

## OLGU SUNUMU / CASE REPORT

# Postmortem Diagnosis of Gastric Ulcer Perforation and Peritonitis with *Sarcina Ventriculi*: A Case Report

## Gastrik Ülser Perforasyonu ve Peritonite Eşlik Eden *Sarcina Ventriculi*'nin Postmortem Tanısı: Olgu Sunumu

Aytul Buğra\*, Taner Daş, Neval Elgörmüş, Gizem Ayaz

### Abstract

*Sarcina ventriculi* is a gram-positive anaerobic coccus with characteristic tetrad morphology. *Sarcina ventriculi* is identified by light microscopy with features of basophilic staining, cuboidal shape, tetrad morphology, and refractile nature. There have been very few case reports of *Sarcina ventriculi* reported in the literature. We present a case of a 53-year-old male, with gastric ulcer perforation where peritonitis was incidentally found to harbor *Sarcina ventriculi* in postmortem histopathological examination. Most of the cases exhibit abdominal pain, nausea, vomiting and delayed gastric emptying. It has also fatal life-threatening complications, such as gastric perforation and emphysematous gastritis. The histopathological examination has a key role for identification of the bacteria. The pathologist must always keep it in mind these bacteria as a cause of gastric ulcer perforation in the differential diagnosis. We want to present a case of a 53-year-old male gastric ulcer perforation who was found dead in his bed.

**Keywords:** *Sarcina Ventriculi*; Stomach Ulcer; Peritonitis.

### Öz

*Sarcina ventriculi*, karakteristik tetrad morfolojisi olan gram pozitif anaerobik koktur. Bazofilik boyanması, küboidal şekli, tetrad morfolojisi ve refraktil yapısı ile ışık mikroskopunda tanınır. Literatürde *Sarcina ventriculi* ile ilgili az sayıda vaka bildirilmiştir. Biz erkek gastrik ülser perforasyonu ve peritonit ile prezente olan 53 yaşındaki erkek olguda postmortem incelemede insidental olarak *Sarcina ventriculi* bakterisini tespit ettik. Olguların çoğu karın ağrısı, bulantı, kusma ve gecikmiş gastrik boşalma ile prezente olmaktadır. Gastrik perforasyon ve amfizematöz gastrit gibi yaşamı tehdit eden fatal komplikasyonlara yol açabilmektedir. Histopatolojik inceleme tanıda anahtar rol oynamaktadır. Bu bakteri gastrik ülser perforasyonun ayırıcı tanısında patoloğ tarafından her zaman akılda tutulmalıdır. Çalışmamızda mide ülser perforasyonu nedeni ile ölen ve yatağında ölü bulunan 53 yaşında erkek olgu sunulmuştur.

**Anahtar Kelimeler:** *Sarcina Ventriculi*; Mide Ülseri; Peritonit.

DOI: 10.17986/blm.2019149824

Aytul Buğra: MD. Spec.,  
The Ministry of Justice, Council of Forensic  
Medicine, Pathology Department, İstanbul  
Eposta: aytulsargan@gmail.com  
ORCID iD: <https://orcid.org/0000-0001-5640-8329>

Taner Daş: MD. Spec., The Ministry of Justice,  
Council of Forensic Medicine, Pathology  
Department, İstanbul  
Eposta: tanerdas@hotmail.com  
ORCID iD: <https://orcid.org/0000-0002-1216-186X>

Neval Elgörmüş: MD. Spec., The Ministry  
of Justice, Council of Forensic Medicine,  
Microbiology Department, İstanbul  
Eposta: neyelgormus@yahoo.com  
ORCID iD: <https://orcid.org/0000-0003-3472-2020>

Gizem Ayaz: MD. Spec., Siirt State Hospital,  
Pathology Department, Siirt, Turkey  
Eposta: gizemayaz17@gmail.com  
ORCID iD: <https://orcid.org/0000-0001-7940-2018>

### Acknowledgement

The authors declare that they have no conflict of interests regarding content of this article.

