

A rare case report on bacterial meningitis in second trimester of pregnancy: Review of literature

Asha Saxena¹, Charu Yadav¹, Ani Chandanan², Neha Yadav³, Priyanka Yadav³

From ¹Assistant Professor, ²Professor, ³Junior Resident, Department of Obstetrics and Gynecology, T.S. Mishra Medical College, Lucknow, Uttar Pradesh, India

ABSTRACT

Bacterial meningitis in pregnancy is a rare but life-threatening condition with significant maternal and fetal risks. A 25-year-old multigravida at 16 weeks of gestation presented with fever, headache, vomiting, and photophobia. Clinical examination revealed meningeal signs and focal neurological deficits. Laboratory findings and cerebrospinal fluid analysis confirmed acute bacterial meningitis. The patient was managed with prompt intravenous antibiotics, corticosteroids, and supportive care under a multidisciplinary approach. She showed marked clinical improvement and was discharged with continuation of pregnancy. Early diagnosis and timely management are crucial to improving outcomes in such cases.

Key words: Bacterial meningitis, Cerebrospinal fluid analysis, Inflammatory markers, Multidisciplinary care

Meningitis is an infectious disease of the brain membranes and spinal cord caused by viruses, bacteria, fungi, parasites, or aseptic action. Bacterial meningitis is a rare medical emergency condition for which prompt diagnosis and treatment are imperative in reducing the rate of death and long-term neurological complications. The most frequent cause of meningitis in pregnancy is tuberculous meningitis (TBM), *Streptococcus pneumoniae*, and herpes virus meningitis [1]. Bacterial meningitis is globally prevalent and is more common in resource-limited countries and in immunocompromised individuals, such as those with pregnancy. The most common signs and symptoms of meningitis are headache, seizure, altered mental status, vomiting, positive meningeal signs, and fever [2].

CASE PRESENTATION

A 25-year G3P1L1A1 woman with a 16-week 4-day period of gestation presented in the obstetrics emergency with complaints of fever for the past 2 weeks, nausea and vomiting, persistent headache, and photophobia for the past 4 days. Her present pregnancy is a spontaneous conception. She had one live issue delivered by lower segment cesarean section 4 years back and had a history of one spontaneous abortion at 8 weeks of gestation 1 year back, managed medically.

On admission, she was afebrile, subconscious but oriented, appeared pale, fatigued, and dehydrated. Vital signs revealed, pulse rate of 102 beats/min, blood pressure of 96/60 mmHg, and respiratory rate of 20 breaths/min. General physical examination showed pallor of grade 2, no icterus, clubbing, or cyanosis. No palpable neck lymph nodes were noted. Systemic examination was unremarkable. Obstetric examination revealed that the uterus corresponded to approximately 16 weeks of gestation, and fetal cardiac activity was present on Doppler examination. Due to persistent on-and-off fever and neurological symptoms such as severe headache, vomiting, and photophobia, a neurological consultation was obtained. On neurological examination, meningeal signs were positive, left-hand grip was weak, and the patient had difficulty performing a tandem walk.

The differential diagnosis of meningitis was made. Routine laboratory analysis showed moderate anemia (hemoglobin 9.2 g/dL), decreased level of total protein (48 g/L), C-reactive protein level reaching 81.93 mg/L, pro-calcitonin level of 0.78, and erythrocyte sedimentation rate amounting to 56 mm/h. The general blood picture shows predominantly neutrophilia. The fever profile was found to be negative. Blood culture and urine culture were sterile. The TORCH panel test had a negative result. Human immunodeficiency (HIV) 1 and 2 antibodies were also negative. Hepatitis serology testing was negative. Ophthalmology reference was done in view of fundus examination, which reported no signs of disc

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Correspondence to: Priyanka Yadav, B- 47 PG Girls Hostel, T.S. Mishra Medical College and Hospital, Lucknow - 226008, Uttar Pradesh, India. E-mail: pyadav8189@gmail.com

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edema in both eyes. Cerebrospinal fluid (CSF) analysis showed a raised white blood cell count, predominantly neutrophil (8800 cells/mL), protein level 75 mg/dL (raised), and glucose 32 mg/dL (raised). Microscopic examination for acid-fast bacilli of CSF and sputum revealed a negative result. India ink stain for cryptococcal of CSF shows a negative result. Neuroimaging was not done because of financial constraints. Obstetric ultrasonography confirmed for fetal well-being shows a single live intrauterine pregnancy consistent with 16 weeks and 6 days of gestation.

