



Case report

Disseminated *Streptococcus bovis* infection after consumption of manatee meat: A case report and review of the literature



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ABSTRACT

Streptococcus bovis bacteremia (currently called *S. gallolyticus*) represents an infrequent condition, but associated with a high rate of morbidity and mortality Amado et al. (2015). The clinical presentation is characterized by symptoms associated with disseminated infection and with a higher frequency of endocarditis and gastrointestinal neoplasms, often occult Amado et al. (2015), Olmos et al. (2016). Probable sources of infection and zoonotic transmission have not been explored in the literature. We present a case of disseminated infection after ingestion of a marine mammal.

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Case presentation

A 43-year-old male patient with no known chronic disease, who was a resident of the urban area of the Urabá subregion, in the department of Antioquia, Colombia was taken to the local emergency department after 4 h of progressive deterioration in the level of consciousness. In the 2 previous months, the patient had a persistent headache and nocturnal diaphoresis. No cardiac murmur is described. Orotracheal intubation and transfer to the intensive care unit was decided because of a 3/15 Glasgow Coma Scale. Initial neuroimaging showed no alterations. Workup included blood cultures, urine culture, and lumbar puncture to rule out infectious etiology. CSF analysis revealed 90 mg/dL glucose concentration, 319.96 mg/dL proteinorrachia, 3450 white blood cells per milliliter (78 % neutrophils) and gram stain with gram-

positive cocci. Empirical antimicrobial treatment with vancomycin, ceftriaxone, and advanced supportive treatment were started.

Cerebrospinal fluid culture, urine culture, and blood cultures (three peripheral samples obtained simultaneously from different puncture sites) were positive for *Streptococcus bovis* group, susceptible to penicillin, vancomycin, daptomycin, linezolid and levofloxacin. HIV antibodies and hepatitis B surface antigen were negative. Single transthoracic echocardiogram did not report findings consistent with infectious endocarditis. Abdominal ultrasound demonstrated slight hepatomegaly, ileus gas and fecaloid residue, edematous-looking kidneys and minimal ascites. Total colonoscopy was performed, and results were normal.

During the course of his illness he developed multiple organ dysfunction including KDIGO 3 acute kidney injury, which required renal support therapy, and continued hemodialysis for another 2 months. After the normalization of the neurological condition, he admitted that 2 months before admission he ingested manatee meat (*Trichechus manatus latirostris*). The animal was found dead and later cooked. He denies subsequent gastrointestinal symptoms, however he emphasizes that the onset of headache and nocturnal diaphoresis was twenty days after the consumption.

Discussion

Streptococcus bovis group bacteremia is relatively uncommon in clinical practice, but it is associated with a high rate of morbidity

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and mortality. They are gram-positive cocci, in pairs and short chains, part of Lancefield group D [3], which also includes enterococci and *Streptococcus equinus*, usual members of the human intestinal microbiome. Previously, *S. bovis* was classified in two different biotypes, but according to recent advances in molecular biology, a taxonomic system proposed division into subspecies (*S. gallolyticus*, *S. lutetiensis*, *S. infantarius*, *S. pasteurianus*) [4].

Clinical presentation is similar to any systemic infection, however, there is a classic association with infective endocarditis in 6%–51% of cases, and occult colon pathology, such as colorectal carcinoma (described in 25%–80%), but also inflammatory bowel disease, acid-peptic disease, diverticular, hepatobiliary and gastrointestinal bleeding [1,4–7]. These associations are more consistent with biotype I (today *S. gallolyticus* subsp. *gallolyticus*), although biotype II (today *S. gallolyticus* subsp. *infantarius* and *S. gallolyticus* subsp. *pasteurianus*) is not excluded [1,2]. Due to the aforementioned, active search for endocarditis and gastrointestinal neoplasia is recommended in the context of *S. bovis* bacteremia even if they are not clinically apparent, especially if it is biotype I [7,8].

This case manifested as disseminated infection with multiorgan involvement, which is reported in different case series; however, infection of the nervous system is infrequent because it corresponds to 13% of cases in a series of 23 Chilean patients and 3.4% in a Spanish series of 59 patients [1,8]. Additionally, the absence of echocardiogram and colonoscopy abnormalities also account for an atypical case, since most of the cases reported in the literature are associated with endocarditis or gastrointestinal lesions.

Regarding the origin of bacteremia due to this type of microorganism, the etiological role of colorectal tumors is debated since it is not clear whether they behave as a cause or consequence [8,9]. It has been found that, in some cases, *S. bovis* group infection can precede the tumor detection by several years [10,11]. Our patient had no known comorbidities or colorectal neoplasm as contributing factors, however, the patient emphasized association with manatee meat ingestion 2 months earlier, when the headaches started. The possibility of zoonotic transmission of this microorganism has been found in avian populations and in ruminants or farm animals [3,12]. There is also biological plausibility to propose a possible zoonotic transmission in this case, since they are hosts of several mammals, including aquatic and semi-aquatic species such as sea otters and clams [13]. In one study, it was retrieved from heart valve vegetations of 7 sea otters [14].

In the evaluation of the clinical history and its relationship with exposure (consumption of the aforementioned), the prolonged incubation time, almost close to two months, is remarkable. Compared to what is reported in the literature, the course of this patient is very different. The clinical course of infection by this microorganism has an incubation period of 20 days [1]; in the presented context, possibly gastrointestinal involvement was followed by dissemination and subsequent appearance of deep, undetected foci such as endocarditis and pneumonia. As described in some case series, pulmonary presentation was the initial manifestation followed by subsequent neurological compromise [15], very similar to how this patient behaved.

Among the properties of the microorganism, it exhibits pili and surface proteins which facilitate hematogenous spread [16]; in this specific case, it behaved like complicated bacteremia and posterior central nervous system compromise. Unfortunately, it was never possible to document isolation in other cultures or to document vegetations on an echocardiogram. It is acknowledged that trans-thoracic echocardiography has a lower sensitivity than trans-esophageal echocardiography for the visualization of cardiac

vegetations [17]. Regrettably, trans-esophageal ultrasound was not available at the time, so we hypothesize that endocarditis could also have been present and not detected.

Additionally, it is described as a colonizing germ, and as such, it could have behaved in a much less virulent fashion, not presenting the risk factors described in the literature, as associated neoplasia or even endoscopic intervention of the lower digestive tract [18].

In conclusion, we present the first case of severe disseminated infection *S. bovis* after consumption of *Trichechus manatus latirostris*, a marine mammal from Colombian coasts.

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Ethical approval

The patient gave informed consent for publication of clinical data. No personal identification data are provided. No intervention, experimentation or violation of rights occurred. All data were retrospectively retrieved. All authors vouch for the accuracy and originality of data.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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