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Case Report OMICS International

Multiple Sclerosis in West Africa, about a Case Confirmed at Ouagadougou, Burkina Faso

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Abstract

Background: Multiple sclerosis (MS) is a chronic, inflammatory and autoimmune disease of central nervous system. MS affects nearly 2.5 million people in the world and is twice more common in women than men. Autoimmune T-cells target the myelin sheath in central nervous system, causing inflammation, demyelination and eventual destruction of neurons. We examined changing expression of serotonin receptor ($5HT_3R_A$) as well as monoamine oxidase (MAO-A) genes in peripheral blood mononuclear cells in MS patients.

Materials and Methods: In this study, peripheral blood mononuclear cells (PBMC) were first isolated from 30 healthy controls and 30 volunteers with MS using Ficoll-hypaque. Total RNA was extracted and cDNA was synthesized. In this process, mRNA concentration of $5\text{-}HT_3R_A$ and MAO-A as target genes as well as β-actin as reference gene was compared in PBMC of healthy subjects and patients using Real-time PCR.

Results: After statistical analysis of resulting data, a significant increase was observed in the expression of $5\text{-}HT_3R_A$ receptor gene as well as MAO-A gene in PBMC of patients with multiple sclerosis (P=0.001).

Conclusion: According to previous studies on the association between serotonin level with MS importance of $5\text{-}HT_3R_A$ serotonin receptor in the function of this neurotransmitter as well as T-cell activation along with significant increase in the expression of $5\text{-}HT_3R_A$ receptor in MS patients, it can be concluded that overexpression of this receptor has a significant correlation with MS progress. On the other hand, considering the fact that monoamine oxidase is a key enzyme responsible for oxidation of serotonin in the nervous system, perhaps the body is not capable of maintaining normal level of this enzyme in MS patients. Therefore, considerable increase in MAO level may be responsible for reduced level of serotonin in MS patients, which is a likely reason for depression in these patients.

Keywords: Multiple sclerosis; Young people; Burkina Faso

Introduction

Multiple sclerosis (MS) is the main inflammatory demyelinating diseases of the central nervous system. It usually affects young female adults between 20 and 40 years old, during professional activity period. Diagnosis is based on combination of the clinical presentation, the white-matter abnormalities on MRI, the CSF and the evoked potentials, making differential diagnosis of MS. Corticosteroid treatment of MS is intended to prevent relapses and to delay progressive aggravation of the disease. The development of medical technology in low prevalence countries allows us to diagnose more frequently MS where it was classically thought to be absent (Tunisia or Jordan). Through this case report, the authors allowed us to show that MS is a disease present in sub-Saharan Africa.

Case Report

The patient is a 25 year old male Burkinabe student, born in Ivory Coast and resident of Burkina since age 14. He is the last of seven uterine siblings. There was no history of tobacco or alcohol consumption. His past medical history revealed a surgery in 2010 for left inguinal hernia. In 2011, the patient presented a brief episode of motor deficit of the right side of body but since there were no cardiovascular risk factors with normal brain CT-scan and improvement of symptoms under corticosteroids therapy, hypothesis of cerebral vascularitis was retained. On 13th September 2014, the patient was hospitalized for motor deficit of the four limbs developing progressively without fever over three weeks. The medical history found a Lhermitte's sign, a decline in visual acuity of the left eye, a slowing of walk speed, dysarthria and sphincter disorders like urinary urgency. On admission, neurological examination revealed a predominantly proximal spastic tetraparesis with bilateral Babinski sign, cerebellar dysfunction with dysarthria, enlargement of the polygon and kinetic ataxia of upper limbs, impairment of bulbar nerves (IX, X, XII) with swallowing disorders and tongue atrophy. Ophthalmological examination found a decrease in bilateral visual acuity rated 5/10 on left eye and 8/10 on right eye; fundus was normal and there was no visual field abnormality. Elsewhere, the examination was strictly normal, in particular dermatological and locomotor. Lumbar puncture showed a clear cerebrospinal fluid, at normal pressure, increased cell count with 8 cells /ml, proteinorrachia at 0.40 g/l and normal glycorrhachia. Blood tests for infection (Haemogram, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), toxoplasmosis serology, HIV serology) returned negative. Tests for hepatitis B and C were normal. Others tests noted blood creatinine at 72.3 mmol/l, normal serum transaminase (AST 20 U/l), fasting blood glucose at 3.81 mmol/l. Thyroid tests were normal with T4 level at 1.04 and TSH level at 0.9409. Brain MRI revealed on T1-weighted images, aspect of "black holes" of white matter and corpus callosum (Figure 1). On Flair (fluid attenuated inversion recovery) sequences, there were noted hyperintensies scattered in periventricular white matter, in brainstem and in infratentorial compartment (Figure 2). Diffusion-weighted sequences allowed showing evolution of some lesions

