

A Case of Spontaneous Streptococcus Salivarius Meningitis

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Abstract This article discusses Streptococcus salivarius meningitis in a 39-year old woman. She was admitted to the hospital for general fatigue, headache, and fever. Cerebrospinal fluid analysis revealed leukocytosis and cultures were positive for Streptococcus salivarius. Streptococcus salivarius meningitis is rare and has been documented to be associated with procedures involving the spinal column such as epidural anesthesia. In this patient the meningitis caused by Streptococcus salivarius was thought to be spontaneous.

Keywords Streptococcus Salivarius, Communicable Diseases, Meningitis, Streptococcus Salivarius Meningitis, Viridans Group Streptococcus

1. Introduction

Streptococcus salivarius is a viridans group streptococcus found as normal flora in the human oral cavity and intestinal tract [1]. It is frequently considered a contaminant and is rarely the source of infection. However cases of meningitis have been reported, typically after procedures involving the spinal column. Other cases have been reported involving post-traumatic cerebrospinal fluid leaks, brain abscesses, and pericranial fistulas [2]. Here we report a spontaneous case of *S. salivarius*, likely due to a transient bacteremia.

2. Case Report

A 39 year old Caucasian presented to her primary care doctor with complaints of fatigue, fever, weakness, and headache of 2 weeks duration. Prior to this, she had been in her normal state of health. She had no known drug allergies and her past medical history was only significant for depression. She denied use of tobacco or recreational drug use. Her medications included escitalopram, bupropion, and butalbital/acetaminophen/caffeine combination.

The patient was then admitted to the hospital for further workup. On initial exam she was afebrile; blood pressure

110/75 mmHg, pulse rate was 84 beats/min, respiratory rate was at 18 breaths/min, and the room air, transcutaneous, arterial oxygen saturation was 100%. Her eyes had erythema bilaterally. She had no nuchal rigidity. Cardiovascular examination was normal without murmurs. Lungs were clear bilaterally with no adventitious sounds. Neurologic examination was nonfocal with normal strength and intact cranial nerves. She was alert and oriented. Erythema nodosum was noted on her shins bilaterally.

Laboratory studies revealed an elevated erythrocyte sedimentation rate (ESR) of 58 mm/Hr (local control 1-20 mm/Hr) and an elevated C-reactive protein (CRP) of 3.806 mg/dL (local control < 0.748 mg/dL). White blood cells were within the normal range at 6.7×10^3 cells/ μ L (local control $3.8-10.7 \times 10^3$ cells/ μ L). Blood chemistry, urea and creatinine, and liver function tests were all normal. Computed tomography (CT) of the abdomen was notable for bilateral internal iliac and inguinal lymphadenopathy. Head CT and chest x-ray were unremarkable for any acute processes.

Because the etiology of her nonspecific symptoms were unknown, she was empirically placed on doxycycline 100mg intravenously every 12 hours to cover for atypical organisms. Blood cultures done were negative. A lumbar puncture was performed under sterile conditions and her cerebrospinal fluid analysis had atypical features for a bacterial meningitis. It demonstrated leukocytosis, with a white blood cell count of 48 cells/cumm (local control 0-5 cells/cumm), 80% being lymphocytes (local control is 28-96%). CSF glucose was normal at 58 mg/dL (local control 40-80 mg/dL) and total protein was normal at 26 mg/dL (local control 15-45 mg/dL).

CSF gram stain was negative, however *Streptococcus salivarius* was cultured and then identified via MicroScan Walkaway (Siemens Healthcare, Sacramento, CA). The patient was then called back into the office. The sensitivity panel, however, did not include the cephalosporins (Table 1). Subsequent attempts to culture the CSF to test for cephalosporin sensitivities were unsuccessful. Despite this, ceftriaxone 2 grams every 12 hours for 28 days was administered through a peripherally inserted central catheter. Although cultures were negative, bacteremia was suspected to have caused the meningitis. However, the duration of the bacteremia was unknown. Thus, we felt an extended course

of antibiotics was warranted.

When she returned to the office for follow up visits after the course of antibiotics her erythema nodosum resolved, she reported subjective improvement, and her ESR and CRP had normalized. Based on these results we believe that she did respond to the antibiotics. Upon questioning, she denied any recent history of procedures involving her spinal column other than the lumbar puncture done in the hospital.

Table 1. Antibiotic susceptibility results.

	MIC	Reaction
Daptomycin	< 0.5	Sensitive
Linezolid	< 1	Sensitive
Oxacillin	1	Sensitive
Trimethoprim/Sulfamethoazole	< 0.5/9.5	Sensitive
Vancomycin	1	Sensitive

3. Conclusions

Non-pneumococcal viridans group streptococci, such as *Streptococcus salivarius*, are very rare and account for 0.3-2.4% of all cases of bacterial meningitis. They are normal flora of the gut and oral cavity and are considered low-virulence organisms. [3]

Although our patient's CSF culture did grow *S. salivarius*, the CSF analysis was atypical for such an infection. In other studies of *S. salivarius*, the majority of the CSF had lower glucose and protein with neutrophil predominance [4]. This was not the case here, as the CSF analysis showed leukocytosis with a majority of lymphocytes. Typically patients presented with signs and symptoms of classic meningitis when infected with *S. salivarius* meningitis. These include fever most commonly, then headache, nuchal, altered mental status, and nausea and vomiting [4]. Our patient presented with headaches and fever. However during her hospital stay she did remain afebrile. Nuchal rigidity, altered mental status, and nausea and vomiting were absent.

Initially doxycycline was used empirically for its wide coverage of atypical organisms and good CSF penetration [5]. We later switched to ceftriaxone for its efficacy against Streptococcal meningitis [5]. Although the sensitivities did not include cephalosporins, we believe the patient responded well to the antibiotics based on the normalization of her laboratory values and relief of her symptoms.

If her symptoms had not improved after administration of antibiotics then a biopsy of her enlarged inguinal lymph nodes would have been done to pursue the possibility of a lymphoma [6]. An echocardiogram may have also been warranted, but we felt it was unnecessary at the time. She did not have a heart murmur and there were no features of endocarditis on physical exam such as subungual hemorrhages or petechiae [7].

Bacterial meningitis can be a serious and devastating illness. If the disease is not recognized and properly treated, it can result in seizures, neurologic deficits, and death [8]. In

the United States the most common causes of bacterial meningitis are *Neisseria meningitides* and *Streptococcus pneumonia* [9]. Nevertheless, less common pathogens must still be considered as this case illustrates.

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Conflict of Interests

The authors declare that they have no competing interests. Sources of financial support: none

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