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**Regression of gastric endoscopic submucosal dissection induced polypoid nodular scar after *Helicobacter pylori* eradication: A case report**

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**Abstract**

**BACKGROUND**

Endoscopic submucosal dissection (ESD) is the treatment of choice for early gastric cancer and premalignant gastric dysplasia. In some cases, ESD induced ulcer heals as a polypoid nodular scar (PNS). These scars may make the physicians raise several clinical implications such as post-ESD neoplastic recurrence.

**CASE SUMMARY**

We described a case of gastric ESD induced PNS which is regressed after *Helicobacter pylori* (*H.pylori*) eradication. A 58-year-old male patient was referred to the outpatient clinic for evaluation and treatment of gastric low-grade dysplasia (LGD). ESD was performed. A PNS was developed at the ESD site. An endoscopic biopsy was done and there was no histological evidence of remnant tumor or recurrence but a hyperplastic mucosal change. The PNS showed increase in size in follow-up endoscopy, and the biopsy specimen demonstrated *H. pylori* infestation. *H.pylori* eradication was done and the PNS was regressed.

**CONCLUSION**

*H.pylori* eradication is considerable for the regression of PNS if *H.pylori* infestation is confirmed.

## **INTRODUCTION**

<sup>3</sup> Endoscopic submucosal dissection (ESD) is the preferred treatment of choice for patients with early gastric cancer (EGC) or premalignant lesions such as gastric dysplasia.<sup>1</sup> It enables minimally invasive and organ-sparing en-bloc resection of the tumor lesions with invasion limited to the mucosal or submucosal layer and with little or no lymph node metastasis. After a curative gastric ESD, typically homogenous and whitish scar change is found on the ESD site. However, in some cases, particularly with lesions located in the antrum of the stomach, the hyperemic polypoid nodular overgrowths of mucosa have been noted after ESD.<sup>2,3</sup> Though the exact mechanism that causes polypoid nodular scar (PNS) is unknown, one study found that 57% of PNS cases were *Helicobacter pylori* (*H.pylori*) positive, implying a link between *H.pylori* infestation and PNS.<sup>4</sup> Herein, we present a case of gastric ESD induced PNS and regression after *H. pylori* eradication. <sup>2</sup> This case report was approved by the Institutional Review Board of Jeonbuk National University Hospital (IRB No. 2022-07-028), and the patient has signed informed consent to the publication of the case.

## **CASE PRESENTATION**

### ***Imaging examinations***

Esophagogastroduodenoscopy showed an elevated nodule of about 2 cm in diameter at the greater curvature side of the antrum, and it was histologically confirmed as LGD. ESD was performed without any complications such as perforation and bleeding (Figure 1). Post-ESD histologic findings showed curative resection. Proton pump inhibitor (esomeprazole 40mg) was prescribed for the healing of iatrogenic gastric ulcer during 8 wk after ESD. A follow-up endoscopy was done after 3 mo and demonstrated a PNS on the previous ESD site (Figure 2A). An endoscopic biopsy was done and the result revealed a hyperplastic polyp. (Figure 3A). After a year, a follow-up esophagogastroduodenoscopy was done and found that the size of the PNS was larger

than that of the previous esophagogastroduodenoscopy (Figure 2B). Biopsy was done and *Helicobacter* gastritis without dysplasia was confirmed (Figure 3B).

### ***Laboratory examinations***

His laboratory evaluation revealed just a moderate rise (177 IU/L) of gamma-glutamyl peptidase.

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### ***Physical examination***

Physical examination was unremarkable, and his abdomen was soft, nontender, and nondistended with no palpable mass.

### ***Personal and family history***

His alcoholic history was notable, consuming about 2 pints of vodka per day, for 5–6 days in a week, with years of alcohol misuse.

### ***History of past illness***

A year before his first presentation, he was diagnosed with hypertension, type II diabetes, and left. aldosterone-secreting adenoma, for which he received laparoscopic left adrenalectomy.

### ***History of present illness***

He denied having any accompanying symptoms.

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### ***Chief complaints***

A 58-year-old male patient was referred to our hospital for treatment of low-grade dysplasia (LGD) at the antrum of the stomach.

### **FINAL DIAGNOSIS**

The patient received a final diagnosis of gastric ESD induced PNS which is associated with *H.pylori* infestation.