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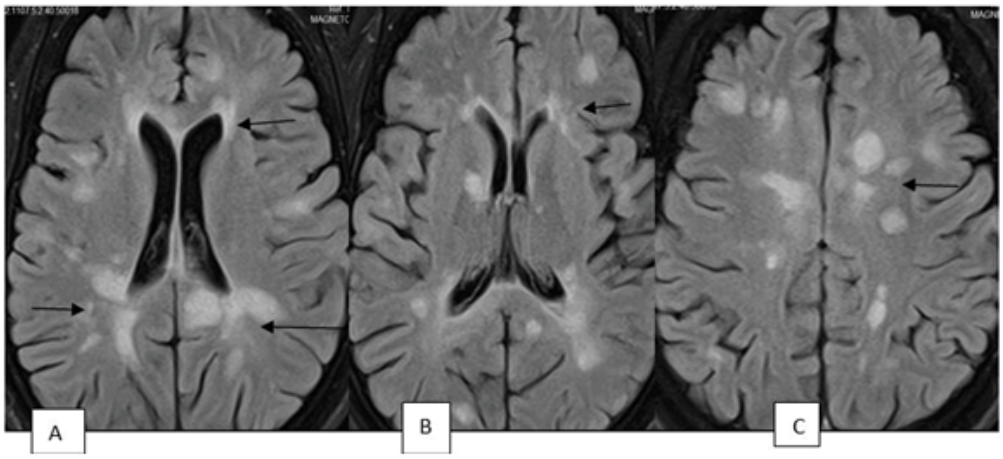

Figure 1: IRM sequence FLAIR. Numerous widely distributed intense periventricular subcortical signals. Leave out the stuff bout perpendiculars.

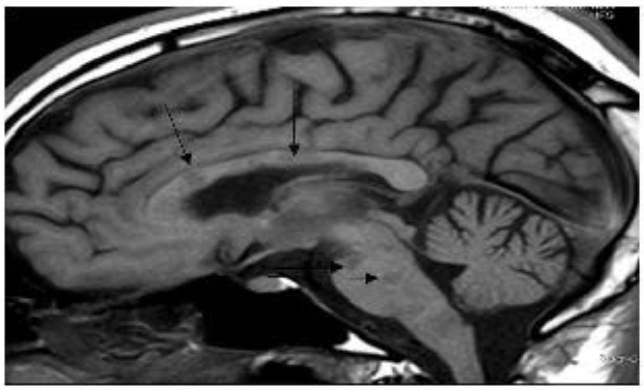

Figure 2: MRI T1-weighted sequence: Black hole in the white matter corpus callosum and pons.

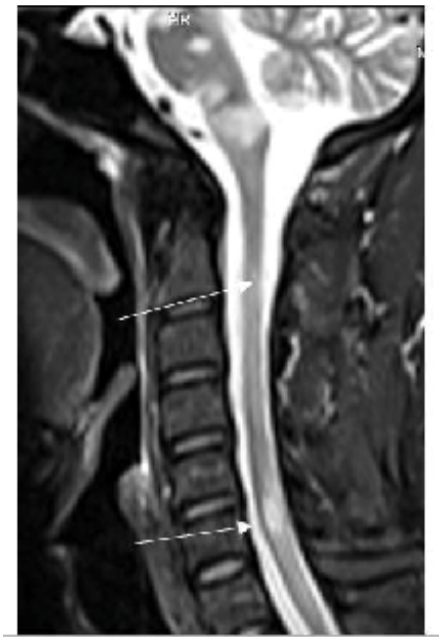

Figure 3: MRI T2-weighted hyperintensities in the cervico-dorsal spine.