On the basis of clinical findings and CSF analysis, a diagnosis of G3P1L1A1 with a 16-week and 4-day live intrauterine pregnancy with acute bacterial meningitis, moderate anemia, and a previous LSCS was established. The patient was managed through a multidisciplinary team involving obstetricians and neurologists. She was kept on intravenous (IV) antibiotics (injection ceftriaxone 2 g IV 12 hourly) for empiric treatment of suspected bacterial meningitis and anti-edematous treatment (mannitol and dexamethasone) given as per neurologist advice. Antipyretics, hydration, and supportive care were given to the patient. Iron supplementation started to correct anemia. Maternal condition and fetal well-being were closely monitored throughout hospitalization.

The patient showed gradual improvement after initiation of treatment, with a reduction in fever and relief of neurological symptoms. She was discharged on oral antibiotics (tablet cefixime 500 mg BD) and oral steroid (tablet prednisolone 40 mg once daily) therapy after 7 days of admission. At present, she is in close follow-up with the neurology team, and her pregnancy is continuing with regular antenatal follow-up and monitoring with an obstetrician.

DISCUSSION

Bacterial meningitis during pregnancy is an uncommon yet potentially life-threatening condition associated with significant maternal and fetal morbidity and mortality.

A case series by Adriani *et al.* [1] reported six cases of bacterial meningitis during pregnancy and highlighted that the condition can occur at any gestational age, with outcomes largely dependent on early diagnosis and treatment. Similarly, Lucas [3] reviewed central nervous system infections in pregnancy and emphasized that prompt antibiotic therapy significantly improves maternal outcomes, although fetal prognosis remains variable. Mylonakis *et al.* [4], in their study on listeriosis in pregnancy, demonstrated a strong association between meningitis and adverse fetal outcomes such as miscarriage, stillbirth, and neonatal sepsis. Brouwer *et al.* [5], in a systematic review, highlighted the beneficial role of adjunctive corticosteroids in reducing neurological complications and improving outcomes in bacterial meningitis. Karanth *et al.* [6] reported a rare case of *Lactococcus lactis* meningitis in pregnancy, emphasizing

that uncommon organisms should not be dismissed, as early targeted therapy is essential. Furthermore, a recent case series by Peddyandhari *et al.* [7] demonstrated that meningitis in pregnancy can rapidly progress to critical illness requiring intensive care, with variable fetal outcomes despite appropriate management. This case report suggested that pregnancy is a predisposing condition for certain infectious diseases, as immunity is compromised during pregnancy. Since B-cell immunity during pregnancy is normal, susceptibility to infections by *S. pneumoniae* remains unchanged [8]. In our case, a diagnosis of acute bacterial meningitis is made on the basis of clinical features, CSF analysis findings, and improvement of symptoms after the start of antibiotics and steroids. The choice of initial antimicrobial therapy is based on the most common bacteria causing the disease, according to the patient's age and the clinical setting, and on patterns of antimicrobial susceptibility [9].

The differential diagnosis in this patient included pre-eclampsia/eclampsia, but there was no clinical or laboratory evidence to support this diagnosis as the patient had no proteinuria or elevated blood pressure. Another diagnosis to consider was TBM, but the lumbar puncture results were not conclusive for the same. HIV/acquired immunodeficiency syndrome, opportunistic infections like *Cryptococcal neoformans* can present in abnormal ways, but in this case report, all the above tests were negative.

CONCLUSION

Bacterial meningitis complicating pregnancy is a rare occurrence. Accurate diagnosis, timely management, and a high index of suspicion are required. Lumbar puncture for culture and polymerase chain reaction is the cornerstone of the diagnosis to determine the causative organism and appropriate treatment. Our case report demonstrates the importance of resuscitation and therapeutic strategies on the basis of the stabilization of the mother's acute condition and the importance of a multidisciplinary approach.

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