

Spontaneous *Streptococcus mitis* Meningitis in a Patient with Liver Cirrhosis: A Case Report and Literature Review

Andrew Villion¹, Michael Lishner^{1,2}, Michal Chowers^{1,3}, Sharon Reissfeld^{1,2*}

¹Sackler School of Medicine, Tel Aviv University, Tel Aviv, Israel

²Department of Medicine A, Meir Medical Center, Kfar Saba, Israel

³Infectious Diseases Unit, Meir Medical Center, Kfar Saba, Israel

Email: sharon.reissfeld@clalit.org.il

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Abstract

Streptococcus mitis is a component of the normal oropharynx, skin, gastrointestinal system, and genital tract flora. It is generally considered as a relatively benign bacterium. We present a case of spontaneous *Streptococcus mitis* meningitis in a patient with liver cirrhosis and no known risk factors for invasive infectious diseases.

Keywords

Streptococcus mitis, Cirrhosis, Meningitis

1. Introduction

Streptococcus mitis (*S. mitis*) is an alpha-hemolytic species belonging to the family of viridans streptococci. *S. mitis* is a component of the normal oropharynx, skin, gastrointestinal system, and genital tract floras [1].

Patients with cirrhosis who have not developed major complications are classified as having compensated cirrhosis.

Patients who have developed complications of cirrhosis, such as variceal hemorrhage, ascites, spontaneous bacterial peritonitis, hepatocellular carcinoma, hepatorenal syndrome, or hepatopulmonary syndrome are considered to have decompensated cirrhosis and have a worse prognosis than those with compensated cirrhosis [2]. A few cases of *S. mitis meningitis* were described in the literature; most of them were associated with risk factors like invasive procedures or a recent upper respiratory tract infection [3] [4]. We present a rare case of spontane-

*Corresponding author.

ous *S. mitis* meningitis in a patient with liver cirrhosis and no other risk factors for such an invasive infection.

2. Case Report

A 58-year-old male presented with complaints of headache, photophobia, and vomiting that started two days prior to admission and worsened on the admission day. The patient had no fever at home or signs of altered mental status. He had no history of invasive procedures or upper respiratory tract infection. His medical history included Type II diabetes mellitus, controlled with oral medications with current glycated hemoglobin level of 6%, cryptogenic liver cirrhosis with thrombocytopenia, splenomegaly, elevated liver enzymes (5-fold increase) and negative serological and autoimmune workup. On physical examination, temperature was 37°C (98.6°F). He appeared somnolent, with nuchal rigidity and no focal neurological deficits. There was no rash or any skin lesions. The rest of the physical examination was normal. Noncontrast head computed tomography scan did not reveal signs of hemorrhage or increased intracranial pressure. Laboratory values are shown in **Table 1**. Lumbar puncture was performed and yielded turbid cerebrospinal fluid (CSF) with xanthochromia. CSF results showed white blood cell count of 5500 cells/ μ l with 96% segmented neutrophils, red blood cell count of 1300 cells/ μ l with normal morphology, glucose level of 2 mg/dl and protein level 703 mg/dl (normal range 15 - 50 mg/dl). Gram positive diplococci were seen on gram stain. Empirical treatment with dexamethasone, ampicillin plus ceftriaxone was started.

The patient was admitted to the intensive care unit. Two days after admission blood and CSF cultures were found positive for penicillin sensitive *Streptococcus mitis*. Therefore, treatment was changed to high dose penicillin. Transesophageal echocardiogram did not reveal vegetations or any other findings suggestive of infective endocarditis.

On the fifth day of admission, the patient developed mild right side hemiparesis. Head magnetic resonance imaging (MRI) revealed high signal intensity in the globus pallidum on T1-weighted images. On the same day, the patient developed massive variceal bleeding that was treated with terlipressin and endoscopic band ligation. Treatment for hepatic encephalopathy was also started. The patient stabilized and continued to improve. He was discharged two weeks after admission with no neurological sequelae. Unfortunately the patient was lost to follow up and we have no information about his current condition.

Table 1. Laboratory data at admission.

Component	Patient Value	Normal Value
White blood cells	13.93 Kc/ μ l	4.8 - 10.8 Kc/ μ l
Hemoglobin	15.00 g/dl	13.5 - 17.5 g/dl
Platelets	85 Kc/ μ l	150 - 450 Kc/ μ l
Glucose	162 mg/dl	70 - 100 mg/dl
Sodium	137 mEq/L	135 - 145 mEq/L
Potassium	3.3 mEq/L	3.5 - 5.1 mEq/L
Aspartate aminotransferase	50 U/L	0 - 35 U/L
Alanine transaminase	30 U/L	0 - 45 U/L
Gammaglutamyl transpeptidase	138 U/L	7 - 49 U/L
Total bilirubin	2.8 mg/dl	0.2 - 1.5 mg/dl
Albumin	3.4 gr/dl	3.5 - 5.5 gr/dl
C reactive protein	5.01 mg/dl	0.00 - 0.5 mg/dl
International normalized ratio	1.16	
Creatinine	0.9 mg/dl	0.5 - 1.2 mg/dl
Urea	44 mg/dl	10 - 50 mg/dl

3. Discussion

Streptococcus mitis (*S. mitis*) is an alpha-hemolytic species belonging to the family of viridans streptococci. *S. mitis* is a component of the normal oropharynx, skin, gastrointestinal system, and genital tract floras [1], and has generally been considered a relatively benign bacterium. Nevertheless, *S. mitis* can cause a range of invasive diseases in humans. Endocarditis caused by *S. mitis* was reported both in adult and pediatric patients [5]. Liver, lung and even myocardial abscesses caused by *S. mitis* were described in a number of case reports in recent years [6]-[9]. *S. mitis* is an important and underestimated cause of bacteremia and sepsis in neutropenic patients and in cancer patients receiving chemotherapy [10]-[11].

S. mitis has been reported in conjunction with meningitis, but in the majority of the cases, patients had previously undergone invasive procedures such as spinal anesthesia [3] [4]. A case of spontaneous *S. mitis* meningitis was reported in an adult patient with a history of alcoholism, without chronic liver disease, who also had very poor oral hygiene and maxillary sinusitis [12].

Our patient was diagnosed with *S. mitis* meningitis; therefore he was evaluated for endocarditis by transesophageal echocardiogram that was negative. The antibiotic treatment was changed to penicillin and gentamycin according to endocarditis guidelines since there are no specific guidelines for *S. mitis* meningitis [13]. The patient completed 2 weeks of antibiotic treatment as recommended in cases of highly susceptible bacteria as in our case.

To the best of our knowledge, this is the first case of spontaneous *S. mitis* meningitis in an adult with no risk factors for such an invasive infection, like poor oral hygiene, recent invasive procedures, a recent upper respiratory infection or a history of alcoholism.

Chronic liver disease and especially liver cirrhosis is considered an immunocompromised state that leads to a variety of infections [14]. The patient reported in our case had decompensated cirrhosis and most probably this was the only risk factor for such an invasive infection from a usually benign bacterium.

We are not aware of any reported cases of meningitis caused by *S. mitis* in cirrhotic patients.

4. Conclusions

We described herein, the first case of spontaneous *Streptococcus mitis* meningitis in a patient with liver cirrhosis and no known risk factors for such an invasive disease.

We emphasize the need to broaden the differential diagnosis of cirrhotic patients with altered mental status. It is important to remember that they are prone to infections from avirulent pathogens due to their liver disease and impaired immune state, including uncommon central nervous system infections similar to that presented here.

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