Sarcina Ventricularis Complicating a Patient Status Post Vertical Banded Gastroplasty: A Case Report

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ABSTRACT

Herein we describe the first case of Sarcina species identified on gastric biopsy material from a patient status post bariatric surgery. As Sarcina species is known to rarely behave as a pathogen, its presence is noteworthy. Our patient was treated with antibiotics with resolution of bacterial overgrowth on repeat biopsies.

MANAGEMENT

The patient was empirically treated with motilium 10 mg twice daily. When Sarcina was delineated in the laboratory, metronidazole 500 mg three times daily was initiated. A repeat
esophagogastroduodenoscopy was performed four months later. The proximal stomach anastomotic polyps persisted but had diminished in size. There was antral erythema of a linear antritis. Histology revealed reactive antral mucosa of a chemical gastropathy. All other mucosa was unremarkable including an absence of Sarcina and Helicobacter species.

**DISCUSSION**

Sarcina species was isolated as a human pathogen in 1842 by Goodsir\(^5\). The organism manifested as a profuse frothy and yeasty vomiting illness in the setting of pyloric obstruction\(^5\). Further study delineated positive Sarcina cultures almost exclusively in stool samples of healthy vegetarians compared to those who ate a mixed diet\(^6\). This finding collaborates with the natural history of Sarcina disease in livestock (goats, cows) and horses whose herbivorous diet predisposes to abomasal bloat\(^7,8\).

Sarcina ventricularis is a gram positive coccus, an obligate anaerobe with a carbohydrate fermentative metabolism and consequent vigorous gas (carbon dioxide) production\(^9\). The organism is exceptionally acid tolerant, growing in environments with a pH as low as 2\(^10\). It has distinct morphology on routine histologic stains allowing for a definitive diagnosis via microscopy\(^3,4\). Individual cells are 1.8-to-3 µm but replicate along at least two planes of growth resulting in tetrad or octet units, the former 8-to-10 µm\(^9\).

There have been nine relatively recent publications in English literature of Sarcina ventricularis in the human upper gastrointestinal tract\(^1-4\). All patients were deemed to have gastric outlet obstruction or gastroparesis\(^1-4\). In particular, four patients had compromised gastric emptying due to previous surgical interventions including a Billroth II procedure and truncal vagotomy for recalcitrant ulcers, small bowel resection for malrotation, gastric pull through for esophageal atresia and a pancreaticoduodenectomy for pancreatic adenocarcinoma\(^2-4\). Our case is the fifth where Sarcina overgrowth complicates a patient with surgically altered gastroenteric anatomy (Table 1). Our patient is also predisposed to bacterial overgrowth in the stomach due to presumed diabetic gastroparesis.

Previous studies have delineated a management paradigm for Sarcina sp. The majority of cases represent an overgrowth of a commensal organism that potentially signifies an underlying anatomic and/or physiologic delay in gastric emptying\(^3,4\). Such cases may not require pharmacologic intervention. However, if Sarcina organisms are identified in a patient with prominent dysphagia or substernal

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**Figure 1** Sarcina sp. overgrowth is facilitated by retained food of a gastroparesis and/or outlet obstruction (A); Anastomosis site polypoid mucosa in our patient (B).

**Figure 2** Each organism was 2-to-3 µm and they were arranged in tetrad and octet groups. Tetrad structures were 8-to-10 µm. This bacteria morphology is pathognomonic for Sarcina species, presumed Sarcina ventricularis. A is 40× and B is 60×, hematoxylin and eosin stain.
There are no conflicts of interest with regard to the present study.

REFERENCES

1. Laass M, Pargac N, Fisher R, Bernhardt H, Knoke M, Henker J. Burning, combined proton pump inhibitor and prokinetic therapy is indicated[17]. Finally, Sarcina organisms proliferating in an ulcerated or eroded stomach may cause sequela such as emphysematous gastritis or perforation[5-7]. In this setting, eradication of the organism by antibiotics is recommended[2,4]. Previous cases have been treated with either gentamycin and metronidazole or ciprofloxacin 250 mg twice daily and metronidazole 250 mg three times daily[1,2]. As a healed ulcer was evident in our case, we decided to treat with metronidazole. Confirmation of Sarcina eradication warrants repeat endoscopy in three to six months[10].

