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MAGNETIC RESONANCE IMAGING IN FIVE PATIENTS WITH A TUMEFACTIVE DEMYELINATING LESION IN THE CENTRAL NERVOUS SYSTEM

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ABSTRACT - Five patients with a tumefactive lesion were clinically followed from 1992 to 1993. Four patients were female; age ranged from 32 to 57 years, the duration of symptoms varied from 3 days to 3 years. Neurological examination disclosed dementia in two patients, aphasia in three, hemiparesis in four, hemihypoaesthesia in three, optical neuritis in two, tetraparesis with sensitive level and neurogenic bladder in one. MRI disclosed lesions with a hypersignal on images assessed at T2 and hyposignal at T1, and gadolinium heterogeneous enhancement; these lesions were located in the: a) temporooccipital region bilaterally and brain stem, b) frontoparietal white matter , c) basal ganglia, bilateral white matter and brain stem, d) left parietal region, e) cervical spinal cord, with enlargement of this region. Cerebral biopsy was performed in three patients; acute and subacute demyelinating disease was diagnosed by histological examination. Two patients had an evolutive diagnosis; exclusion of other pathologies and clinical and radiological improvement after corticotherapy, pointed to an inflammatory disease.

KEY WORDS: encephalomyelitis, multiple sclerosis, magnetic resonance, demyelinating disease, tumefactive lesion.

Ressonância magnética em cinco pacientes com lesões desmielinizantes pseudo-tumorais do sistema nervoso central

RESUMO - Cinco pacientes com lesões pseudo-tumorais foram acompanhados entre 1992 e 1993. Quatro pacientes eram do sexo feminino; a idade variou entre 32 e 57 anos; a duração dos sintomas foi de três dias a três anos. O exame neurológico mostrou demência em dois pacientes, afasia em três, hemiparesia em quatro, hemi-hipoestesia em três, neurite óptica em dois, tetraparesia com nível sensitivo e bexiga neurogênica em um. A ressonância magnética revelou lesões com hipersinal nas imagens em T2 e hipossinal em T1, além de realce heterogêneo após o gadolíneo; essas lesões estavam localizadas: a) na região têmporo-occipital bilateral e tronco encefálico, b) substância branca frontoparietal, c) gânglios da base, substância branca bilateral e tronco encefálico, d) região parietal esquerda, e) medula espinal cervical, com aumento de volume. A biópsia cerebral foi realizada em três pacientes; o exame histopatológico mostrou doença desmielinizante aguda ou subaguda. Dois pacientes apresentaram doença evolutiva; a exclusão de outras patologias e a melhora clínica e radiológica após a corticoterapia sugeriram doença inflamatória.

PALAVRAS-CHAVE: encefalomielite, esclerose múltipla, ressonância magnética, doença desmielinizante, lesão pseudo-tumoral.

Demyelinating diseases are characterized by destruction of the myelin sheath in the central and peripheral nervous system[1]. A broad spectrum of clinical manifestations was described associated to these lesions[1-6]. Multiple sclerosis is the prototype of a demyelinating disease of the central nervous

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system (CNS) and is characterized by temporally and geographically distinct lesions affecting the white matter[1]. Other demyelinating diseases include Schilder's diffuse periaxial encephalitis, Balo's concentric sclerosis, disseminated acute encephalitis and necrotizing hemorrhagic encephalitis[4,6-8].

Furthermore there are patients with extensive tumor-like demyelinating lesions that do not fit into the groups listed above[2,9,10]; for these, a cerebral biopsy is necessary for the correct diagnosis of the inflammatory process. In recent years, there has been a growing number of reports of atypical demyelinating lesions simulating brain neoplasms[2,9-15].

The purpose of this paper is to report the clinical and radiological findings in five patients with tumor-like demyelinating lesions seen between 1992 and 1993.

CASE REPORTS

Patient 1. A 32-year-old black woman developed progressive dementia, bilateral visual impairment and right hemiparesis during the last 12 months; on examination there was also optic atrophy. Three years previously she presented an attack of numbness and hypoaesthesia of the right upper limb of 10-month duration and spontaneous regression. Cerebrospinal fluid (CSF) was normal. Computadorized tomography (CT) scan disclosed a low density lesion in the right temporal region involving both cortex and white matter (Fig 1). Corticotherapy was ineffective. One month after, a CT scan showed involvement also of the left temporo-occipital region. Magnetic ressonance imaging (MRI) disclosed large heterogeneously enhancing lesions in the white matter of the temporal and occipital lobes, thalamus, mesencephalon, pons and medulla. These lesions showed low signal intensity on T1-weighted images and high signal intensity on T2-weighted images. Brain biopsy showed chronic lesions with gliosis and foam cells; inflammatory cells were scanty. Her clinical status deteriorated and she died after 30 months of the beginning of the last attack of the illness. Autopsy disclosed extensive lesions in the white

