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Esophageal cytology: a tale of shish kebab and Roman legionaries

Short title: Unusual finding in esophageal cytology

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Question: An 86-year-old male patient was referred to the Department of Gastroenterology at the Inselspital Bern, following a one-month history of reduced general condition, weakness, and relapsing fever. During admission, he also experienced epigastric pain with tenderness on palpation. No other symptoms were noted, including weight loss, gastrointestinal bleeding, or allergies. His medical history included rheumatic disease (with long-term steroid use), mild reflux esophagitis and a hiatus hernia, colonic pandiverticulosis, valvular and hypertensive cardiopathy, and chronic renal insufficiency. Laboratory findings indicated elevated inflammatory markers and transaminases, thrombocytopenia, and anemia. Blood and urine cultures were sterile. Following treatment with antibiotics, his fever, inflammatory markers, thrombocytopenia, and anemia all improved. Endoscopic evaluation of the upper gastrointestinal tract revealed white mucosal plaque-like lesions in the esophagus (Figure A), a small hernia in the gastric cardia, and a normal esophageal z line. Cytology smears were taken from the esophageal lesions, with biopsies taken from the gastric antrum and corpus, and samples were submitted for microscopic evaluation. Esophageal squamous epithelium showed reactive changes including eosinophilic cytoplasm, perinuclear halos, and a so-called “shish kebab”-like arrangement (Figures B, C). Gastric biopsies showed changes indicative of a reactive gastropathy without evidence of *Helicobacter pylori* infection.

What is the diagnosis?

Answer: Clinical history and presentation, and endoscopic findings are suggestive of an esophagitis due to fungal *Candida* species. Accordingly, esophageal cytology showed alterations consistent with *Candida* infection. Numerous pseudohyphae and *Candida* organisms were detected near the squamous epithelium, with detritus, commensal esophageal flora, and neutrophilic granulocytes in the background (Figure B). Within this background, *Sarcina ventriculi* bacteria with its distinct morphology of cuboid, basophilic tetrads or octets were observed, each single bacterium measuring approximately 2.5 µm in diameter (Figure B, C, D). *Sarcina ventriculi* was not detected in simultaneously evaluated histological biopsies of the stomach. The patient was treated with fluconazole.

S*arcina ventriculi* is a gram-positive, anaerobic coccoid bacterium with unique carbohydrate fermentation abilities, and the potential to colonize acidic environments. The name 'Sarcina' reflects their morphology, and refers to the Latin word for "marching pack" of Roman soldiers. Because of its thick cell wall and lattice-like arrangement, *Sarcina* can easily be mistaken for vegetable matter by pathologists not familiar with its morphology. *Sarcina* can colonize the luminal debris of the esophagus or stomach without inducing mucosal lesions or inflammation at the surface epithelium (1, 2, 3), and unlike the adverse outcomes of *Sarcina*–associated veterinary disease, the pathogenicity of *Sarcina* in humans is debated (1). Clinical presentations in *Sarcina*–colonized patients range from asymptomatic, to abdominal and epigastric pain, nausea, or dysphagia (1, 2). *Sarcina* is associated with delayed gastric emptying and bacterial overgrowth (1) and has been suggested to exacerbate preexisting gastrointestinal mucosal injuries resulting in threatening complications such as emphysematous gastritis or esophagitis, or gastric perforation (1, 2). Colonization of the esophagus with *Sarcina ventriculi* has recently been described to cause an endoscopic presentation reminiscent of esophageal candidiasis, and esophageal candidiasis was discussed as a differential diagnosis (3).

To our knowledge, *Sarcina* has not previously been described in cytological specimens. Here, we report a case of esophageal candidiasis with detectable *Sarcina ventriculi* in esophageal cytology smears, implying that *Sarcina ventriculi* and *Candida* species can coexist. Identification of *Sarcina* organisms in the upper gastrointestinal tract may contribute to the prevention or early diagnosis of

complications in at–risk patients. Furthermore, the incidental finding of *Sarcina ventriculi* in esophageal candidiasis may have important pathological implications.

Literature:

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