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Case Report

Meningitis due to a Combination of *Streptococcus mitis* and *Neisseria subflava*: A Case Report

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Keywords

Streptococcus mitis · *Neisseria subflava* · Bacterial meningitis · Compromised host

Abstract

We report a rare case of meningitis due to a combination of *Streptococcus mitis* and *Neisseria subflava*. An 80-year-old female had a 4-year history of type II diabetes mellitus (DM) and an 11-year history of rheumatoid arthritis, which was treated with prednisolone, tacrolimus, and methotrexate. One month after the removal of a dental implant, she complained of a disturbance of consciousness and suffered a convulsion. A cerebrospinal fluid culture was found to be positive for both *S. mitis* and *N. subflava*. After 14 days of antibiotic treatment with 4 g/day ceftriaxone, her stiff neck, somnolence, and laboratory data greatly improved, and she was successfully discharged at 27 days after admission. Although both *S. mitis* and *N. subflava* are generally considered to be benign bacteria, they can cause meningitis in patients with the following risk factors: older age, on immunosuppressive treatment, DM, or dental treatment.

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Introduction

Streptococcus mitis is a component of the normal flora of the oropharynx, skin, gastrointestinal system, and genital tract [1, 2]. *Neisseria subflava* is a natural inhabitant of the mucous membranes of the upper respiratory tract [3–5]. Both species are generally considered to be benign bacteria, and infections of the central nervous system involving these bacteria are very rare. In fact, there have only been a few reports about such cases, and they all involved pediatric patients [1–6]. In addition, there have not been any reports about cases of meningitis involving a combination of *S. mitis* and *N. subflava*. Here, we report a case of meningitis caused by a combination of *S. mitis* and *N. subflava.*

Case Report

An 80-year-old female complained of a disturbance of consciousness, which had started 2 days prior to her admission. It had subsequently worsened, resulting in a convulsion on the day of her admission. She had a history of rheumatoid arthritis since she had been 69 years of age, which had been controlled with prednisolone (5 mg) and tacrolimus (2 mg) every day, and methotrexate (6 mg) every week. She also suffered from type II diabetes mellitus (DM) since she had been 77 years of age, which was controlled with oral medications. Her glycated hemoglobin level on admission was 7.8%. She had had a dental implant removed 1 month prior to admission and had developed fever 27 days prior to admission. She had been treated with antibiotics (amoxicillin/clavulanic acid), and tacrolimus and methotrexate had been stopped 1 week prior to admission.

Physical examination revealed a temperature of 36.6°C. The patient appeared somnolent, and she had a Glasgow Coma Scale score of 12 (E3V4M5). On neurological examination, her cranial nerves revealed left conjugate deviation. Her motor function was intact. Her deep tendon reflexes were hyperactive in all four limbs, and no pathological reflexes, ataxia, or sensory disorders were noted. She had a stiff neck, but Kernig's sign was absent. Laboratory tests showed a white blood cell count of 13,400/μL and a C-reactive protein level of 5.6 mg/dL. During a lumbar puncture, her initial cerebrospinal fluid (CSF) pressure was 130 mm H_2O, and her CSF cell count was 40/μL (96.6% mononuclear cells). Her CSF protein concentration was elevated (115 mg/dL), and her CSF glucose level was decreased (70 mg/dL; blood glucose level: 214 mg/dL). Brain magnetic resonance imaging did not show any parenchymal abnormalities. As empirical therapy for viral or fungal meningitis, she was initially treated with 800 mg/day acyclovir and 100 mg/day amphotericin B. However, her CSF cultures became positive for *Streptococcus* and *Neisseria* species 3 days after admission. We replaced the acyclovir and amphotericin B with 4 g/day ceftriaxone. Although her blood culture was negative at 6 days after admission, her CSF culture revealed *S. mitis* and *N. subflava*. She was diagnosed with bacterial meningitis due to a combination of *S. mitis* and *N. subflava.*

The patient's stiff neck, somnolence, and laboratory data had greatly improved by 14 days after admission. We replaced ceftriaxone with 4 g/day cefotaxime because thrombocytopenia occurred at 19 days after admission. Her C-reactive protein level normalized, and the total number of cells in her CSF decreased to 2/μL (100% mononuclear cells) at 22 days after admission. She was able to walk after rehabilitation and was discharged from the hospital at 27 days after admission (Fig. 1).

