

CASE REPORT

Otogenic meningoencephalitis caused by *Streptococcus pneumoniae*

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ABSTRACT

Meningitis/ meningoencephalitis due to *Streptococcus pneumoniae* are with severe course and high mortality rate. A case of severe meningoencephalitis by *S. pneumoniae* secondary to chronic bilateral otitis and mastoiditis is presented here. A 37-year-old male patient was admitted with fever, excitation, somnolence and meningeal irritation. Investigation of cerebrospinal fluid (CSF) revealed increased protein level (11.3 g/L), leucocytes count 59,790/ μ L (93% neutrophils), extremely decreased glucose level (0.1 mmol/L). *S. pneumoniae* was confirmed by latex test and culture of CSF. Otitis media and mastoiditis were found bilaterally by computerized tomography. Bilateral cortical mastoidectomy was performed together with antibacterial treatment by consequently ceftazidime and cefepime and corticosteroids were administered. He experienced progressive improvement and was discharged with normal laboratory parameters and without sequels after 17 days hospital treatment. In conclusion, both surgical and conservative treatments are crucial for outcome of meningitis/ meningoencephalitis by *S. pneumoniae* secondary to chronic mastoiditis. *J Microbiol Infect Dis* 2013; 3(2): 86-88

Key words: *Streptococcus pneumoniae*, meningitis, meningoencephalitis, mastoiditis

Streptococcus pneumoniae'nin sebep olduğu otojenik meningoensefalit

ÖZET

Streptococcus pneumoniae'nin sebep olduğu menenjit/meningoensefalitler ağır bir seyredirler ve yüksek mortalite gösterirler. Burada kronik bilateral otitis media ve mastoidite seconder olarak gelişen ciddi seyirli bir *S. pneumoniae* olgusu sunuldu. Otuz yedi yaşında erkek hasta ateş, eksitasyon, somnolans ve menings irritasyon bulguları ile başvurdu. Beyin omurilik sıvısı (BOS) incelemesinde artmış protein seviyesi (11,3 g/L), lökosit sayısı μ L'de 59790 (%93'ü nötrofil) ve çok düşük düzeyde glukoz düzeyi (0,1 mmol/L) bulundu. *S. pneumoniae*'nin etken olduğu BOS'tan yapılan lateks testi ve kültürle doğrulandı. Bilgisayarlı tomografi ile bilateral otitis media ve mastoidit olduğu gösterildi. Seftazidim ve devamında sefepim ve şekilde antibakteriyel tedavi, destek tedavisi ve kortikosteroid uygulaması yanında bilateral kortikal mastoidektomi yapıldı. Hasta hızlı bir iyileşme gösterdi ve hastanede 17 gün süren bir tedaviden sonra normal klinik ve laboratuvar bulgularla taburcu edildi. Sonuç olarak hem cerrahi hem de konservatif tedavi kronik mastoidite sekonder olan ve *S. pneumoniae*'nin etken olduğu menenjit/ meningoensefalitlerde akıbet için hayati önem taşırlar.

Anahtar kelimeler: *Streptococcus pneumoniae*, menenjit, meningoensefalit, mastoidit

INTRODUCTION

The investigation of central nervous system (CNS) infections has made major progress over the recent years. The CNS infections, however, still pose a considerable number of problems to the clinical medicine and their complex solution becomes even more relevant. The most common causative agents of bacterial meningitis are *Neisseria meningitidis*, *Haemophilus influenzae* and *Streptococcus pneumoniae*. According to the literature, *S. pneumoniae* ranks first among the etiologic agents.^{1,2}

Genus *Streptococcus* involves a large group of widespread Gram (+) cocci that cause varied clinical conditions. *S. pneumoniae* is especially noteworthy, because it causes severe invasive infections with high mortality.^{3,4} Pneumococcal meningitis is most often secondary to otitis, sinusitis, mastoiditis, bronchopneumonia, craniocerebral traumas.⁵⁻⁸ Bulgarian authors describe cases of pneumococcal meningitis in cholecystitis, spina bifida, thrombophlebitis.^{6,7} There is a trend for increased incidence of pneumococcal meningitis worldwide.⁸ Over the recent decades, in Bulgaria it is with second preva-

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lence, following the meningococcal one in etiologically confirmed bacterial meningitis.^{5-7,9}

We are present here a case of severe otogenic meningoencephalitis due to *S. pneumoniae* that after conservative and surgical treatment was discharged with full recovery.

CASE REPORT

Thirty-seven year-old male patient was admitted to Clinic of Infectious Diseases at University Hospital, Pleven, Bulgaria on sixth March 2011. The patient fell ill two weeks earlier with rhinitis (treated with drops) and leakage of purulent discharge from both ears for an unknown period. He was febrile, but his temperature was not measured. On the day of hospitalization his temperature was 39°C. He started vomiting and he was urgently taken in obtundation to the hospital from Gorna Oryahovitsa but later was transported to Clinic of Infectious Diseases at University Hospital, Pleven because of critically worsening. He was without co-morbidity. He had not contacts with any infectious person.

