Abstract. Recurrent bacterial meningitis is a less common clinical entity, but it is usually more challenging for the clinician because it requires a thorough investigation of any predisposing factor. We report the case of an adult patient with a history of recurrent bacterial meningitis. Following extensive investigation for underlying predisposing factors, we found a malformation of the central nervous system as the cause of his recurrent meningitis. With the appropriate antimicrobial treatment the patient improved and he was referred to a neurosurgical department in order to solve his anatomic defect.

Keywords: recurrent meningitis, ethmoidal meningoencephalocele

Background

Bacterial meningitis is a severe infection often associated with high mortality and morbidity rates.[1,2] Recurrent bacterial meningitis is a less common clinical entity, the recurrence rate being 5-6%. [1,2] However, some literature data suggest that the mortality rate is lower than in patients with an isolated episode, 15% versus 34% in a study by Adriani and 0% versus 25% in study by Durand.[1,2] This is probably due to the fact that the patients with recurrent meningitis are able to recognize the symptoms earlier, therefore they present earlier to the hospital, this fact improving their prognostic. On the other hand, recurrent meningitis usually poses more serious diagnostic challenges and it often requires extensive exams in order to discover any underlying pathology. When dealing with a case of recurrent bacterial meningitis, it is imperative to look for predisposing factors, such as various immunodeficiency disorders or anatomical abnormalities, either congenital or acquired. Most of the recurrent bacterial meningitis may be attributed to anatomical factors, most of them being intracranial or cervical abnormalities, followed by immunodeficiencies, especially complement deficiency, HIV infection, agammaglobulinemia, asplenia, immunoglobulin G deficiency and chronic parameningeal infections such as chronic otitis media or chronic mastoiditis.[3]

We describe the case of an adult patient with recurrent meningitis. Following investigation we found him to have an anterior skull base abnormality as the cause of his recurrent meningitis.

Case report

A 27-year-old patient presented to the emergency room of our department in March 2015, with fever, headache, vomiting and disorientation, installed 6 hours previously. He had a history of other 3 bacterial meningitis: a meningococcal meningitis at the age of 14 years, a second one when he was 18 years old – without an etiologic agent isolated and further meningococcal meningitis when he was 20 years old. At the age of 5, the patient was diagnosed with Waldeyer’s ring non-Hodgkin lymphoma, for which he was treated and considered cured after a 10 years follow-up.

The physical examination revealed fever of 39°C, positive signs of meningeal irritation and disorientation. The laboratory tests showed high leukocytes count (22,300/mm³) and inflammation (C-reactive protein=111 mg/L, fibrinogen=555.68 mg/dl). Cerebrospinal fluid (CSF) was turbit and hypertensive presenting a count of 15,000 leukocytes/mm³ (88% polymorphonuclear leukocytes, 2% lymphocytes and 10% monocytes). The protein level in CSF was elevated (1,364 mg/dl), the glucose level was low (20 mg/dl, with a serum glucose of 98 mg/dl), the lactic acid level was elevated (104 mg/dl). CSF meningococcal, pneumococcal and Haemophilus influenzae antigens were absent. Gram staining was performed on CFS and it showed gram-positive diplococci. The CSF cultures however proved to be negative, as well as the hemocultures and urine cultures. Serologic test for HIV was negative. Immunoglobulin A, G, M and complement levels were normal.

Chest and sinus X-ray exams were both unremarkable. An ENT exam was performed and it didn't reveal abnormal
structures, rhinorrhea or otorrhea.

The patient started antibiotics treatment with Ceftriaxone (4 g/day) and vancomycin (2 g/day), along with Dexamethasone 0.5 mg/kg/day and symptomatics. The patient became afebrile from the second day of the treatment. The signs of meningial irritation became negative on the fourth day. The lumbar puncture performed on the fifth day of the treatment revealed an important improvement of the CFS values, which became clear, presenting a count of 120 leucocytes/mm3, normal glucose level, protein level of 71 mg/dl and lactic acid level of 17.5 mg/dl. The patient underwent treatment for 14 days. Because the serologic tests didn’t reveal any immunodeficiency as the cause of the patient’s recurrent meningitis, a brain magnetic resonance imaging investigation was performed in order to establish if any anatomical abnormalities were present. The exam revealed an image compatible with a skull base defect: a bony defect at the right cribriform plate which continued with a small sac into the right nostril, between the nasal septum (deviated to the left) and the right nasal cornet (Figure 1).

The patient was discharged from the infectious diseases on day 16 day and was guided to a neurosurgical clinic for the treatment of his anatomical defect.

Discussion

One of the anatomical abnormalities leading to recurrent bacterial meningitis is encephalomeningocele, a rare, extracranial, congenital malformation of the central nervous system. Basal encephalocele may protrude into the superior meatus, posterior ethmoid or sphenoid nervous system. Basal encephalocele may protrude into the right nostril, between the nasal septum (deviated to the left) and the right nasal cornet (Figure 1). The patient was discharged from the infectious diseases on day 16 day and was guided to a neurosurgical clinic for the treatment of his anatomical defect.

Fig.1. A bony defect at the right cribriform plate which was continued with a small sac into the right nostril, between the nasal septum (deviated to the left) and the right nasal cornet.

Discussion

One of the anatomical abnormalities leading to recurrent bacterial meningitis is encephalomeningocele, a rare, extracranial, congenital malformation of the central nervous system. Basal encephalocele may protrude into the superior meatus, posterior ethmoid or sphenoid sinus or into the nasal or pharyngeal space, causing nonspecific symptoms like nasal obstruction, respiratory difficulties, rhinorrhea or leading to recurrent bacterial meningitis, usually with the first episode manifesting during childhood [4]. According to the literature data, this anatomic abnormality is discovered in paediatric patients [3,5]. In the case of our patient, the malformation presented with recurrent meningitis, first episode being at the age of 14. Not being thoroughly investigated for this malformation until the last episode of meningitis, may be due to the fact that the first episodes were probably attributed to the immunosupression by non-Hodgkins lymphoma or its treatment. In fact, literature mentions that the correct diagnosis of the predisposing condition of recurrent meningitis is often delayed, sometimes for many years [6]. In our case the gap between the first episode of bacterial meningitis and the diagnosis of the predisposing condition was 13 years.

As far as etiology concerns, most of the cases of recurrent bacterial meningitis secondary to heterotopic brain tissue are caused by Streptococcus pneumoniae (83%), followed by Staphylococcus aureus (11%) and Neisseria meningitidis (6%). Although in most cases of recurrent bacterial meningitis the causative agents were identified, many patients had culture-negative meningitis, despite the fact that the CSF findings were highly suggestive for bacterial etiology.[3] This was the case for this episode of bacterial meningitis in our patient. However, the direct exam of CSF was highly evocative for a pneumococcal aetiology. Therefore the patient was treated according to this result, having a rapid favourable evolution. Another issue that we took into account in our patient was the vaccination against Streptococcus pneumoniae, Neisseria meningitidis and Haemophilus influenzae. This approach is recommended in some cases of recurrent bacterial meningitis, although it is questionable in the cases secondary to anatomical abnormalities.[1,7] Due to the fact that the patient was going to be subjected to the surgical repair of the anatomical defect, we decided not to proceed with the vaccination.

Although most skull base anatomic abnormalities in recurrent meningitis are found in paediatric patients, our case emphasizes the fact that these defects should also be carefully assessed in adult patients. The closure of the anatomical abnormality is crucial in order to prevent further episodes of bacterial meningitis.

References