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Letter to the Editor

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Optic neuritis as sign presentation of acute disseminated encephalomyelitis following *Mycoplasma pneumoniae* infection

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Sir,

Acute disseminated encephalomyelitis (ADEM) is an immune-mediated disorder of the central nervous system (CNS) affecting the white matter of brain and spinal cord [1,2]. Rapid onset encephalopathy associated with neurological deficits preceded by a prodromal phase (fever, nausea, headache) is the most common presentation. Neurologic features depend on the location of lesions: pyramidal signs, hemiplegia, ataxia, cranial nerve palsies, visual loss due to optic neuritis, seizures, spinal cord involvement, aphasia, coma. Optic neuritis (ON) represents a 7-23% of cases [1,3–6], so it is not the most common form of presentation. Lesions in ADEM are multiple and asymmetric, affecting subcortical and central white matter and cortical gray-white junction. Gray matter of thalami and basal ganglia are also involved [1]. Diagnosis is made based on clinical and radiological findings. Magnetic Resonance Imaging (MRI) results can be classified in 4 types: a) Small lesions, b) Large, tumefactive lesions c) Symmetric bithalamic affection, d) Acute hemorrhagic encephalomyelitis. Spinal cord involvement is reported to represent 11-28%, typically in the thoracic region [1]. Differential diagnosis is challenging, and multiple sclerosis should be considered [1,2]. Steroids, intravenous immunoglobulin and plasma exchange are the main used treatments. Here we describe a case of ADEM with ophthalmologic debut and discuss its main clinical aspects.

16-year-old female presented to our clinic complaining of blurry vision and ocular pain that started a week ago concurring with flu-like symptoms and fever. Ophthalmic examination showed up right optic nerve edema (Figure 1), confirmed with optic coherence tomography (Figure 2) that revealed thickening of retinal fiber nerve layer in the right eye. Right eye chromatic vision was altered and she had a concentric visual field reduction. Brain computed tomography (CT) was normal, and cerebrospinal fluid analysis showed pleocytosis and increased protein concentration. She received intravenous megadoses of methylprednisolone, but after 24h she experienced worsening of her symptoms: pain, strength loss in her low extremities and walking difficulties. Serology studies were negative, except *Mycoplasma pneumoniae* IgM. Oligoclonal bands, anti-myelin oligodendrocyte glycoprotein antibodies (MOG-abs), anti-aquaporin 4 antibodies, all tested negative. MRI neuroimaging demonstrated thickening of right optic nerve, small supra and infratentorial demyelinating lesions and large dorsal myelitis, all of these suggested ADEM. We started plasmapheresis with excellent response, showing improvement in optic disc swelling, visual field defect and strength loss, although she needed physical rehabilitation. She followed treatment with low descendent dose of oral steroids to avoid further relapses.

ADEM is usually seen in prepuberal patients preceded by a viral infection or post vaccination [1,2], and less frequently post-bacterial infection caused by *Mycoplasma*, *Chlamydia*, *Legionella*, *Campylobacter* and *Streptococcus* [7], but main causes are measles, rubella and chickenpox [8]. It is unclear whether central nervous system affection is due to direct *Mycoplasma pneumoniae* infection or antibodies produced against this pathogen cross-react with myelin antigens [7]. Extrapulmonary complications of this infection include encephalitis, optic neuritis, psychosis, stroke, cranial nerve palsies, aseptic meningitis and it can trigger immune mediated neurological diseases such as ADEM, Guillain-Barré syndrome and transverse myelitis [9,10]. Encephalitis is common in children, and up to a 20% of patients do not have respiratory compromise, as in our case [10]. Diagnosis can be made with PCR (gold standard) or serology (IgM for *Mycoplasma pneumoniae).* It is an important differential diagnosis in demyelinating diseases in prepuberal patients. Antibiotic treatment in controversial, it was not used in our case [8]. Visual prognosis in optic neuritis due to ADEM is good when it is diagnosed early and treated aggressively [3].

