



CASO CLÍNICO

BRAIN MRI LESIONS IN NEUROMYELITIS OPTICA

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Resumen: A pesar de que en muchos casos no se presentan lesiones desmielinizantes en la sustancia blanca cerebral de los pacientes con neuromielitis óptica, se ha documentado que esta entidad puede causarlas desde el inicio de la enfermedad o a través de su evolución natural. En Costa Rica esta enfermedad es poco prevalente y no se conoce con exactitud cuál es su prevalencia e incidencia. Con los métodos diagnósticos actuales como la Imagen por Resonancia Magnética (IRM) y la determinación de anticuerpos específicos en plasma (como la antiaquaporina-4), recientemente se ha diagnosticado algunos casos de neuromielitis óptica que inicialmente fueron confundidos con esclerosis múltiple. A través de un caso clínico se ilustra el grado de afección, tanto en la sustancia blanca cerebral como espinal, en un paciente con neuromielitis óptica durante un periodo de seguimiento de 4 años. Este es el primer caso reportado en la literatura científica de Costa Rica.

Palabras clave: Neuromielitis óptica, lesiones de RM cerebral, anticuerpos antiaquaporina-4

Abstract: Although in many cases demyelinating lesions in the white matter of the brain are not present in patients with neuromyelitis optica, it has been documented that this entity can cause it since the beginning of the disease or throughout its natural evolution. In Costa Rica this entity is not very prevalent although it is not exactly established its real prevalence and incidence. With the help of modern diagnosis test such as magnetic resonance image (MRI) and plasma specific antibody determination (such as antiaquaporin-4), recently many cases of neuromyelitis optica have been diagnosed, which were initially confused as multiple sclerosis. With a clinical case, in this paper it is illustrated the degree of affection in both, brain white matter and spinal cord, in a patient with neuromyelitis optica after a 4 year follow-up period. It is the first case report in the scientific literature of Costa Rica.

Key words: Neuromyelitis optica, MRI brain lesions, Antiaquaporin-4 antibodies

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INTRODUCTION

Neuromyelitis optica (NMO) is a demyelinating disease of the CNS which commonly affects the spinal cord and the optic nerves. It usually has a female to male ratio of 9:1 and appears around the fourth decade of life. In this disease, immunoglobulin G antibodies (NMO-IgG) against Aquaporin 4 are produced (AQP-4). Aquaporins are membrane water channel proteins important in maintaining fluid homeostasis in the body, and the brain tissue contains different types of aquaporins which include 1, 4 and 9 [1]. The hypothalamus and regions adjacent to the third and fourth ventricles are rich in AQP-4 [2]. It is now recognized that NMO is an independent entity from multiple sclerosis and it can also compromise cerebral white matter and produce well defined lesions in topographical areas where there are high concentrations of AQP-4 [3]. Some of these lesions can correlate with neurological symptoms. A case of NMO is presented in which is illustrated the degree of involvement of both, the brain white matter and the spinal cord, after a 4 year follow-up period.

CASE REPORT

A 15 year-old-male right-hand Hispanic patient, started having recurrent episodes of alternating optic neuritis and acute cervical myelitis presented as Brown-Sequard syndrome. A cervical MRI revealed an extensive demyelinating lesion in more than three medullar segments (Figure 1A, 1B). Brain MRI during the first episode revealed a few non specific hyperintense lesions in cerebral white matter (Figure 1 C,D,E). On each clinical relapsing 1 gram of IV methylprednisolone was administered for 5 days, with an adequate clinical response. On one occasion, due to the severity of the symptoms a plasmapheresis was performed. Throughout his evolution the patient had several relapses which were presented as a cerebellar syndrome or alternating hemiparesis. His current

EDSS scale score was 3.5, affecting mostly the pyramidal tract, cerebellum and the optic system. Many studies were performed to rule out other diseases which might affect brain white matter, with the following values: ESR 1 mm/h (normal 0-20 mm/h), VDRL in plasma non reactive, vitamin B12 level was normal. CSF showed no cells, glycorrhachia 83 mg/dl, proteins 48 mg/dl (normal to 45 mg/dl), Gram stain negative, VDRL in CSF was non reactive and oligoclonal bands was negative. Immunologic test to rule out SLE and Sjögren syndrome were negative.

Due to the clinical presentation of relapsing-remitting symptoms and the brain's MRI features, the diagnosis of MS was considered. The patient received treatment with both interferon beta 1-a (Avonex™) and interferon beta 1-b (Betaferon™), which were canceled, because both failed to provide results. NMO-IgG was performed at Mayo Medical Laboratories with positive results, consistent with NMO. The patient is currently receiving immunosuppressive treatment with azathioprine 200 mg each day and quarterly pulses of methylprednisolone 1 g daily for 3 consecutive days. With this treatment regimen the patient has been free of relapsing and his clinical condition has been stabilized. Recently, proceedings for the acquisition of the monoclonal antibody ritubzimab (Mabtera™) were initiated.

