Journal of Clinical Microbiology®

PHOTO QUIZ

Answer to Photo Quiz: *Sarcina ventriculi*

Jamie L. Elvert,[a] Wissam El Atrouni,[b] Audrey N. Schuetz[a]

[a]Department of Laboratory Medicine and Pathology, Mayo Clinic College of Medicine and Science, Rochester, Minnesota, USA

[b]Department of Internal Medicine, University of Kansas Medical Center, Kansas City, Kansas, USA

KEYWORDS anaerobe, anaerobic cocci, bloodstream infections, Gram-positive bacteria, *Sarcina ventriculi*, tetrad, urinary tract infection

The 16S rRNA sequencing confirmed the isolate as *Sarcina ventriculi*, with a 99.35% match to the database entry.

Sarcina spp. are large (up to 3 μm in diameter), sphere-shaped, anaerobic, Gram-positive cocci which typically form clusters of tetrads or octets. The genus name *Sarcina* derives from the New Latin word meaning "bundle." Two species associated with human infection are *Sarcina ventriculi* and *S. maxima* (1). *Sarcina* is a member of the *Clostridiaceae* and related to the genus *Clostridium*; its taxonomy is currently under evaluation and may change in the future (2).

Since its discovery in the stomach of a patient with abdominal bloating and vomiting in 1842, *S. ventriculi* has been identified primarily on histopathology by surgical pathologists and appears to be increasingly reported in the pathology literature within the past 5 years (1, 3). On the other hand, *Sarcina* is not even mentioned in many of the routine clinical microbiology textbooks. On histology, the organisms appear as packets of large Gram-positive cocci in tetrads or octets. Although most often detected histologically on gastric biopsy specimens from patients with gastroparesis and other gastrointestinal disorders, *Sarcina* has also been noted on gastric biopsy specimens from asymptomatic patients (4). It has also been noted on a urine cytology specimen from a child with vesicoureteral reflux and pyuria. The presence of *Sarcina* in blood has been reported only twice before. The first report was in 1872, but the author failed to state how he confirmed its presence (5). The other report of *Sarcina* in blood was a case of bacteremia in a patient with congenital chloride diarrhea; however, the authors describe recovery from blood without indicating the culture method (6). The differential diagnosis on histology includes other Gram-positive cocci which can form tetrads, such as *Micrococcus*, but micrococci are smaller (approximately 0.5 μm in diameter). If the organism is cultivated in the clinical microbiology laboratory, the differential may include yeast, given its large size, its budding appearance, and its poor uptake of Gram stain; however, its obligate anaerobic growth identifies this as an anaerobic bacterium.

This patient's urine culture was positive for *E. coli*. Both blood and urine *E. coli* isolates were susceptible to all antimicrobials tested, including levofloxacin. The patient improved with a 14-day course of levofloxacin. It is not certain whether *Sarcina* played a pathogenic role in bloodstream infection in this patient. This anaerobe would not be cultivatable from routine aerobic urine culture. We believe that the source of *Sarcina* may have been either gastrointestinal or urogenital, given the history of vomiting and structural kidney abnormalities.

Citation Elvert JL, El Atrouni W, Schuetz AN. 2018. Answer to Photo Quiz: *Sarcina ventriculi*. J Clin Microbiol 56:e01335-17. https://doi.org/10.1128/JCM.01335-17.

Editor Paul Bourbeau

Address correspondence to Audrey N. Schuetz, schuetz.audrey@mayo.edu.

See https://doi.org/10.1128/JCM.01334-17 in this issue for photo quiz case presentation.

REFERENCES

1. Al Rasheed MR, Senseng CG. 2016. *Sarcina ventriculi*: review of the literature. Arch Pathol Lab Med 140:1441–1445. https://doi.org/10.5858/arpa.2016-0028-RS.
2. Tindall BJ. 2016. Priority of the genus name *Clostridium* Prazmowski 1880 (Approved Lists 1980) vs *Sarcina* Goodsir 1842 (Approved Lists 1980) and the creation of the illegitimate combinations *Clostridium maximum* (Lindner 1888) Lawson and Rainey 2016 and *Clostridium ventriculi* (Goodsir 1842) Lawson and Rainey 2016 that may not be used. Int J Syst Evol Microbiol 66:4890–4894. https://doi.org/10.1099/ijsem.0.001361.

3. Goodsir J. 1843. XXIII.—History of a case in which a fluid periodically ejected from the stomach contained vegetable organisms of an undescribed form. Ann Mag Nat Hist 1 11:125–126. https://doi.org/10.1080/03745484309445276.
4. Bommannan K, Gaspar BL, Sachdeva MU. 2016. Pathogenic *Sarcina* in urine. BMJ Case Rep 2016:pii=bcr2016216991. https://doi.org/10.1136/bcr-2016-216991.
5. Ferrier D. 1872. The constant occurrence of *Sarcina ventriculi* (Goodsir) in the blood of man and the lower animals: with remarks on the nature of sarcinous vomiting. Br Med J i(578):98–99.
6. Tuuminen T, Suomala P, Vuorinen S. 2013. *Sarcina ventriculi* in blood: the first documented report since 1872. BMC Infect Dis 13:169. https://doi.org/10.1186/1471-2334-13-169.