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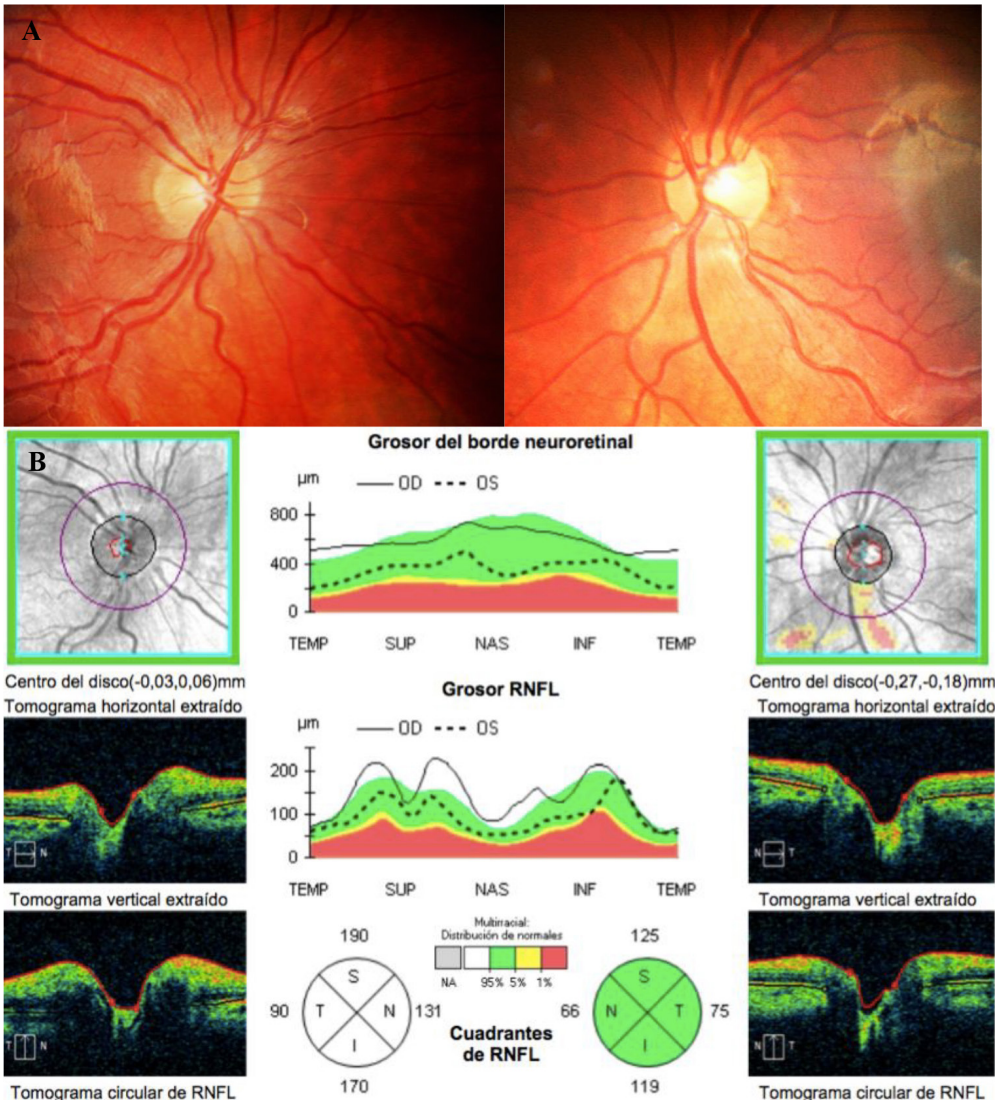

Figure 1 | **Optic nerve images showing swelling of the right optic nerve (left image) and absence of abnormalities in the left one (right image). B) Optical coherence tomography (OCT) images confirmed optic disc swelling of the right eye (left side of the image), there is a thickness augmentation of retinal nerve fiber layer (RNFL) as shown above.**

Pediatric ADEM belongs to a group of disorders characterized by acute or subacute onset of neurological deficits with inflammatory demyelination of CNS. One of the clinical subgroups is ADEM-optic neuritis. Inflammatory optic neuritis is a frequent cause of acute visual loss in young adults, although visual prognosis is excellent in most cases, many patients develop demyelinating lesions during its evolution. ON was described as a form of relapsing course of the disease, with one or more episodes of ON [5], but as a form of presentation, preceding ADEM, it is infrequent [1,7]. Manifestations of optic nerve inflammation include vision loss, pain with ocular movements, dyschromatopsia, optic nerve swelling, relative pupillary afferent defect and central visual field loss; it is usually unilateral, although bilateral cases have been reported. ADEM-ON has been classified as an entity within "MOG-spectrum disorder". MOG-abs positivity is common in children with optic nerve affection, since MOG is a glycoprotein that is only present in the CNS, it maintains myelin sheath integrity. Their positivity supports the diagnosis; these antibodies have also been related to the risk of new events [5]. Particularities of our case are that ON preceded ADEM, time between both events was 24h and MOG-abs resulted negative. This case has the aim to contribute to a better description of presentation and epidemiology of *Mycoplasma pneumoniae* as a trigger of demyeli-

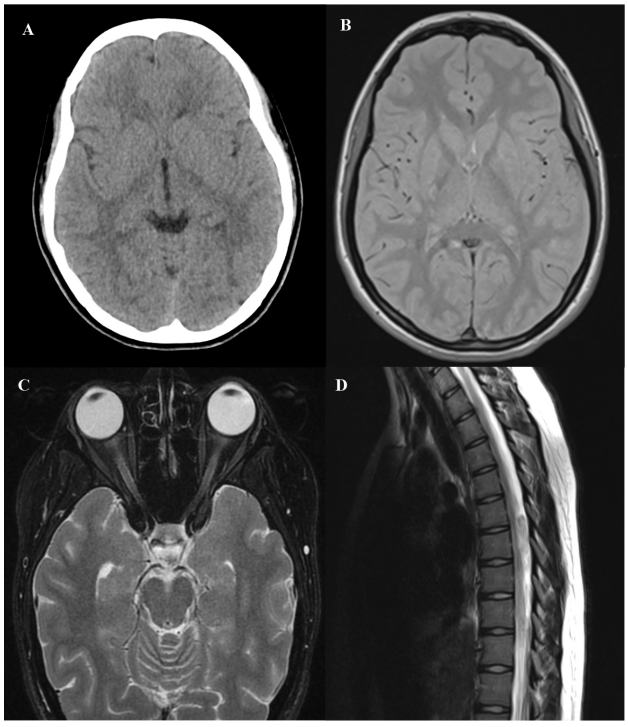

Figure 2 **A) Normal CT brain scan. B) Brain MRI showing features of acute disseminated encephalomyelitis with small lesions. C) Orbit MRI demonstrating unspecific inflammatory changes in the right optic nerve, congruent with optic neuritis. D) Spine MRI suggestive of dorsal myelitis.**

nating diseases, and remark the uncommon ophthalmological debut of ADEM with optic neuritis.

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None to declare

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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