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## **Sarcina ventriculi: an unexpected herald of gastric carcinoma**

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## ***Sarcina ventriculi*: an unexpected herald of gastric carcinoma**

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*Sarcina ventriculi* is an anaerobic, gram-positive bacterium present in soil and water [1]. In alkaline pH environments, it forms spores that can survive for years. Its role in human pathology is debated. However, multiple studies link it to conditions marked by slowed gastric emptying and gastric outlet obstruction, such as diabetic gastroparesis, cystic fibrosis, and pyloric stenosis [1].

We present the case of a 51-year-old female patient referred to our gastroenterology department. She had been experiencing severe dysphagia, dyspepsia and belching for several months. Notably, the patient reported a palpable mass in her epigastric area. Throughout a series of three upper endoscopies, consistent findings included mucosal erosions and ulcers observed in the gastric cardia and antrum, alongside a stiff and granulated mucosal texture.

Circumferential stenosis was noted in the antrum. A significant amount of retained gastric contents was observed. A gastric biopsy was performed during each procedure, but was negative for malignancy. However, the presence of large bacteria in tetrad packets consistent with *S. ventriculi* was noted on the surface of the gastric mucosa. Subsequent imaging with multi-phase contrast-enhanced computed tomography of the abdomen revealed concentric thickening of the gastric wall at the antrum. The pre-stenotic proximal part of the stomach was enlarged and filled with retained contents.

Based on the worrisome clinical presentation in addition to the patient's debilitating symptoms, a decision was made to perform a gastrectomy with an intraoperative frozen section that revealed the poorly cohesive carcinoma (PCC) with a signet ring component. Routine histopathological examination showed the mucosa was mainly devoid of cancer whereas submucosa, muscularis propria, adipose tissue, and serosa were widely infiltrated by PCC cells. Isolated tumor cells were found in one lymph node. All margins were negative. This case accentuates the relationship between *S. ventriculi* infection and severe gastric pathologies associated with delayed gastric emptying, including malignancies. Due to the predominantly deep location of PCC in addition to minimal mucosal changes, conventional upper endoscopy, and superficial biopsies might overlook the diagnosis [2]. This case emphasizes the necessity for more extensive diagnostic evaluations in patients with *S. ventriculi* infection, as it may indicate an increased likelihood of an underlying malignancy in the appropriate clinical context. English literature reported more than 80 cases of *S. ventriculi* encountered in humans [1,3,4]. A few cases documented the concomitant presence of gastric, esophageal, and rectal cancer [4]. A hypothesis can be made that the detection of *S. ventriculi* in gastric biopsy, even in the absence of visible cancer, is highly suspicious for underlying malignancy. This highlights the critical need for a vigilant investigative approach once the bacterium has been identified. In addition, some studies have shown that *S. ventriculi* may

increase the risk of gastric emphysema and perforation [3]. The most frequently reported empirical treatment for *S. ventriculi* infection includes metronidazole, sometimes with ciprofloxacin and/or a proton pump inhibitor. There is no agreement what is the standard of care for this infection and the efficacy of various regimens remains unclear [3,5].

#### Article information

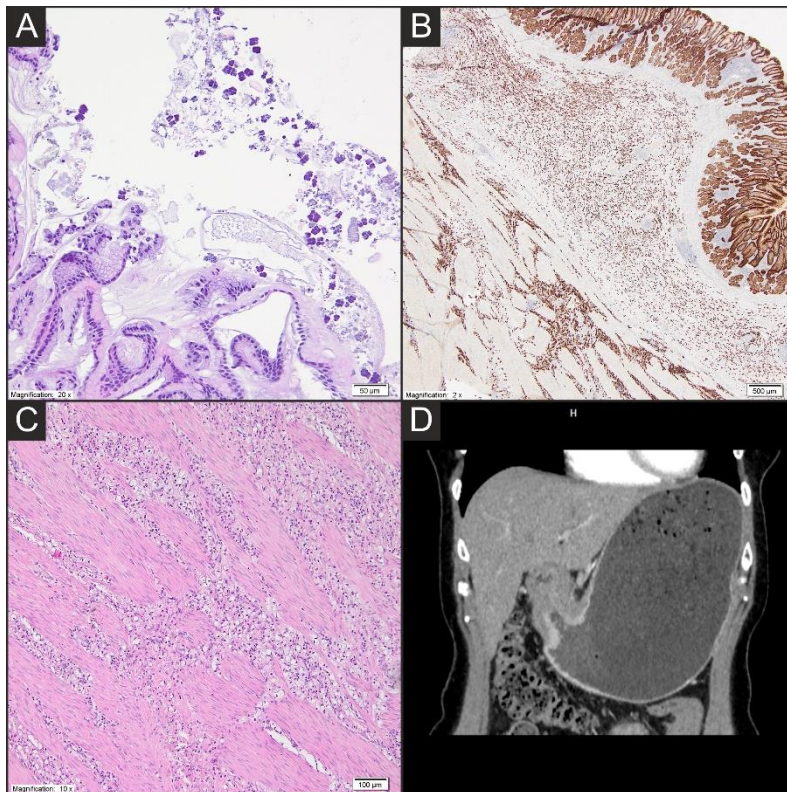
**Conflict of interest** None declared.

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#### References

- 1 Al Rasheed MRH, Senseng CG. *Sarcina ventriculi*: review of the literature. Arch Pathol Lab Med. 2016; 140: 1441-1445.
- 2 Drubay V, Nuytens F, Renaud F, et al. Poorly cohesive cells gastric carcinoma including signet-ring cell cancer: updated review of definition, classification and therapeutic management. World J Gastrointest Oncol. 2022; 14: 1406-1428.
- 3 Tartaglia D, Coccolini F, Mazzoni A, et al. *Sarcina ventriculi* infection: a rare but fearsome event. A systematic review of the literature. Int J Infect Dis. 2022; 115: 48-61.
- 4 Ugarte Bilbao A, de la Fuente Molinero I, Bravo Rodríguez MT, et al. *Sarcina ventriculi* in gastric biopsies of two patients with an underlying neoplasia. Rev Esp enfermedades Dig. 2022; 114: 557.
- 5 Mishra S, Singh A, Kumar A, Phulware RH. A rare bacterial infection of the gastrointestinal tract: *clostridium ventriculi*. Autops Case Reports. 2024; 14: e2024469.



**Figure 1** A – Surface of gastric mucosa with mucoid material and numerous tetrads of *Sarcina ventriculi* (hematoxylin-eosin stain, 20x magnification); B – poorly cohesive carcinoma infiltrating the submucosal and muscularis propria layers of the stomach wall (CKAE1/AE3 stain, 2x magnification); C – intramuscular infiltration of poorly cohesive carcinoma, including signet-ring cell component (hematoxylin-eosin stain, 10x magnification; D – the proximal part of the stomach lumen appears dilated, accompanied by the retention of gastric contents; the antrum wall displays circular thickening with strong post-contrast enhancement (computed tomography scan, arterial phase)