Individuals with obesity, gastroparesis and/or metabolic syndrome have an increased prevalence of stomach and intestinal bacterial overgrowth[11,12,13]. This bacterial overgrowth can have deleterious consequences in the post-bariatric surgery population manifesting as liver toxicity and liver failure[5-7]. The bariatric procedure Roux-en-Y is associated with a transition to a lean weight microbiota profile in obese patients. In this setting, eradication of the organism by antibiotics is recommended[2,4].

Certainly the microbiota landscape in the surgically resected stomach has implications for patient outcome. Sarcina ventricularis is one known gastric commensal that rarely behaves as a pathogen in the setting of gastroparesis and/or outlet obstruction. In our patient, there was no deleterious outcome and the organism was eradicated by antibiotics. However, our case delineates that the bariatric surgery population is at risk for Sarcina overgrowth. Additional examples of overgrowth need to be analyzed to discern if Sarcina sp. modifies the trajectory of weight loss in this patient cohort. As this agent is known to cause emphysematous gastritis and perforation in the eroded or ulcerated stomach, clinicians should be mindful of this bacterium when surveilling their bariatric surgery patient population.

CONFLICT OF INTERESTS

There are no conflicts of interest with regard to the present study.

Table 1 Sarcina ventricularis in individuals status post gastrointestinal surgery.

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age/Sex</th>
<th>Surgical History</th>
<th>Symptoms</th>
<th>Surgical/Endoscopic Findings</th>
<th>Pathology Findings</th>
<th>Clinical outcome</th>
<th>Pathologic Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tolentino et al</td>
<td>14 year old male</td>
<td>Small bowel resection for malrotation 43 days prior</td>
<td>Abdominal pain and distension</td>
<td>Gastric perforation and necrotic fundus</td>
<td>Acute hemorrhagic gastritis Sarcina organisms</td>
<td>Gentamycin, metronidazole. Fully recovered day 5</td>
<td>No follow up biopsy</td>
</tr>
<tr>
<td>2. Lam-Himlin et al</td>
<td>12 year old female</td>
<td>Gastric pull-through for esophageal atresia</td>
<td>Dysphagia</td>
<td>Retained food in stomach. Anastomosis stricture</td>
<td>Reflux esophagitis. Sarcina organisms</td>
<td>Lost to follow up</td>
<td>Lost to follow up</td>
</tr>
<tr>
<td>3. Lam-inlin et al</td>
<td>46 year old female</td>
<td>Whipple’s procedure for pancreatic adenocarcinoma</td>
<td>Painful epigastric spasms</td>
<td>Bile and retained food</td>
<td>Chronic active duodenitis. Sarcina organisms</td>
<td>Continued spasms</td>
<td>No follow up biopsy</td>
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<tr>
<td>4. Ratuapli et al</td>
<td>73 year old male</td>
<td>Billroth II antrectomy and vagotomy 27 years prior</td>
<td>Iron deficiency anaemia</td>
<td>Retained food. Diffuse gastric erythema. Two 4 mm polyps at anastomosis site</td>
<td>Diffuse active gastritis. Bacteria overgrowth including Sarcina sp</td>
<td>Metronidazole, Ciprofloxacin and Sucralfate. 3 month follow up - no erythema, no bezoar</td>
<td>3 month follow up - chronic gastritis, negative for Sarcina</td>
</tr>
<tr>
<td>5. Medlicott and Adams</td>
<td>53 year old female</td>
<td>Vertical banded gastropasty 4 years prior.</td>
<td>Dyspepsia</td>
<td>Retained food, healed ulcer in pouch and polyoid anastomosis site</td>
<td>Mild chronic gastritis, Sarcina organisms</td>
<td>Motilium, Metronidazole 4 month follow up - Antral erythema</td>
<td>4 month follow up - chemical gastropathy of antrum, negative for Sarcina</td>
</tr>
</tbody>
</table>

Emphysematous gastritis caused by Sarcina ventriculi. Gastrointest Endosc 2010 Nov; 72(5): 1101-1103


Medlicott SA et al. Sarcina sp. and bariatric surgery

are long-term metabolic consequences possible? Obes Surg 2014; May 10 [Epub ahead of print]


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