DISCUSSION

Although many neurologists are skeptical about diagnosing NMO when there are white matter lesions in the brain MRI, we can see how this disease can produce these changes over time. Up to 60% of patients, when studied with serial brain MRI scans over several years after NMO onset, will develop non specific sub-cortical white matter lesions[4]. In our case we saw how at the onset of the disease, white matter lesions were only few and nonspecific; but over time they became extensive and located in the areas where typically there are high concentrations of AQP-4 (Figure 1 F,G,H,I). The most

striking finding on the MRI, which appear to be specific to NMO, is the "cloud-like enhancement" which consists of multiple contrast enhanced patched lesions with ill defined margins, as well as lesions located at the third ventricle and hypothalamus [5]. In the CNS, NMO-IgG bind selectively to the abluminal face of microvessels, pia mater, sub pia mater, and Virchow-Robin sheaths located on these zones [6]. Anti-NMO antibodies attack these structures causing dysfunction of the brain-blood barrier; which is seen as hyperintense lesions in the MRI. Usually the brain MRI

is negative in most patients with NMO, but the presence of brain lesions do not exclude the diagnosis of NMO. In fact these lesions have been related with positive Anti-NMO antibodies in patients with NMO in several previous studies [7].

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Figure 1. Brain MRI involvement in neuromyelitis optica



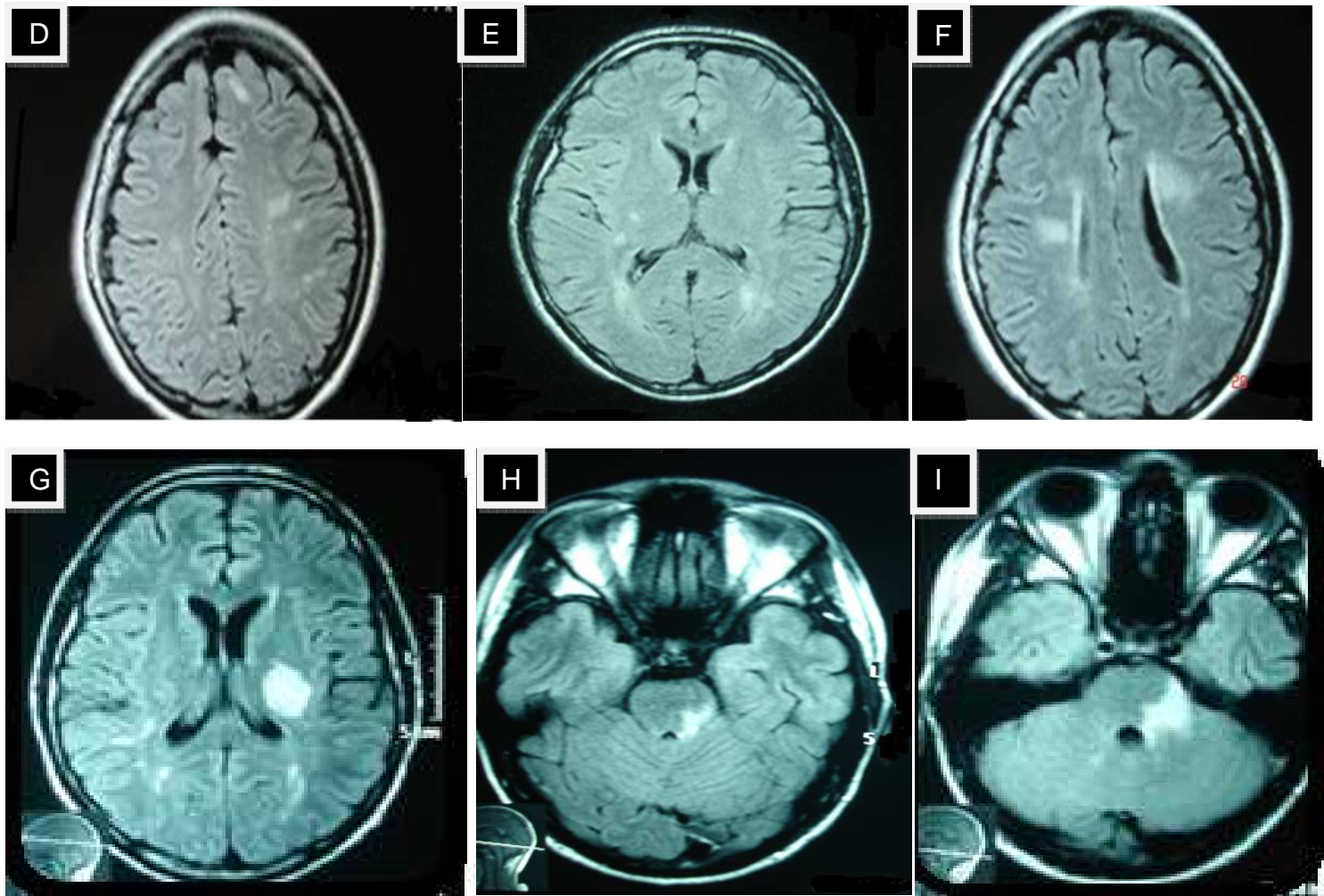


Figure 1 (A) Sagittal T2WI MRI of cervical spinal cord showing longitudinally extensive myelitis. The lesion spans 3-4 cervical segments (from C2 to C5) . (B) Axial T2WI MRI (corresponding axial image of (A)) showing the transverse extend of the lesion, which involves more than half of the cord. (C) Axial T1WI brain MRI at the beginning of the disease showing a hyperintensive lesion in the deep white matter in the left parietooccipital region. (D) Axial FLAIR MRI at the same time showing more extensive confluent lesions in the posterior horns of lateral ventricles and some on the right posterior limb of internal capsule. (E-F) Axial FLAIR MRI one year later showing more confluent lesions on the left frontoparietal white matter and on the periventricular regions. (G-I) Axial FLAIR MRI two years later showing tumefactive lesions in the posterior limb of the left internal capsule and a periependymal lesion surrounding the fourth ventricle extending to the left superior cerebellar peduncle with the so called "cloud-like enhancement".

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