**Streptococcus bovis** meningitis associated with colonic diverticulosis and hearing impairment: a case report

**Meningite da Streptococcus bovis associata a diverticolosi del colon e ipoacusia: descrizione di un caso**

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**INTRODUCTION**

*Streptococcus bovis* (group D non-enterococcal streptococcus) is an indigenous resident bacterium that inhabits the gastrointestinal tract of humans and ruminants [1]. It can be isolated from the mouth through the anus and it is found in approximately 16% of feces samples from healthy individuals (2, 3). *S. bovis* is further classified in two biotypes according to ability (biotype I) or inability (biotype II) to ferment mannitol. Biotype I was renamed *Streptococcus gallyoticus subsp. Galloyticus* [1, 4].

The relationship between *S. bovis* bacteremia and gastrointestinal disease, including colon carcinoma, villous adenoma, inflammatory bowel disease, diverticulosis, hemorrhoids and *Strongyloides stercoralis* colitis, is well-known [5-7].

Liver chronic disease and biliary disease have also been associated with this infection [3, 8-10]. *S. bovis* is responsible for several cases of bacteremia and endocarditis, as well as cases of peritonitis and arthritis, but it is rarely a cause of meningitis [11].

We describe a case of *S. bovis* meningitis associated with colonic diverticulosis that evolved with impaired hearing.

**CASE REPORT**

A 75-year-old woman presented to the Tropical Diseases Hospital, Goiania, Brazil, with two days’ history of fever and chills followed by headache and vomiting over the last 24 hours. She had been using captopril for hypertension control.

There was no other associated condition. The patient was somnolent with mild neck stiffness. The cardiovascular, respiratory and digestive systems were normal. White blood cell count showed 11,800 cells/mm³ (23% band neutrophils and 69% segmented neutrophils). A lumbar puncture was performed and revealed 270 leukocytes/mm³ (30% neutrophils); 20 red cells/mm³; undetectable levels of glucose and 232 mg/dL of protein.

Gram stain revealed several Gram-positive cocci. Treatment with 4 g per day of ceftriaxone and 16 mg per day of dexamethasone was initiated. Computed tomography of the head was normal. The cerebrospinal fluid (CSF) culture yielded *Streptococcus bovis*.

The patient evolved with headache and nausea and started to complain of hearing difficulty. New lumbar puncture performed on the seventh day revealed 812 leucocytes/mm³ (8% neutrophils), 26 mg/dL of glucose and 168
mg/dL of protein. No bacteria were seen in Gram stain. Although a previously performed susceptibility test demonstrated in vitro susceptibility to ceftriaxone and penicillin G, ceftriaxone was discontinued and treatment with penicillin G was initiated (24 million units per day). Blood cultures and HIV serology were negative, and a transesophageal echocardiogram was normal. A colonoscopy showed diverticulum in descendent and transverse colon (Figure 1). Magnetic nuclear imaging (MRI) of the brain demonstrated alteration of the signal in periventricular deep white substance, consistent with microangiopathy; small areas of hyposignal in T1 and hypersignal in T2; and flair, associated with enhancement post-contrast in the anterior horn of the right lateral ventricle, suggesting the presence of an inflammatory/infectious focus. No abscess was observed (Figure 2). After a 2-week course of penicillin G treatment, the patient was discharged in a state of good general health with only mild hypoa-

cusia (confirmed by the audiogram) and a normal CSF exam.

**DISCUSSION**

The isolation of *S. bovis* in the blood and/or in the CSF raises the possibility of intestinal disease and/or associated endocarditis. The relationship with gastrointestinal disease and *S. bovis* infection, and the association with bacteremia and endocarditis is well demonstrated, but the pathogenesis remains uncertain.

Some experimental studies with mice support the carcinogenic role of *S. bovis* in the gastrointestinal tract. *S. bovis* was found in feces of 56% of patients with colon carcinoma, in contrast to 11% of controls [12-14]. It has been suggested that lesions in the colonic mucosa promote a specific niche for *S. bovis*, changing the normal microbiota. The bacterial invasion or translocation would be represented

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**Figura 1** - A colonoscopy showing diverticula in descendent colon.
by the lesion itself in individuals with intestinal diseases or by alterations in the secretion of biliary salts and immunoglobulins in individuals with liver or biliary diseases [3, 13].

In our patient, colonoscopy revealed diverticulum without mucosal inflammation. There was no recent history of diarrhea, abdominal pain or intestinal bleeding, suggesting a diverticulitis episode preceding meningitis. Nonetheless, the gastrointestinal tract was the probable source of the infection due to a transitory subclinical diverticulitis, with bacterial translocation and bacteremia as well as central nervous system infection. Community-acquired meningitis caused by streptococci other than Streptococcus pneumoniae are uncommon, representing less than 2% of all cases of bacterial meningitis in adults, but in recent years, meningitis caused by streptococci other than S. pneumoniae have been responsible for an increasing number of hospital-acquired meningitis cases [15-17]. S. bovis is an exceptional etiology of meningitis in adults, usually occurring in patients with an underlying disease [2]. This pathogen was also related with bacterial meningitis in neonates [18].

The blood cultures were negative, favoring the hypothesis of transitory bacteremia. Some cases of S. bovis meningitis have been associated with concomitant endocarditis and bacteremia, but in the present case a transesophageal echocardiogram was normal (19, 20).

To our knowledge, this is the second case with positive Gram stain in the CSF. The first occurred in a HIV seropositive patient who had no evidence of endocarditis and had normal colonoscopy results [19]. The presence of alterations to the deep white substance revealed by the MRI could justify the symptoms and the need for a longer course of antibiotics. In this case, penicillin G was used, due to the worsening of CSF cellularity and the maintenance of headache despite the use of ceftriaxone. After a 14-day course of penicillin G, the patient was discharged and, to date, remains in a good state of health.

The hearing impairment started in the first week of the disease and remained at the end of antimicrobial treatment, as confirmed by the audiogram. Hearing impairment is a frequent sequela of central nervous system infections, but to our knowledge, this is the first report of hearing loss due to S. bovis meningitis [21].

Key words: Streptococcus bovis, meningitis, hearing impairment.

SUMMARY

A 75-year-old woman presented to the Tropical Diseases Hospital, Goiania, Brazil, with a two-day history of fever and chills followed by headache and vomiting over the last 24 hours. The cerebrospinal fluid (CSF) showed 270 leukocytes/mm³ (30% neutrophils); 20 red cells/mm³; undetectable levels of glucose and 232 mg/dL of protein. The Gram stain revealed several Gram-positive cocci, and CSF culture yielded Streptococcus bovis. A colonoscopy showed diverticula in descendent and transverse colon. After a 14-day course of penicillin G, the patient was discharged in a good state of health, with only mild hearing impairment.
RIASSUNTO

Una donna di 75 anni si presenta al Tropical Diseases Hospital, Goiania, in Brasile, con storia di due giorni di febbre e brividi seguiti da mal di testa e vomito nelle ultime 24 ore. Il liquido cerebrospinale (LCS) mostrava 270 leucociti/mm³ (30% neutrofili). 20 emazie/mm³; livelli non rilevabili di glucosio e 232 mg/dL di proteine. La colonoscopia mostra diverticoli del colon in discendente e del colon trasverso. Dopo un ciclo di 14 giorni di Penicillina G, il paziente viene dimesso in buone condizioni di salute, con solo ipoacusie lievi.

REFERENCES