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Meningeal Syndrome with Bilateral Visual Loss Secondary to Meningococcal Meningitis in an Immunocompetent Young Adult: Uncommon Presentation

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Abstract **Case Report**

We present a case of acute bilateral optic neuritis and clinical meningeal syndrome related to meningococcal meningitis in an immunocompetent young adult. A 24-year-old man was admitted in the emergency department with sudden bilateral visual loss, headache, and fever. Clinical examination showed manifest stiff neck with positive Kernig and Brudzinski signs, a skin rash was also observed on the legs. Cerebrospinal fluid (CSF) examination and brain magnetic resonance imaging (MRI) demonstrated a diagnosis of meningococcal meningitis with infectious optic neuritis aspect. He was treated with intravenous ceftriaxone. After treatment, her vision improved rapidly within 2 hours. In conclusion, it is very important for clinicians to perform the necessary tests and initiate appropriate treatment as soon as possible for patients with urgent presentation as seen in our case.

Keywords: acute bilateral optic neuritis, meningococcal meningitis, Cerebrospinal fluid.

INTRODUCTION

Meningitis is an infection/inflammation of the brain and spinal cord surrounding membranes known as the meninges. Meningococcal meningitis is the term used to describe a bacterial form of meningitis caused by *Neisseria meningitidis*. Meningococcal meningitis is a medical emergency for which symptoms can range from transient fever to fulminant bacteremia and septic shock [1].

Meningococcal disease, known for more than 200 years, is recognized as a worldwide public health problem due to its cosmopolitan distribution, potential to cause outbreaks or epidemics, the greater impact on children and teenagers (especially during epidemics), high mortality rates and significant morbidity represented by complications of the disease, especially permanent neurologic sequelae [2].

N. meningitidis is a gram-negative, aerobic, and non-encapsulated bacterium of the family *Neisseriaceae* that infects humans only. It is transmitted directly from respiratory or salivary projections of patients and especially healthy carriers by prolonged and close contact. On direct examination of pathological products, most commonly cerebrospinal fluid (CSF), these microbes appear as diplococcus. It can occur in sporadic cases form or causes epidemics as in 'the sub-Saharan African meningitis belt', which extends from Senegal in the west to Ethiopia in the east. The invasive meningococcal diseases rate is higher in that belt with clonal epidemics due to the strains of serogroups A, W and recently serogroups X and C, which can cause epidemics in sub-Saharan Africa. In Morocco, meningococcal disease is endemic-sporadic with an incidence rate ranging from 2 to 3.6 cases per 100 000 inhabitants [3].

Ophthalmic manifestations of meningococcal meningitis include ocular motility abnormalities due to third, fourth, and sixth nerve palsies. Raised intracranial pressure associated with meningitis may cause papilloedema and secondary optic atrophy. Optic neuritis and papillitis are potential causes of visual loss in patients with meningitis [4].

Here we present an uncommon case of bilateral optic neuritis in the setting of meningeal syndrome due to meningococcal meningitis.

CASE REPORT

A 24-year-old man, well vaccinated, without any particular medical history, was admitted to our emergency department (ED) complaining of severe

headache of 4 days' duration, aggravated by changes in position, and associated with vomiting, fever of 39°C, sweating, photophobia and phonophobia. The course was rapidly progressive, with bilateral loss of vision occurring in the morning of the day of admission to our ED, preceded by perception of bilateral visual fog.

There was no evidence of vigilance impairment or convulsive seizures. The clinical evaluation at the ED revealed a manifest stiff neck with positive Kernig and Brudzinski signs, a maculopapular rash on the legs, and no sensory-motor deficit with symmetrical tendon reflexes. Oculomotricity was preserved and photo motor reflexes were present and symmetric. The ophthalmological examination was unremarkable, with a normal funduscopy.

Given this clinical presentation, a cerebral CT scan was performed, which showed the presence of cerebral edema with no process images. The leucocyte count showed neutrophils hyperleukocytosis (32 10^9/L) with an elevated C-reactive protein at 146 mg/l. A lumbar puncture was performed, yielding a purulent fluid, and a cytobacteriological study with chemistry of cerebrospinal fluid was initiated.

After the puncture, treatment with ceftriaxone 3g x2/day and injectable paracetamol was started.

Two hours later, the patient reported complete recovery of vision. This reported bilateral blindness had lasted almost 6 hours. A cerebral MRI was performed showing bilateral contrast-enhanced optic neuritis associated with cerebral leptomeningeal enhancement. (Fig. 1).