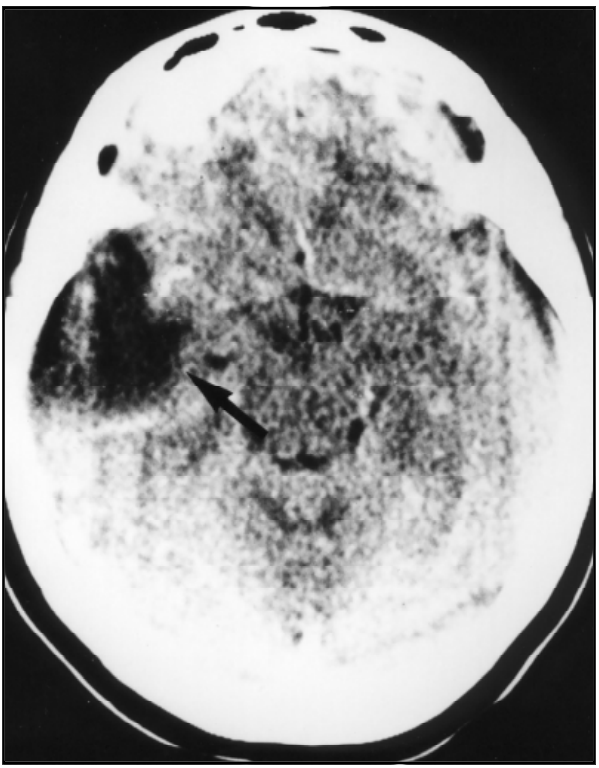

Fig 1. CT scan of Patient 1: low density lesion in the right temporal region.

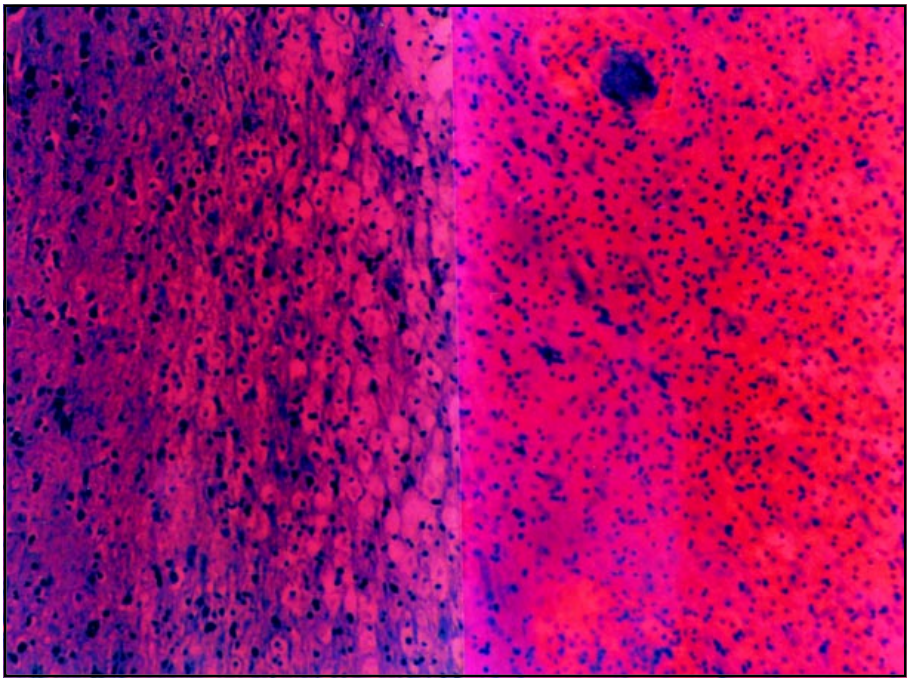

Fig 2. Pathological findings of Patient 1: limits between normal nervous tissue and the demyelinating lesion. Left: white matter rarefaction focally sparing U-fibers (Weil). Right: proliferation of macrophagic cells loaded with fat (R scarlet).