Discussion

We present a case in which an elderly immunocompromised patient developed meningitis due to a combination of *S. mitis* and *N. subflava,* both of which are natural inhabitants of the mucous membranes of the upper respiratory tract and are generally considered to be benign bacteria [1–5]. Meningitis has been reported to be caused by *S. mitis* or *N. subflava* alone in cases involving spinal anesthesia, neurosurgical procedures, malignancy, neurological complications of endocarditis, or in newborns [1–10]. Older age, the use of immunosuppressants, DM, and dental treatment played important roles in the present case, in which the patient was treated with ceftriaxone because it diffuses more readily into the CSF than other drugs. To the best of our knowledge, this is the first reported case of meningitis caused by a combination of *S. mitis* and *N. subflava.*

S. mitis and *N. subflava* might be more significant causes of meningitis than is generally understood. Balkundi et al. [1] reported a fatal case of penicillin-resistant *S. mitis*-induced meningitis in a 6-year-old child with acute lymphoblastic leukemia. In addition, Chong et al. [4] reported a fatal case of *N. subflava*-induced endocarditis, meningitis, and septicemia in a healthy 36-year-old male. We have to recognize that *S. mitis* and *N. subflava* can be pathogenic and can cause meningitis in patients with risk factors such as older age, on immunosuppressive treatment, DM, and dental treatment.

Statement of Ethics

The authors have no ethical conflicts to disclose.

Disclosure Statement

The authors state that they have no conflicts of interest.

Funding Sources

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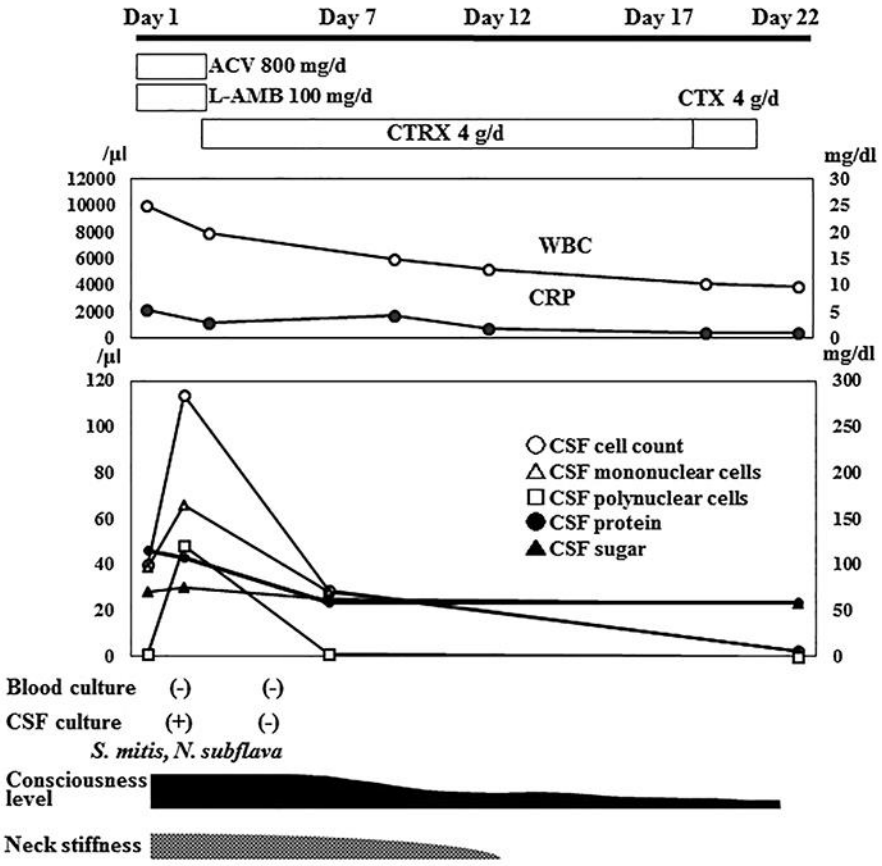

Fig. 1. The patient's clinical course. ACV, acyclovir; CRP, C-reactive protein; CSF, cerebrospinal fluid; CTRX, ceftriaxone; CTX, cefotaxime; L-AMB, amphotericin B; *N. subflava, Neisseria subflava*; *S. mitis*, *Streptococcus mitis*; WBC, white blood cell.