(Figure 3). Brain and spine sagittal T2-weighted images demonstrated hyperintensities of dorsal spinal cord corresponding to location of plaques. During hospitalization the clinical course was favorable under injection of Solumedrol® 1 g for 5 days followed by a degressive oral corticosteroid therapy 60 mg/day for 14 days. Three months after hospitalization, the patient had an EDSS score of 5.5. He was then lost of sight of and no MRI control has been possible.

Discussion

Multiple sclerosis is a disease that affects all populations in the world to varying degrees. African migrants living in Europe are affected by the disease [1]. Multiple sclerosis is rare in an African black [2-4]. The first confirmed case of MS in African black was published in 1987 by Bhigjee in South Africa [5]. Since then, several other cases have been published in the literature [6-8]. M'bonda in 1990 in Belgium [9] and recently Diagana in Mauritania in 2005 [10] reported cases of MS confirmed by MRI. We report the first case of MS confirmed at the IRM in Burkina Faso. He was a patient native of West Africa with no history of living in temperate regions (Maghreb, Europe). Epidemiologically, the age of our patient (25 years old) was consistent with the literature data. Indeed, this age is on average around 30 years, with extremes ranging from young adolescent to adulthood [2,11]. Evolution was in favor of remitting form second relapse, after a first episode in 2011. Multiple Sclerosis (MS) is a multifactorial disease, resulting from an interaction between genetics and unknown environmental factors [12-15]. In this case, no environmental or genetic factor permits suspecting MS, as viral infections (EBV...), hygiene ("excessive" hygiene appears to increase the risk), parasites (that protect), tobacco (which increases risk and aggravates pre-existing disease). MS is characterized by its clinical polymorphism. In this case, the thrust consisted of motor deficit [16], sensory deficit as Lhermitte's sign [17], cerebelleux with ataxia [18] and cranial nerve damage [19]. In addition, the existence of retrobulbar optic neuritis was in favor of multiple sclerosis. However, visual evoked potentials, once essential for diagnosis, have lost their value with McDonald's new criteria [20,21]. Clinically, there were no dermatological, rheumatologic signs or any signs in favor of another autoimmune disease (diabetes, lupus, rheumatoid arthritis, Gullian Barre syndrome, etc.). There was no evidence of corticosteroid therapy in the long term. When the diagnosis is suspected, the first investigation that will be requested is magnetic resonance imaging (MRI). It remains the most sensitive test and the more specific, necessary and sufficient in itself to establish the diagnosis in the vast majority of cases [22]. Periventricular areas, optic

nerves and chiasm, hemispheric white matter, corpus callosum (inter-hemispheric white matter), cerebellum, brainstem and spinal cord are the most evocative anatomical sites [20]. Spinal injury is rarely observed in vascular attacks [21]. Our patient received MRI with Flair and T2 sequences and the abnormalities observed were consistent with those described and allowed to be included in MS by the criteria of McDonald 2010 [20,21]. In effect, one observes a spatial dissemination (two symptoms in different clinical regions or localized lesions in strategic MRI areas, i.e., periventricular, juxtacortical infratentorial or spinal) and a temporal dissemination (different lesion ages demonstrated by a contrast enhancement for some and not for others).

Biologically, an increased protein level in CSF was observed but protein electrophoresis and immunofocalisation are not facilities rather than context. In fact, abnormalities in the cerebrospinal fluid are not specific to MS [23,24]. In addition, lumbar puncture does not provide any additional arguments to the diagnosis, does not modify the therapeutic strategy, while it increases the patient's management [22]. In our context, the lumbar puncture was inflammatory and allowed us to eliminate a spastic paraparesia.

For the moment, management is done exclusively with high dose corticosteroid therapy with favorable clinical outcomes. It is used for the treatment of relapses and has no effect on the prevention of flare recurrences or on long-term disability [25]. The use of immuno-modulators and immunosuppressants is inaccessible in Burkina Faso because of its very expensive cost. Evaluation of neuro-imaging was not possible because patient had no financial resources and was lost sight of after three months post hospitalization follow-up. Conventional predictive factors of good prognosis: initial symptoms (sensory disorders, optic neuropathy), young age at onset of the disease, female subject, are present in the medium term (5 years) and lose their significance in the long term.

Conclusion

MS, although rare in West Africa, is evolving from its "myth" status to becoming a reality with the advent of MRI in our medical practice. The discovery of a first case in Burkina Faso may make this region an interesting field for the study of this condition.

Conflict of Interests

The authors declare none.

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