Review Article
A Closer Look to Approach SarcinaVentriculi

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ABSTRACT:
Sarcina ventrculi (SV) is an anaerobic bacteria causing gastrointestinal infection. Over years cases were reported about this infection proving that it can be diagnosed by histopatholgical findings. Moreover, literature recorded variety of clinical presentations and management options highlighting antibiotic as a key of treatment. This paper aims to give an overview of an approach to a clinical case suspected with SV infection.

Key words: Sarcina, sarcina ventriculi, bacteria, microorganism, pathogen, sarcina ventriculi treatment, sarcina ventriculi infection

INTRODUCTION:
Sarcina ventriculi (SV) is gram positive, non-motile, obligate anaerobic bacteria with exclusive carbohydrate fermentative metabolism that enables it to survive in a wide range of environmentalconditions (1). It belongs to the Clostridiaceae family and its origin is derived from the Latin word "sarcina" meaning bundle. SV has a thick fibrous layer of150 to 200 nm on the outer surface of its cell wall composed mostly of cellulose that allows its fermentation (2)(3). It is found in soil and water and can grow in low pH condition (1) (3) (4).

In livestock, SV is a common pathogen (1) seen mostly in the stomach of animals such as cats, horses, cows, and goats. Although some papers reported that the bacteria infects both humans and animals via the consumption of contaminated material or preexisting pathologies, the pathogenesis of this microorganism is still not well-explained (2)(3)(5). SV was first described in the human stomach in 1842 by Good sir and first cultured in 1905 (3)(5). Since then, an increasing number of cases are reported when Sarcina were incidentally found. The pathogen has been identified on gastric biopsies of patients with gastric stasis, ulcerative disease, diabetic gastroparesis or pyloric stenosis (1)(4)(5)(6). It has also been cultured from the feces of healthy humans consuming a predominantly vegetarian diet (3)(4)(7).

Sarcina has been described in both pediatric and adult patients with a median age of 48 years andan age range between 3 and 73 years. It affects predominantly females in 68% of cases (4).

Even though the discovery of SV infection goes back to more than 170 years, less than 70 cases were reported. Hence, this paper aims at providing an overview of the current state of knowledgeabout Sarcina infection with a highlight on clinical presentation, diagnosis and management.

CLINICAL PRESENTATION:

Sarcina infection can have various manifestations such as abdominal pain (49%), vomiting (29%), diarrhea (21%) or abdominal distention (15 %). Other less frequent symptoms include dyspepsia, anorexia, dyspnea, and dysphagia (10 %). It can also be totally asymptomatic. Many predisposing factors were described in the literature. In a review published in 2016, more than half of the documented cases had a history of gastrointestinal surgery, gastroparesis, or gastric outlet obstruction (7) and 17% had a history of diabetes mellitus. Other major comorbidities recorded in patients with SV infection included gastroesophageal reflux disease (12%), arterial hypertension (11%), peptic ulcer disease (8%) and respiratory diseases 5% (4)(5)(6).Thus, patient's medical history and comorbidities are essential in raising the clinical suspicion of infection but on the other hand, it is still difficult to determine whether the symptoms are related to the infection itself or to the underlying gastric pathology.

DIAGNOSIS:

SV is usually found on biopsies obtained during upper gastrointestinal endoscopy (4). There is a wide range of endoscopic findings which could promote SV growth such as: inflammation (esophagitis, gastritis or duodenitis) (7%), food bezoar (9%), erosions and ulcers (6%) (4)(8). Histologic analysis can identify the pathogen by Hematoxylin and Eosin (H&E) staining (1) (4) which shows a packeted morphology, often in tetrads with thick cellulose-dominant wall (5)(8)(9).Other less common stains can also be used such as Gram stain, Grocott's methenaminesilver, May-Grumwald Giemsa, and periodic acid-Schiff (4). Moreover, with more cases reported, molecular testing is being considered and polymerase chain reaction (PCR) test can beperformed (4)(10)(11). Histopathological features might include a normal gastric mucosa (3%), active or inactive gastritis (9%), erosive esophagitis (4%), gastric ulcer (8%), necrosis (1%), gastric hyperplastic polyps (1%), duodenitis, emphysematous gastritis or superficial mucosal hemorrhage (4)(7). Realizing that there are no consistent or specific histologic findings in the gastric mucosa, every case should be tackled with high level of suspicion and an approach correlated with the clinical presentation of the patient. Al Rasheed et al reported that the key for diagnosis of SV relies on histology alone, and the diagnosis could be reconfirmed by geneticanalysis.(5) (7)

APPROACH TO MANAGEMENT:

The management of SV infection is based mainly on antibiotic therapy. Metronidazole as a monotherapy was used in about 59% of reported cases, alone or combined with ciprofloxacin. Other potential antibiotics included piperacillin-tazobactam, amoxicillin/penicillin, ceftriaxone, gentamicin, levofloxacin, imipenem and vancomycin, most of which were started for another associated infection. However, the literature did not reach a consensus on the recommended antibiotic choice or the duration of treatment (4)(5)(8)(10).

Besides antibiotic therapy, symptomatic treatment can include anti-ulcer therapy such as proton pump inhibitors (PPI) and ranitidine sucralfate, or antiemetic drugs such as metoclopramide (4)(7)(10).

The response to medical treatment is assessed by both clinical improvement and the eradication of SV on histological analysis.