## **TREATMENT**

The patient was treated with the concomitant therapy (Lansoprazole 30 mg 1T bid + Amoxicillin 500 mg 2T bid + Clarithromycin 500 mg 1T bid + Metronidazole 250 mg 2T bid for 10 days) for *H.pylori* eradication. *H.pylori* eradication was assessed by a urea breath test.

## **OUTCOME AND FOLLOW-UP**

Endoscopy was performed after 1 year of *H.pylori* eradication and revealed a significant decrease in the size of the PNS (Figure 4A). After two years of *H.pylori* eradication, the PNS was regressed. (Figure 4B).

## **DISCUSSION**

PNS, a protuberant polypoid nodule, which develops 3 to 18 mo after ESD mostly in the gastric antrum, is prevalent in men.<sup>4</sup> The incidence of PNS is not yet known due to its uncertainty during the follow-up, but a multi-centered study by Arantes *et al*<sup>5</sup> reports it to vary broadly from 1.7% to 13.3%. The mechanism of development of PNS is not fully understood. The healing process of post-ESD ulcers is thought to include the continuous growth of gastric mucosa and the convergence of folds at the ulcer rim.<sup>6</sup> This ulcer healing causes a progressive decrease in the size of the polypoid lesion, which eventually heals as a homogeneous, whitish flat scar after 8 wk, for which an oral proton pump inhibitor is administered following ESD.<sup>7</sup> However, the accelerated mucosal repair and pulling-out phenomenon of ulcer rim are suspected to contribute to the nodular overgrowth of mucosa and the development of PNS. Approximately 18% of the diagnosed PNS eventually disappeared, but the rest remained in various sizes.<sup>7</sup> A distinctive characteristic of PNS is its location, predominantly in the distal stomach such as the antrum, probably due to the locally thicker submucosal layer, generating more frequent inflammatory and regenerative reactions compared with other parts of the stomach.<sup>8</sup>

There appear to be two primary clinical quandaries to resolve in PNS following the ESD operation. The first is the possibility of recurrence or persistent carcinoma following EGC removal; the second is the difficulty in distinguishing it from intramucosal carcinoma. However, in the studies undertaken by Arentes *et al*<sup>9</sup> and Choen *et al*, all PNS cases located in the antrum exhibited no histological evidence of tumor recurrence but a hyperplastic alteration with intestinal metaplasia if curative resection was performed. In our case as well, PNS developed after ESD showed the biopsy-confirmed hyperplastic mucosal change.

In a study by Nam *et al*, which included 183 patients for an average follow-up of 2.2 years, 83.7% of hyperplastic polyps had disappeared by the time *H.pylori* eradication was completed; without eradication, only 16.3% of polyps disappeared, and there were even cases where the size increased and removal was considered. *H.pylori* induces epidermal cell proliferation and foveolar hyperplasia, resulting in hyperplastic polyp. These hyperplastic polyps regress after eradication, with improvement in gastric mucosal inflammation.<sup>10</sup> Therefore, a successful eradication of *H. pylori* is thought to reduce the risk of developing hyperplastic polyp.<sup>11</sup> This demonstrates that the development of gastric hyperplastic polyp is associated with *H.pylori* infection at some instant and that the polyp regresses after eradication, as did with our case. Although reports on the relation between PNS and *H.pylori* are rare, as long as the biopsy of ESD induced PNS is histologically verified as benign and hyperplastic, *H. pylori* eradication should regress the nodule, as current guidelines indicate for stomach hyperplastic polyps.<sup>12</sup> Furthermore, the 2020 Korean guidelines for the treatment of *H.pylori* recommend eradication after the endoscopic resection of *H.pylori*-positive gastric tumors, including EGC and adenoma, because a lower rate of metachronous cancer recurrence was reported with the eradicated group.<sup>13</sup> Considering this clinical aspect, *H.pylori* eradication for ESD-induced PNS is reasonable in our case.

## **CONCLUSION**

We present a case of ESD-induced PNS which was regressed after *H. pylori* eradication. Although reports on the relationship between PNS and *H. pylori* infection are rare and further study is needed to define it, the *H.pylori* eradication may be helpful for the PNS to regress. With the reduction of further injury to the gastric mucosa and less gastrointestinal morbidity, the prospective management of *H.pylori* could reduce the physician's concerns for remnant or recurred tumors along with unnecessary endoscopic surveillance in patients with gastric ESD induced PNS.

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