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SHORT COMMUNICATION

# Meningitis in a Pregnant Woman Caused by *Streptococcus dysgalactiae* subspecies *equisimilis*

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Abstract

Infection of the central nervous system by streptococci is known to result in severe bacterial meningitis, however some strains have low pathogenic potential and affect the brain only in immunocompromised patients. Here we report the first case of an otherwise healthy non immunocompromised young adult woman who developed meningitis caused by *Streptococcus dysgalactiae* subspecies *equisimilis*. The patient was in the 17th week of her 3rd pregnancy. The course of the disease was quickly remittent under antibiotic treatment.

Key words: Meningitis, *Streptococcus dysgalactiae*, Coxsackie virus, pregnancy

Whereas species of *Streptococcus* genus, notably *S. pneumoniae*, are common causes of severe bacterial meningitis (Meli *et al.*, 2002), meningitis due to *S. dysgalactiae* has been reported in only 4 cases, all of them in either infants or elderly individuals and with mild clinical course (Luyx *et al.*, 2001, Berenguer *et al.*, 1992, Mollison *et al.*, 1990, Quinn *et al.*, 1978). It is believed that streptococcal meningitis is acquired via transient colonization of the nasopharynx, followed by bacteraemia and invasion of the central nervous system (CNS). To enter the brain *via* this route, the bacteria require a set of virulence factors that seem to be present in *S. pneumoniae* strain but not in *S. dysgalactiae*. In the literature, there was so far no case reported of meningitis in an otherwise healthy adult caused by *S. dysgalactiae*. Here we report the first case of an otherwise healthy non immunocompromised young adult woman who developed meningitis caused by *Streptococcus dysgalactiae* subspecies *equisimilis*.

In the present case, a 38 year old otherwise healthy caucasian woman was admitted to the hospital with acute fatigue, severe headache and temperature of 39.5°C. She was in the 17th gestational week of her 3rd pregnancy. Because she was working as a staff nurse for children and as a childminder, she had contact to several preschool children including her own, who suffered 10 days before admission from an acute febrile pharyngitis, which was self-limiting after 1–2 days. On clinical examination, she presented a mild meningeal irritation, with cephalgia but without any other neurological deficit. Examination of the pharynx was unremarkable. Serum CRP was mildly elevated to 1.7 mmol/l; all other standard laboratory findings were within normal range, including leukocyte count. A lumbar puncture was performed and revealed a pleocytosis of 1.000/µl leukocytes, most of them granulocytes, slightly increased albumin concentration (371 mg/l) and an increased lactate concentration (2.8 mmol/l). However, culture of CSF revealed no bacterial growth (Table I). Therefore, broad-spectrum amplification of 16S rRNA gene was performed in accordance to Goldenberger *et al.* (1997). Antibiotic treatment was initiated immediately with 2 g ceftriaxone and 12 g ampicillin intravenously. Because of pregnancy, the regimen did not include adjuvant dexamethasone treatment. On day 2, cephalgia had improved and temperature declined to 38°C, and on day 3, she was asymptomatic. A second lumbar puncture on day 5 showed 25/µl leukocytes, most of them lymphocytes, and no further abnormalities.

On day 6, sequencing of the PCR product from the first lumbar puncture revealed infection caused by

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Table I
Microbiological findings in CSF from day 1

| | |
|---|---|
| Gram and methylene blue stainings | negative |
| Aerobic culture on blood agar | negative |
| Anaerobic culture on brain heart agar | negative |
| PCR of eubacterial DNA | positive |
| PCR of eubacterial DNA (Day 5) | negative |
| Sequence analysis of PCR product | 498 of 499 base pairs homologous to 16S r-RNA gene sequenc of the beta-haemolytic bacterium *Streptococcus dysgalactiae* subspecies *equisimilis* |
| PCR of enterovirus DNA | negative |
| PCR of Coxsackie virus RNA | negative |

*Streptococcus dysgalactiae* subspecies *equisimilis*. Ampicillin treatment was stopped and ceftriaxone continued until day 14.

This is the first case, to our knowledge, of meningitis in an otherwise healthy adult associated with evidence of *Streptococcus dysgalactiae* subspecies *equisimilis* in cerebrospinal fluid (CSF) (Table I). Although invasive infection (including shock, renal and liver involvement, soft-tissue necrosis, but not meningitis) caused by Japanese strains of *S. dysgalactiae* have been reported, *S. dysgalactiae* usually provides a low pathogenic potential (Ikebe *et al.*, 2004).

In our patient, there were no signs of immune compromission or other overt reasons that may promote invasion of the nervous system. In humans, *S. dysgalactiae* sometimes is the aetiological agent of pharyngitis especially in children. In humans *S. dysgalactiae* does not belong to the physiologic flora and infections are caused by person-to-person transmission (Sunaoshi *et al.*, 2010). Therefore, it is possible that the children in our patient's environment, suffering from pharyngitis, were infected with *S. dysgalactiae* and transmitted the bacteria to her. However, we still have to ask what could have allowed the exacerbation from benign pharyngitis to meningitis in this case. There are – as far as we can realize – two characteristics in which our patient differed from completely normal individuals. The first point is that our patient was in the 17$^{th}$ week of her 3$^{rd}$ pregnancy. Pregnancy is a complex phenomenon associated with metabolic and immunological changes in the child-bearing mother. Nevertheless, the literature does not provide evidence that during pregnancy bacterial invasion of the maternal CNS is more common. The second point is that we observed concomitant infection with Coxsackie virus in our patient. The increase of Coxsackie virus neutralization reaction (Table II) indicates an acute infection. Although Coxsackie virus itself can cause meningitis, we could not detect Coxsackie virus RNA by PCR (Kämmerer *et al.*, 1994) in CSF (Table I). Therefore, it could be speculated whether the concomitant Coxsackie virus infection, demonstrating limited course, was an additional factor that triggered meningitis formation by *S. dysgalactiae* in this case.

Table II
Microbiological findings in serum from day 5

| | |
|---|---|
| HSV IgM ELISA | negative |
| CMV IgM ELISA | negative |
| EBV VCA IgM ELISA | negative |
| FSME IgM ELISA | negative |
| Rubella IgM CLIA | negative |
| Coxsackie A9, B1-B6 CBR (Day 2) | 1:10 |
| Coxsackie A9, B1-B6 CBR (Day 4) | 1:40 |
| Q-Fever CBR | negative |
| Mumps IgM CLIA | negative |
| Measles IgM ELISA | negative |
| Poliovirus CBR | negative |
| VZV IgM ELISA | negative |
| Influenza A CBR | negative |
| Influenza B CBR | negative |
| Mycoplasma pneumoniae CBR | negative |

However, it is of note that this *S. dysgalactiae* associated meningitis was very mild, was beyond headache and fever without other clinical signs of meningitis, was quickly remittent under antibiotic regimen, and only diagnosed by lumbar puncture. Further, admission to the hospital occurred only because our patient was worried on account of her pregnancy. As the bacteria were not found in our case by culturing, it may be possible that they were already damaged by sufficient immune response, suggesting self limiting infection; and it can be speculated whether this clinical presentation would have been self limiting without any medical treatment. Often, CSF from patients showing mild symptoms are not analysed by PCR, and based on the lack of microbiological findings, the cause of the infection remains unknown. Thus, meningitis in healthy adults by *S. dysgalactiae* could be more common than previously reported.

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