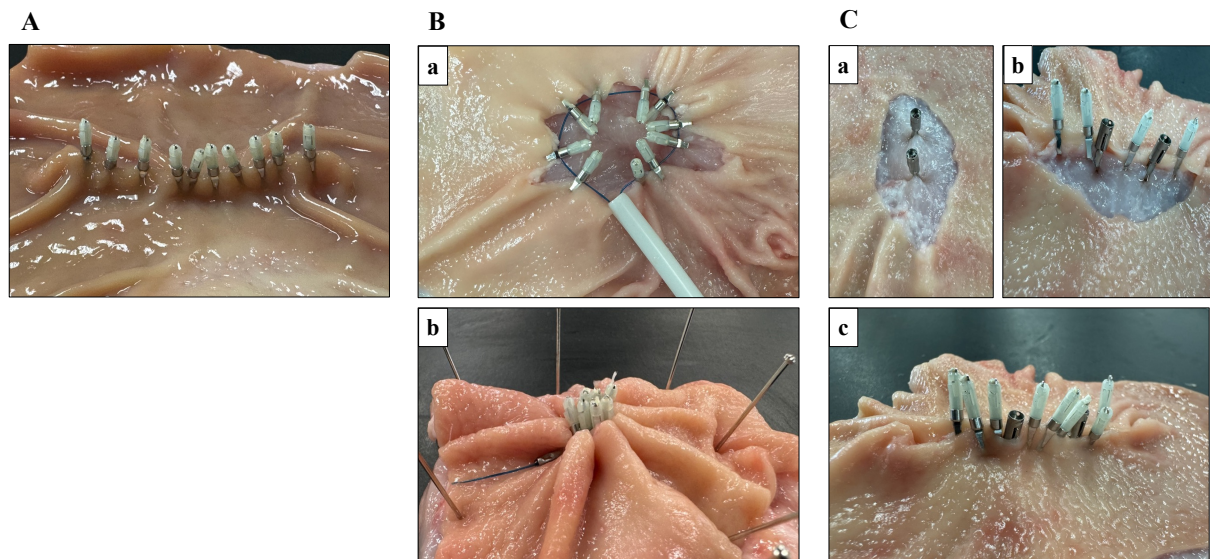
Supplementary Figure S1. The post- endoscopic submucosal dissection (ESD) mucosal defect model



We developed a 30-mm-diameter post-ESD mucosal defect model using a frozen-preserved stomach removed from a porcine. The resected stomach was opened in the direction of the greater curvature, and several portions from the middle to the lower body of the stomach were selectively used (a).

A 30-mm-diameter circular area was marked on the mucosal surface, which was excised with scissors and forceps without using energy devices, ensuring preservation of the underlying muscularis propria (b).

Supplementary Figure S2. The three methods of closing post-endoscopic submucosal dissection (ESD) mucosal defect



(A) The conventional method; Only the mucosal edge was sutured evenly with 10 clips (EZ Clip; Olympus, Tokyo, Japan). The mucosal edges were lifted with forceps, and the muscle layer was not clipped.

(B) The ligating method; Dedicated closure device (FLEXLOOP; Hakko Co., Ltd., Nagano, Japan) was used with EZ Clips. The loop was deployed and anchored along with the mucosal defect with clips (a). The defect was circumferentially narrowed with additional several clips. The loop was then tightened by pushing the outer sheath as the clip did not bury under the mucosa. After closure, the tail of the loop was cut. The total number of clips was fixed at 10, based on the median number reported in a previous pilot study (Shiotsuki K, et al. *Endosc Int Open*. 2025) (b).

(C) The double-layered suturing method; A modified technique known as the ‘origami method,’ was utilized. The muscle layer was grasped with forceps, and two reopenable clips (Sure Clip; Micro Tech, Nanjing, China) were used to fold the muscle layer (a). The folded muscle and margins of the defect were connected using EZ Clips, paying attention not to bury the clips beneath the mucosa (b). The total number of clips was fixed at 10, based on the median number reported in a previous study (Masunaga T, et al. *Gastrointest Endosc*. 2023) (c).