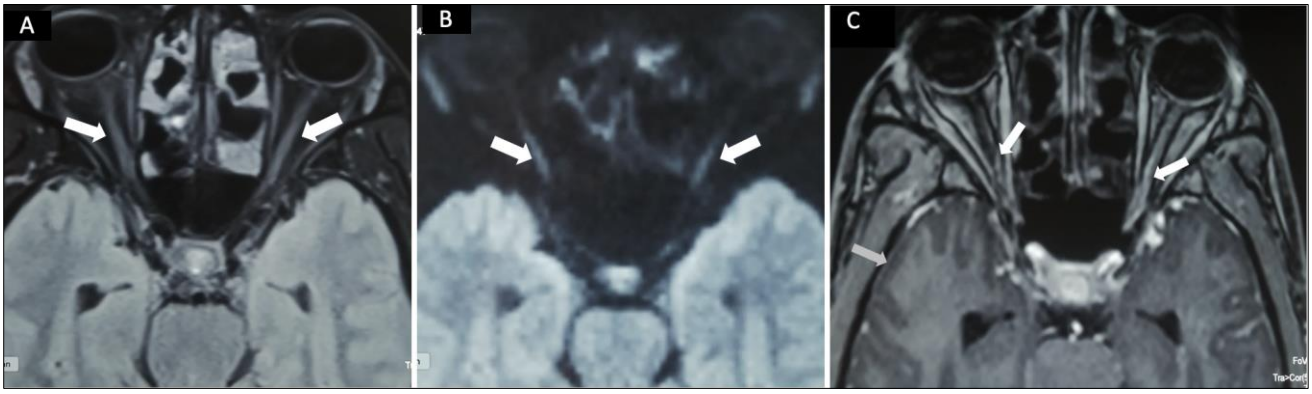

Fig. 1: Axial brain MRI showing hypersignal on FLAIR sequence (A) with diffusion restriction (B) associated with enhancement (C) of optic nerves (white arrows) and brain leptomeninges (grey arrow) on post-Gado T1

Cytobacteriological study of the CSF showed the presence of 1800 WBC/mm3 predominantly neutrophils with increased level of CSF proteins (6 g/l) and very low glucose level at 0.01 g/l. After 24 hours of incubation, the culture revealed the presence of small greyish colonies with a round, smooth appearance, positives to oxidase and catalase. On direct examination, these were gram-negative diplococci in the form of coffee beans (Fig. 2), The antibiogram study showed a germ sensitive to amoxicillin, penicillin G, ceftriaxone, ciprofloxacin, chloramphenicol, and rifampicin. The diagnosis of meningococcal meningitis with bilateral regressive optic neuritis of infectious origin was accepted in our patient.

The course was favorable after 10 days of treatment with antibiotic alone, and the patient was discharged from the hospital. The case was reported and all contacts, including healthcare workers, were given chemoprophylaxis with ciprofloxacin.

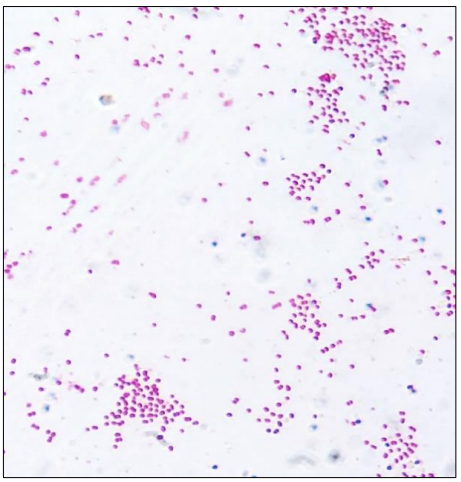

Fig. 2: gram-negative diplococci in the form of coffee beans

DISCUSSION

Neisseria meningitidis is a pathogen capable of causing extremely severe conditions in humans, especially meningococcal meningoencephalitis and meningococcemia [2]. The incubation period is 2 to 10

days. Manifestations of this infection include fever, chills, dizziness, headache, general malaise, vomiting and meningism. Ten to 30 per cent of people with meningitis develop complications such as seizures, hydrocephalus, cranial nerve palsy, damage to the inner ear and intellectual disability [5].

The mortality of meningococcal meningitis is still 10 to 15% despite appropriate antibiotic therapy. Shock, disseminated intravascular coagulopathy and purpura fulminans are the most common acute and severe complications of meningococcal disease. Cranial nerve involvement can be observed in the early stages of the disease [5]. Our patient developed bilateral visual loss on the fourth day after the onset of symptoms. This visual involvement is uncommon in patients with meningitis and it could be secondary either to the compromise of optic nerves, chiasma, retrochiasmatic visual pathways and occipital lobe lesions. Given this, brain MRI was carried out in our patient and showed features of bilateral optic neuritis.

Severe visual loss and optic disc edema are typical for acute neuritis of the optic nerve. Optic neuritis is characterized by the acute inflammation of the optic nerve causing demyelination of the nerve leading to acute visual loss [6]. In general, optic neuritis is mainly associated with inflammatory diseases in adults, usually in one eye, such as multiple sclerosis, neuromyelitis optica spectrum disease and sarcoidosis. However, post-infectious optic neuritis is common in children and usually affects both eyes.

Bilateral optic neuritis associated with a central nervous system infection is rare in adults. Only a few cases of infectious optic neuritis have been reported in recent years. Cases of optic neuritis associated with encephalitis and meningitis are even less common [7]. To the best of our knowledge, our case is the second reported in the literature of meningococcal disease complicated by bilateral and symmetric optic neuritis. The first case was reported by Zellner *et al*., in a 15-year-old boy [5].

An Indian study conducted during an outbreak of systemic meningococcal disease found optic neuritis in 1.8% of all patients. Whether the optic neuritis was unilateral or bilateral was not described in their paper [8].

It is further discussed that, in case of acute, severe, bilateral optic neuritis associated with presumed bacterial meningoencephalitis, aggressive corticosteroid treatment with antimicrobial coverage is the first treatment choice, even if no infectious agents could be detected [5]. The empirical therapy of this type of meningitis includes intravenous administration of third-generation cephalosporins such as cefotaxime and ceftriaxone. Our patient recovered rapidly on ceftriaxone and we didn't decide to use corticosteroids.

CONCLUSION

Optic neuritis is known to be associated mainly with inflammatory disease. In contrast, in the setting of infectious disease they are very uncommon in adult patients. Meningococcal meningitis is a very serious and potentially fatal disease. if it is not treated correctly, serious complications and sequelae can occur. Clinicians should be aware that complication like bilateral optic neuritis in the setting of this meningitis are possible.

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