Surgical intervention can be considered notably in symptomatic infections refractory to medical treatment and in some other cases complicated of gastrointestinal perforation, peritonitis, mucosal necrosis, purulent expectoration, hemoptysis or emphysematous gastritis . Surgical interventions included total or subtotal gastrectomy with Roux en Y gastrojejunostomy, jejunostomy tube placing, duodenal resection or endoscopic dilatation. (8)(12)(13)

In Figure 1, we provide an algorithm that resumes the management of SV infection starting fromdiagnosis to treatment.
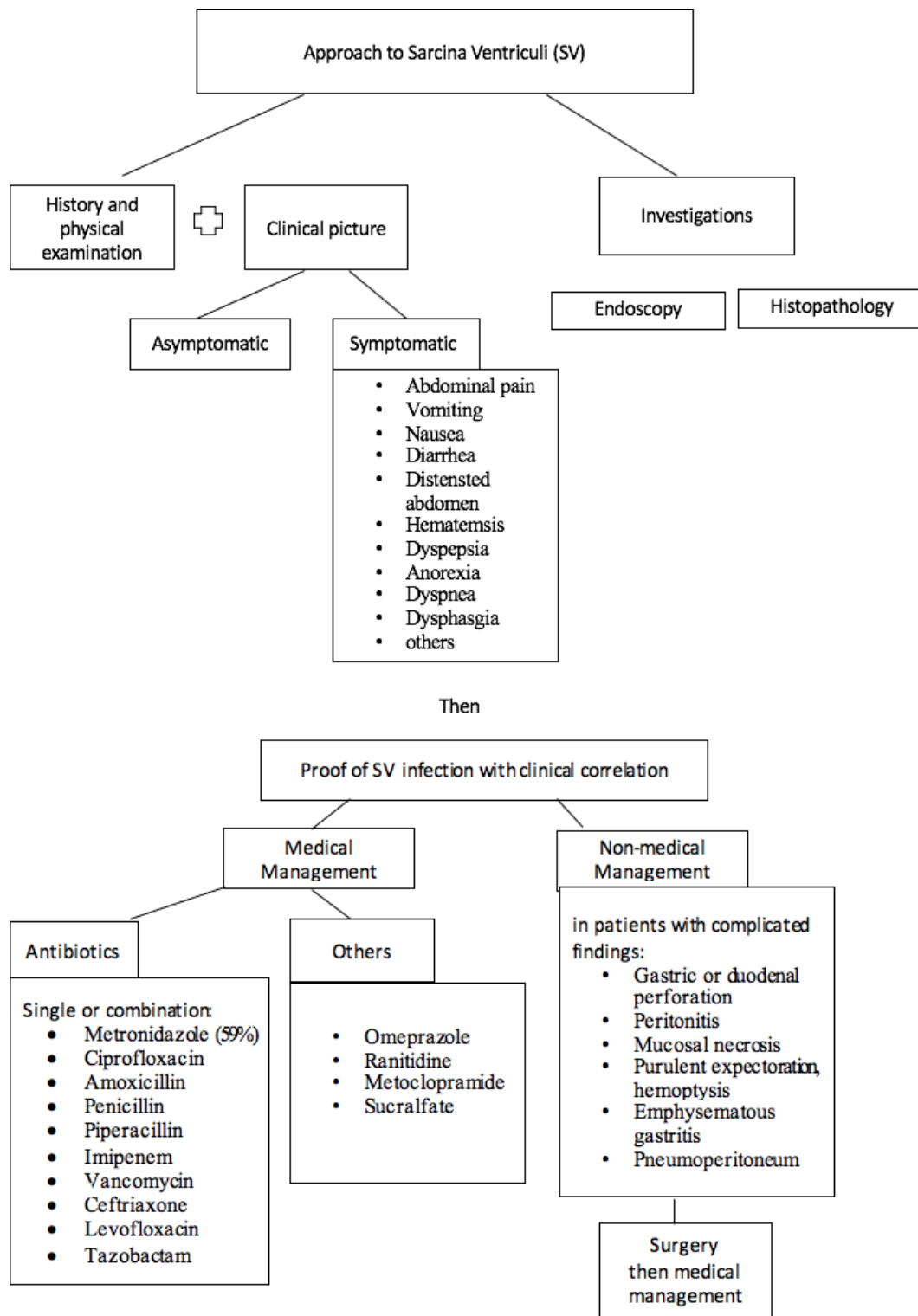
Figure 1: An algorithm explaining the approach to a patient with Sarcina vetriculi (SV) infection

CONCLUSIONS

Sarcina infection is a rare pathogen that is being more frequently reported in patients with some predisposing upper gastrointestinal pathologies and may be associated with a significant clinical burden. This paper provided an overview on the clinical features and the diagnosis of this infection and tailors an algorithm that might help in the approach to its management..

SARCINA VENTRICULI AND THE FUTURE

Reported cases and review papers play an essential role to understand and clarify rare pathologies as Sarina ventriculi infection. The future is enlightening for the success of other research papers and clinical trials to light on the pathogenicity of SV, implement consensus guidelines for approach, and optimize a treatment regimen.

LIMITATIONS:

This review has two major limitations. The first that small number of cases reported over years. The second is related to lack of follow up in some cases that don't allow researchers to reach the optimal approach and management of this pathogen.

Conflict-of-interest statement:

Neither author has any personal or financial interests related to the publication of this study or its findings.

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