**Received:** 18.12.2018

**Revised:** 05.02.2019

**Accepted:** 12.02.2019

**p-ISSN:** 1300-865X

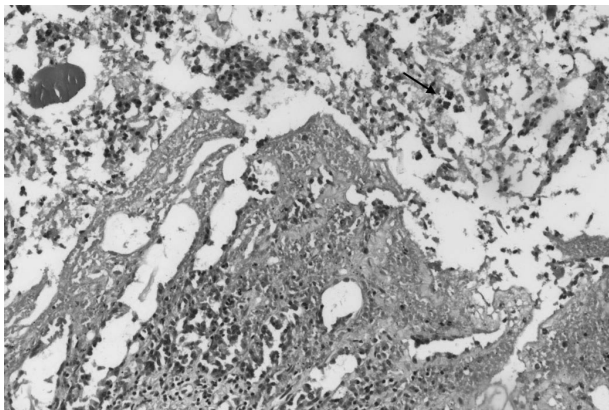
**e-ISSN:** 2149-4533

## 1. Introduction

*Sarcina ventriculi* (*S. ventriculi*) is a gram-positive anaerobic coccus that can grow in low pH environments, with characteristic tetrad morphology (1,2). It was first identified in 1842 as a human pathogen by Goodsir (3). *S. ventriculi* can be identified by light microscopy with features of basophilic staining, cuboidal shape, tetrad morphology, and refractile nature (4). There are very few case reports about the presence of this bacteria, delayed gastric emptying, emphysematous gastritis and perforation (5). We present a case of a 53-year-old male with gastric ulcer perforation who was incidentally found to harbor *S. ventriculi*.

## 2. Case

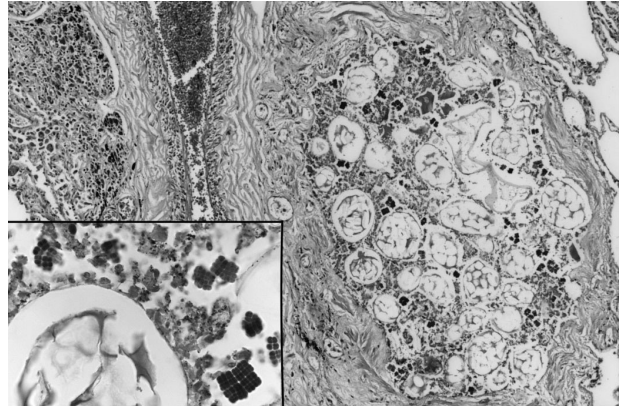
A 53-year old male, with a history of severe abdominal pain, complaint with sweating, a night before his death. He was found dead in his bed in the morning. There was no history of chronic disease or drug use. In autopsy, there was 1000 cc brownish fluid in the abdomen and a crater like shaped perforated ulcer was observed in the pyloric part of the stomach with size of 1,5 cm in diameter. There were no specific findings in the other organs. Histopathological examination of the stomach showed severe ulcerative gastritis next to the presence of bacteria in the gastric mucosal surface (Figure 1).



**Figure 1.** *S. ventriculi* in the gastric mucosal surface and its characteristic morphology (arrow) (H&E, x200)

We observed fibrinous peritonitis on serosal surfaces. The bacteria were basophilic, cuboidal shaped, arranged in tetrad groups, compatible with *S. ventriculi*. In lung, we observed widespread food aspiration in bronchial lumens and *S. ventriculi* clusters in aspiration material (Figure 2). The *Sarcina* organisms were identified with hematoxylin and eosin (H&E) stain, no additional stain

or molecular test was performed. Gram positive bacterial clusters which are compatible with *S. Ventriculi* were seen in the tracheal swab taken for microbiological examination.



**Figure 2.** *S. ventriculi* admixed with food aspiration material in the bronchi (H&E, x100) and the characteristic basophilic staining, cuboidal shape, tetrad arrangement (little box at the bottom) (H&E, x1000)

## 3. Discussion

*Sarcina ventriculi* is a gram-positive anaerobic coccus with carbohydrate fermentative metabolism, acid tolerant and able to survive in low pH environment (2,6). It was first identified in 1842 as a human pathogen by Goodsir and isolated from stomach in 1911 (3,7). The characteristic morphological features of *S. ventriculi* are basophilic staining with H&E, cuboidal shape, flattening of the cell walls in areas of contact with the adjacent cells, tetrad m size (2,8,9). It can mimic vegetable  $\mu$ arrangement which is the result of at least two planes of growth, and 1.8- 3 matter due to its refractile nature (4). *S. ventriculi* can be identified with other organisms. Sauter et al and Aggarwal et al reported cases which describe the concurrence of *S. ventriculi* with *H. pylori* and *Candida*, respectively (5,8). In our case there was no concurrent organism. There have been very few case reports of *S. ventriculi* reported in the literature. It has been reported in patients with ages between 3 and 73 years with female predominance (4). Our case is of a middle age man who had gastric perforation and peritonitis. The morphological features of *S. ventriculi* help to identify it by light microscopy (5). The bacteria have unique features in routine H&E stained sections. We could recognize the bacteria with these features in the light microscope. The organism is generally located near the mucosal surface and it is not invasive. The histological features of the gastric mucosa can vary, there are no

