## The potential role of artificial intelligence besides predicting gastric cancer invasion depth

To the Editor:

In recent articles published by *Gastrointestinal Endoscopy*,[1-3] artificial intelligence (AI) has been used to predict the invasion depth of gastric cancer (GC) on the basis of nonmagnifying endoscopic images with high accuracy. The accuracy of white-light imaging (WLI) with AI is from 78.6% to 94.5% when distinguishing GC within the mucosa, the superficial and deeper submucosa, and beyond the submucosa.

The diagnosis and invasion depth prediction of GI cancer is always a prerequisite for the treatment choices (eg, endoscopic or surgical resection). In current clinical practice, the invasion depth of GC mainly relies on the macroscopic features from WLI, such as Paris classification, size, color, and ulceration. The diagnostic ability is subjective and changeable. These results may indicate the feasibility of the clinical application of AI based on WLI in determining GC invasion depth to improve accuracy and reduce the workload after the optimization of AI models and algorithms in the future.

For esophageal squamous cell cancer and colorectal cancer, intrapapillary capillary loops (IPCL), the National Institute for Health and Care Excellence guidelines, and the Japan Narrow-Band Imaging Expert Team classification can give us common diagnostic criteria for invasion depth. Specific criteria of GC invasion depth are lacking, which may be a limitation of endoscopic evaluation. Therefore, besides the clinical application to endoscopic diagnosis that is considered the dominant goal of AI, does the high accuracy indicate a criterion of GC invasion depth hidden in WLI? Furthermore, can AI be used to find a specific structure and the corresponding change rule responsible for GC invasion depth, similar to IPCL and pit pattern? If so, it means that image-based AI may promote the development of endoscopic diagnostic criteria of GC invasion depth and also may be applicable to esophageal adenocarcinoma and the mechanism of gastric carcinogenesis behind the structure.

### DISCLOSURE

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## Gastric juice accelerates liquefaction of pancreatic necrosis

To the Editor:

The recently published meta-analysis on $H_2O_2$-assisted endoscopic necrosectomy of pancreatic walled-off necrosis (WON) showed that it facilitated debridement without significant adverse events.[1] Debridement is often inefficient, requiring multiple procedures and the retention of drains or stents for prolonged periods.[2] Many solutions have been investigated, including collagenases,[3] tissue plasminogen activator,[4] and gastric acid.[5] An in vitro study by us also showed that fluid obtained from a nasogastric tube (patient taking a proton pump inhibitor) was an effective liquefaction solution.[6]

We conducted an in vitro study to evaluate the liquefying effects of 4 different chemical solutions on human pancreatic necrosis: 0.9% normal saline (group I), 5% sodium bicarbonate (group II), 3% $H_2O_2$ (group III), and artificial gastric juice (Coolaber Corporation, Beijing: 3.5 mg/mL pepsin, hydrochloric acid diluted to pH 2.0,

group IV). Approval from the Institutional Review Board and informed consent were obtained for the collection of human pancreatic necrosis samples from patients who underwent necrosectomy procedures. Pancreatic necrosis tissue (weight A) was incubated with individual test solutions for 2 hours at 37°C, and then the remaining tissues were weighed (weight B). The liquefaction efficiency (%) was calculated by (1-B/A) * 100%. The liquefaction results (median and interquartile range) in groups I to IV (each n = 12) were 28.4% (5.1), 31.8% (26.2), 40.5% (22.8), and 56.7% (36.1), respectively. Artificial gastric juice was significantly more effective than $H_2O_2$ in liquefying pancreatic necrosis ($P < .01$). As a safety study, normal healthy aortic tissue from rats was also incubated (for 2 hours at 37°C) with each solution (each n = 6), and no histologic evidence of injury was identified for any of the solutions.

In this pilot study, artificial gastric juice exposure for at least 2 hours was more effective than $H_2O_2$ in accelerating liquefaction of pancreatic necrosis without damaging normal vascular tissue. This approach should be further investigated as an adjunct to percutaneous drainage and debridement procedures.

## DISCLOSURE

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## Response:

In this interesting correspondence, authors Gao et al[1] describe accelerated liquefaction of necrotic debris in pancreatic walled-off necrosis (WON) using gastric juice. In our meta-analysis published in *Gastrointestinal Endoscopy* we explored the pooled outcomes of $H_2O_2$ in the necrosectomy of pancreatic WON.[2] Excellent pooled outcomes were demonstrated in our study.

As Gao et al[1] noted in their letter, many chemical formulations have been investigated with interesting results. In their in vitro study, 4 different chemical solutions on human pancreatic necrosis were studied. Based on the percentage liquefaction efficiency results, artificial gastric juice was significantly more effective than $H_2O_2$. Interestingly, the authors exposed normal aortic tissue from rats to incubation with artificial gastric juice, and no histologic evidence of injury was noted.

We congratulate the team for their innovative study. It does make theoretic sense that gastric juice, with its acidic pH and enzymatic properties, can potentially liquify necrotic debris. This is a very exciting in vitro finding that might pave the way for some novel liquefactive agents in the chemical debridement of pancreatic WON.

## DISCLOSURE

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