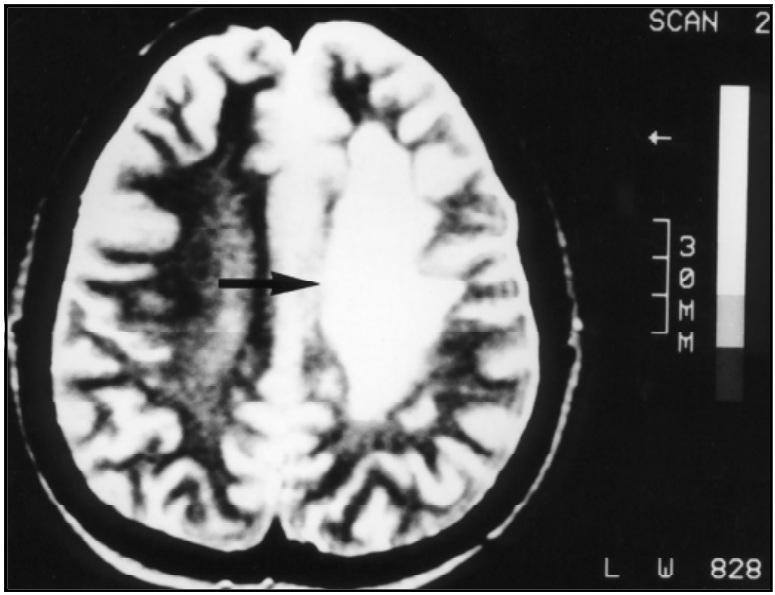

Fig 3. T2-weighted MRI of Patient 3: high signal intensity lesion in left hemisphere.

matter of the cerebral hemispheres, focally sparing U-fibers (Fig 2), and in the brain stem; by light microscopy, these lesions were classified as both acute and chronic.

Patient 2. A 36-year-old white woman presented with confusion and paresthesia in the right upper and lower limbs of 2 months duration followed, after one week, by aphasia and right and left hemiparesis. CSF disclosed high levels of protein (74mg/100ml). CT scan showed a bilateral low sign lesion in the periventricular white matter, with focal enhancement. MRI showed a large irregular and enhancing lesion in the frontoparietal white matter, bilaterally, exhibiting a low signal intensity on T1-weighted images and high signal intensity on T2-weighted images. She recovered almost completely under corticotherapy. No subsequent attacks developed after one year of follow-up.

Patient 3. A 39-year-old white woman developed right facial numbness followed by right hemiparesis and aphasia. CT scan and CSF were initially normal. Two weeks later CT scan showed a low density lesion with enhancement in left basal ganglia and internal capsule. MRI revealed large enhancing bilateral lesions in both hemispheres, mesencephalon, pons, and medulla with a low signal intensity on T1-weighted images and a high signal intensity on T2-weighted images, and edema (Fig 3). Brain biopsy disclosed an active demyelinating lesion with white matter rarefaction, gemistocytic gliosis and mononuclear infiltrate. Under corticotherapy there was partial improvement of aphasia and hemiparesis. MRI performed one year later showed T2 hypersignal in the left pyramidal tract.

Patient 4. A 57-year-old white man presented with right lower limb numbness after three days. He experienced right peripheral facial paralysis 30 years and one year previously. Six years earlier he presented right hemiparesis that improved after corticotherapy. Neurological examination disclosed right hemiparesis and numbness, and bilateral papilledema. Spinal tap yielded a CSF with an initial pressure of 40 cm H_2O. CT scan showed a left parietal low density lesion. By MRI this lesion showed a low signal intensity on T1-weighted images and a high signal intensity on T2-weighted images, and edema; furthermore a similar lesion was seen in the right cerebellar penduncle. Biopsy of the parietal lesion showed an acute demyelinating plaque, with intense reactive gliosis, and macrophagic proliferation with perivascular lymphocytic inflammatory infiltrate. He was treated with corticotherapy and improved partially after one year.

Patient 5. A 49-year-old white woman presented with tetraparesis, hyposthesia in the four limbs and neurogenic bladder of acute installation. Two years before she experienced paresthesias in right upper and lower limbs that improved spontaneously. Cerebral MRI was normal. Cervical spinal cord MRI showed a tumefacted lesion with high signal intensity on T2-weighted images and irregular enhancement after gadolinium (Fig 4).