consistently associated histologic features in the gastric mucosa (4). We observed severe ulcerative gastritis and peritonitis in our patient. There was sarcina clusters in the gastric mucosal surface next to the ulcer and perforation. Most of the cases exhibited abdominal pain, nausea, vomiting and delayed gastric emptying (1). It has also fatal life-threatening complications, such as gastric perforation and emphysematous gastritis (10,11). In our case, who had severe abdominal pain, perforating ulcerative gastritis and peritonitis was thought to cause death. Although the mechanism of mucosal injury caused by *S. ventriculi* is not clear, the accumulation of acetaldehyde and ethanol formed from carbohydrate fermentation by the organism lead to gastric mucosal injury in similar pathway acetaldehyde induced mucosal injury in acute alcohol ingestion (4). Because of the tetrad morphology, *Micrococcus* species enter the differential diagnosis which is gram positive coccus. *Micrococcus* species are smaller in size and present in tight clusters (5). *Staphylococcus* are also in the differential diagnosis because of the Gram-positive staining, but they are smaller in size (approximately  $< 1 \mu\text{m}$ ) and in grapelike clusters. The thick extracellular layer on the outer part which gives the refractile feature of the *S. ventriculi* allows differentiation from *Sarcina maxima* (4).

#### 4. Conclusion

*S. ventriculi* is a gram-positive coccus with its unique morphology which can be identified by light microscopy. It is important to see and be experienced beforehand in order to identify it. The histopathological examination has a key role. The pathologist must always keep it in mind. It must be well recognized as it can lead to life threatening complications, as in our case.

#### References

1. de Meij TGJ, van Wijk MP, Mookhoek A, Budding AE. Ulcerative Gastritis and Esophagitis in Two Children with *Sarcina ventriculi* Infection. *Front Med.* 2017;4(August):1–5.
2. Haroon Al Rasheed MR, Kim GJ, Senseng C. A Rare Case of *Sarcina ventriculi* of the Stomach in an Asymptomatic Patient. *Int J Surg Pathol.* 2016;24(2):142–5.
3. Goodsir J. XXIII: history of a case in which a fluid periodically ejected from the stomach contained vegetable organisms of an undescribed form. *J Nat Hist.* 1843;11(68):125–6.
4. Haroon Al Rasheed MR, Senseng CG. *Sarcina ventriculi*: Review of the literature. *Arch Pathol Lab Med.* 2016;140(12):1441–5.
5. Aggarwal S, Tyagi R, Selhi PK, Garg A, Sood A, Sood N. Coinfection of *Sarcina ventriculi* and *Candida* in a patient of gastric outlet obstruction: An overloaded pyloric antrum. *Diagn Cytopathol.* 2018;(July):1–3. DOI: <https://doi.org/10.1002/dc.24048> [cited 11.08.18]
6. Ratuapli SK, Lam-Himlin DM, Heigh RI. *Sarcina ventriculi* of the stomach: A case report. *World J Gastroenterol.* 2013;19(14):2282–5. DOI: <https://doi.org/10.3748/wjg.v19.i14.2282> [cited 20.06.18].
7. Beijerinck M. An experiment with *Sarcina ventriculi*. *Proceedings, Sect Sci Koninklijke Ned.* 1911;13:1234–40.
8. Sauter J, Nayar S, Anders P, D'Amico M, Butnor K, Wilcox R. Coexistence of *Sarcina* organism and *Helicobacter pylori* gastritis/duodenitis in pediatric siblings. *J Clin Anat Pathol.* 2013;1:1–3.
9. Lam-Himlin DM, Tsiatis A, Montgomery E et al. *Sarcina* Organisms in the Gastrointestinal Tract: Clinicopathologic and Molecular Study. *Am J Surg Pathol.* 2011;35(11):1700–5.
10. Tolentino LF, Kallichanda N, Javier B, Yoshimori R, French SW. A Case Report of Gastric Perforation and Peritonitis Associated With Opportunistic Infection by *Sarcina ventriculi*. *Lab Med.* 2003;34(7):535–7.
11. Alvin M, Jalbout N Al. Emphysematous gastritis secondary to *Sarcina ventriculi*. 2018;1–2.