At admission, the patient was in deep stupor, with psychomotor agitation. Examination of the respiratory system revealed rhythmic breathing with respiratory rate 18-20 breaths/min, without crepitations. Cardiac examination showed normal heart rhythm, heart rate 84 beats/min, clear tones and blood pressure was 120/90 mm Hg. Hepatomegaly was found. Neurological examination revealed neck rigidity, positive Kernig's sign and negative upper and lower Brudzinski's signs. Patellar and Achilles reflexes were increased to clonus, with extended reflex zones. There were no pathological reflexes of Babinski's group. Cranial nerves were not affected. Pupils were with equal diameters, with preserved reaction to light. The bilateral external auditory canals were filled with plenty of stick, string, gray-brownish, odorless pus.

Blood laboratory investigations revealed: erythrocytes 3.15 per 10¹²/L, haemoglobin 106 g/L, leucocytes 21.9 per 10⁹/L, 95% granulocytes, erythrocytes' sedimentation rate (ESR) 60/80 mm, fibrinogen 9.9 g/L, glucose 11.2 mmol/L. Aminotransferases, blood urea nitrogen, creatinine, electrolytes and alkaline/ acid balance were in reference values. Investigation of cerebrospinal fluid (CSF) revealed increased protein level up to 11.9 g/l, leucocytes 59,790 per μ L, 93% neutrophils, glucose 0.1 mmol/L (glycorhachia/glicemia ratio was 0.009). Microbiological tests of CSF were performed and direct microscopy, latex agglutination and culture proved *S. pneumoniae*, sensitive to chloramphenicol, penicil-

lin, vancomycin, trimetoprim/sulfamethoxazol, cephalosporins. Microbiological tests of secretion from the ears were performed and *S. aureus* was isolated from both ears, sensitive to chloramphenicol, penicillin, vancomycin, levofloxacin, clindamycin, trimetoprim/sulfamethoxazol, erythromycin, cephalosporins etc). Computerized tomography (CT) of the head revealed mastoids with homogenously shaded cellular system bilaterally (mastoiditis), bilateral otitis and maxillary sinusitis. Consultation with otolaryngologist was performed but tympanic membranes are not visualized. There was retroauricular pain on palpation.

The treatment started with ceftazidime, followed by maxipime and metronidazol. Supportive treatment included dexamethazone, mannitol, furosemide, diazepam, infusions of fluids and blood products. After discussion of the case with otorhinolaryngologist, a decision for radical surgical treatment was taken. Bilateral mastoidectomy was done early (on the second day after admission) before waiting for improvement from the conservative treatment.



Figure 1. View of the mastoids intraoperatively

During the surgical intervention was seen that the cells of the two mastoids were filled with granulations and pus (Figure 1). *S. pneumoniae* was isolated after examination of that content. Draining pipes were placed in the mastoid cavities and the retroauricular wounds were left opened. Washes were carried out with hydrogen peroxide and physiologic saline 0.9% twice daily until CSF had normalized. The retroauricular wounds were stitched at the second stage. The drainage pipes were further removed. On the second day after the surgery, the patient recovered the consciousness and was afebrile. He was without any important complaints. The syndrome of meningeal irritation lasted until

the fifth day after surgery with total duration of nine days. Follow-up blood tests were normal except of erythrocytes count (2.73 per $10^{12}/L$) and hemoglobin level (87 g/L). CSF tests revealed protein 0.84 g/L, leucocytes 78 per μL , 94% lymphocytes, 4% monocytes and 2% neutrophils, glucose 2.1 mmol/L (glycorhachia/glicemia ratio was 0.4).

After 17-days complex therapy, the patient was discharged afebrile, without complaints, with normal somatic and neurological status, with trouble-free surgical wounds and normal hearing.

DISCUSSION

The reported case concerns an adult patient in poor condition, with severe disorders of the consciousness, marked pathological changes of CSF parameters and prolonged syndrome of meningeal irritation (nine days). These clinical characteristics are confirmed in the literature and in previous our studies.⁵⁻⁹ We had found increased levels of blood glucose in previous our studies on purulent meningitis, and especially in pneumococcal meningitis, whose most logical explanation is the stress due to the potent streptococcal toxins. Severe anemia also is due to the streptococcal toxins.^{5,9}

About treatment, otolaryngologists recommend early surgical intervention with a view to better recovery.^{10,11} The timely removal of the softened bone tissue facilitates the access and full absorption of the antibiotic. This trend is common consideration and the results are positive. Along with the surgery, active conservative treatment is also conducted with third and fourth generation of cephalosporins (ceftazidime, maxipime), corticoids and blood products, which coincides with the world practice.^{1,11-13} However, the emergence of antibiotic resistant pneumococci is an increasing problem worldwide.^{11,14-17} Furthermore, there are described cases of recurrent pneumococcal meningitis.^{14,17} It is considered that vancomycin can be the appropriate alternative for cephalosporins-resistant strains of *S. pneumoniae*.^{15,16} On the other hand, vaccination with pneumococcal vaccine might decrease the incidence of pneumococcal meningitis.¹⁸

The described case ended up with full recovery. We had mentioned the absence of residual symptoms after pneumococcal meningitis in previous our studies,^{5,9} unlike other authors, where such symptoms occur relatively frequently.^{12,18,19}

In conclusion, the reported case confirms our opinion that in the treatment of otogenic meningoencephalitis, the most appropriate approach aimed to favorable outcome is the complex surgical and conservative treatment. Purulent and catarrhal

otitis and mastoiditis with latent course should be promptly and properly treated. In order to avoid fatal outcome, the pneumococcal vaccine should be considered more often, especially in frequently ill children.

Conflict of interest: The authors declare that there are not conflicts of interest.

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