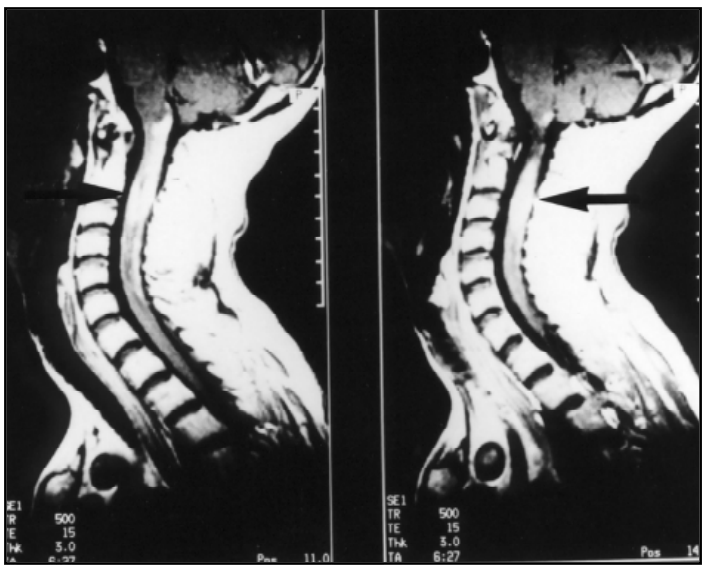

Fig 4. T1-weighted MRI of Ppatient 5: tumefacted lesion in cervical spinal cord with irregular enhancement after gadolinium.

CSF study was not performed. She received corticotherapy; there was a partial improvement. MRI performed one year later showed atrophy of the cervical spinal cord.

None of those five patients referred previous cerebrovascular disease. There was no history of alcoholism, metal or insecticide poisoning.

DISCUSSION

The five patients of this report had atypical clinical and radiological manifestations of a demyelinating process of the CNS; in three of them, clinical and radiological aspects suggested neoplasia; accordingly, cerebral biopsy for diagnostic elucidation was performed. In the remaining two patients, only the clinical and radiological evolution during a year suggested the diagnosis of a demyelinating disease. Over the last years, episodes of atypical demyelination of the white matter with mass effect and enhancement following contrast leading to suspicion of a neoplastic process are being recorded with increasing frequency[12,13,15]. The histopathological diagnosis of these lesions lies between multiple sclerosis and acute disseminated encephalomyelitis[2].

Classical multiple sclerosis may present as either a progressive form with disorders of gait and cerebellar involvement or as a form with remittent attacks[3]. In both forms, several lesions may be detected by MRI and by visual, auditory, and somatosensory evoked potentials. Clinically, four patients of this report manifested an atypical form of multiple sclerosis (dementia, aphasia and intracranial hypertension); the remaining patient presented signs and symptoms of transverse myelitis without involvement of the optic nerves.

Three patients had a previous history of nervous system impairment that, although a useful element for the diagnosis of multiple sclerosis, does not exclude other possibilities; in fact, multiple sclerosis has been reported in association with, among others, primary intracranial neoplasias[16].

In two patients MRI showed diffuse lesions of white matter in both cerebral hemispheres and in brain stem. Furthermore the rapid clinical worsening and the absence of response to corticotherapy, led to the suspicion of a primary neoplasia. Other two patients presented extensive lesions restricted to the cerebral hemispheres and the fifth patient had lesions in the spinal cord initially with increased volume of the cervical segment and, later with atrophy; this spinal cord contraction has been described in the past by myelography and, more recently by MRI [11].

In the larger series of patients with tumor-like demyelination, most of the cases had hemispheric localization and single lesions, without a history of other attacks, in addition to good response to the corticotherapy[2]. Nevertheless, cases with infratentorial impairment, multiple lesions, severe evolution leading to death, and previous attacks, such as the patients of this report, had been described [2,13,15].

The radiological aspect of tumefactive demyelinating lesions is variable: a hypoattenuating lesion on CT scan; hyposignal on images assessed at T1, hypersignal at T2, and enhancing lesions, at times presenting edema, on MRI [2,13,15]. Periventricular disposition is uncommon in these cases [2].

Classification of these five patients is difficult. Autoimmune demyelinating lesions are clinically and radiologically pleomorphic. Acute encephalomyelitis with lesions simulating neoplasia and with progressive worsening have been described [5,8]. Although the patients in this report had no history of recent vaccination, viral infections may have been subclinical.

Atypical forms of demyelination such as those of the patients in this report had been assigned to alteration in immunoregulation; increase of seric levels of TNF (tumoral necrose factor) and adhesion molecules (VCAM-1 and L-selectin) have been detected in the active phase of the disease and this is best seen in patients with evidence of lesion in the hematoencephalic barrier, inferred by enhancement in MRI following contrast administration, as was the case in our patients [17,18].

Hypercellularity, pleomorphic astrocytes, mitoses, areas of necrosis, and cystic degeneration may be erroneously interpreted in the pathological examination as neoplasia; immunohystochemistry

for astrocytic and macrophagic markers, in addition to special colorings for myelin and axon, should be performed to achieve the correct diagnosis.

These cases emphasize the need to include demyelination in the differential diagnosis of tumors of the central nervous system.

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