

Devic's Optical Neuromyelitis: a Case Report in Ivory Coast

Yapo-Ehounoud A. C.¹, Jiongo Tiago E. E.², Amon-Tanoh M.³, Tanoh A. C.⁴, Kadjo C. Béné Y. R.⁵,
Aka-Anghui-Diarra E.⁶, Assi B.⁷

^{1,2,3,4,5,6,7}Felix Houphouët Boigny University, Abidjan, Ivory Coast

(¹constanceyapoehounoud@gmail.com, ²jtespoir2000@yahoo.fr, ³muriamon@gmail.com)

Abstract-Devic's neuromyelitis optic is an inflammatory disease of the central nervous system characterized by the combination of episodes of extensive myelitis and optic neuritis. It is an autoimmune disease which has been long time confused with a particular form of multiple sclerosis (MS), which is currently known to be due to the presence of anti-aquaporin-4 autoantibodies (AQP4) called antibodies anti-NMO.

We report the diagnostic difficulties seen in a black female patient presenting a clinical picture of optico-medullary involvement evolving for a decade and meeting the diagnostic criteria of Devic's disease: medullary MRI has confirmed extensive spinal cord injury in more than three segments. The study of CSF showed pleocytosis without oligoclonal band. The anti-NMO- antibodies were positive. With the use of MRI and the dosage of anti-NMO antibodies, Devic's neuromyelitis optica could be diagnosed early. Evolution is often pejorative that can lead to blindness and severe motor sequelae

Keywords- *Devic's Neuromyelitis Optic, Multiple Sclerosis, Anti-NMO, Côte d'Ivoire*

I. INTRODUCTION

Devic's neuromyelitis optic (NMO) was described for the first time by Eugène Devic in 1894, hence the eponymous name of "Devic's disease". It is a demyelinating disease of the central nervous system, of autoimmune inflammatory origin evolving mostly by thrusts interrupted by remissions. It affects electively the optic nerve and the spinal cord and is characterized by lesions induced by specific autoantibodies directed against the nervous structures aroused [4]. Databases on the incidence and prevalence of NMO are insufficiently provided. In the West, the prevalence is estimated between 1 and 4.4 / 100,000 inhabitants [6].

It is currently known that NMO is due to the presence of autoantibodies anti-aquaporin 4 (AQP4) called anti-NMO antibodies in blood and the CerebroSpinal Fluid (CSF) [2]. NMO has longtime been assimilated to an atypical form of multiple sclerosis (MS). However, recent studies have shown epidemiological, immunological, pathological and clinical differences between MS and NMO. The latter is now recognized as a distinct inflammatory disease whose treatment and prognosis differ from multiple sclerosis [2].

There are few documented cases in sub-Saharan Africa, particularly in Côte d'Ivoire where it is often under diagnosed. We report the diagnostic difficulties encountered in a female Ivorian patient with optico-medullary involvement evolving by thrusts for a decade.

II. OBSERVATION

A 24-year-old woman reported that at the age of 12 she had presented a first neurological episode with a decrease in monocular visual acuity and left hemiplegia in a few weeks. She has not been explored and the signs spontaneously regressed over 3 months without sequelae. This patient has a history of pulmonary tuberculosis treated and declared cured in 2012.

Nine years later, a new episode of decreased binocular visual acuity occurred. This time, it was associated with paraparesis and urinary retention of subacute installation. This new episode was also not documented. There was a spontaneous regression with motor sequelae (paraparesis) and left monocular (decreased visual acuity)

In May 2015, she consulted in our neurology department for a third episode of decreased binocular visual acuity, accompanied by asymmetric spastic tetraparesis evolving for five months. Muscle strength (FM) according to the MRC (Medical Research Council) was rated at 4/5 for the upper limbs and 1 + / 5 for the lower limbs. An exploration was then started. Thoracic magnetic resonance imaging (MRI) revealed a discretely enlarged medullary cord with a T2 and STIR hypersignal from T6 to T10, an intramedullary T1 hyposignal from T6 to T10 (Figure 1). Cervical MRI also showed demyelination of the white matter (medullary cord discretely enlarged, multiple hypersignal T2 and STIR) suggesting a myelopathy (Figure 2). Otherwise, cerebral MRI was unusual. The ophthalmological examination revealed an optic atrophy of the left eye. Cerebrospinal fluid (CSF) analysis revealed pleocytosis with 37 cells at 97% lymphocyte and a discrete hyperprotéinorachie (0.61 g / l), without an oligoclonal band. Treponemal serology and PCR BK were negative. HIV serology, pulmonary x-rays, tuberculin IDR (Intradermo reaction), and the search for BAAR (Bacillus acido-alcoholo Resistant) in sputum did not reveal abnormalities. The search for a mitochondrial mutation for a hereditary optic neuropathy of the Leber type, thus an etiological assessment of systemic

inflammatory disease such as desquered lupus erythematosus and the determination of anti-NMO antibodies could not be achieved at this time due to lack of financial means. In view of the available results, extensive transverse inflammatory myelitis was evoked (optic neuromyelitis or multiple sclerosis). Corticosteroid therapy was undertaken. After a bolus of corticosteroid (methylprednisolone 1 g in IV for three days) and relayed per os by 1 mg / kg / d prednisone, there was incomplete functional recovery (MS= 5/5 and 4 +/- 5 to Upper left and right limbs, MS = 4/5 to lower limbs, improvement in visual acuity to the right eye) .Three months later, she presented a fourth thrust with a decrease in visual acuity of the right eye and blindness of the left eye. At the same time, it was noted the worsening of sequellar tetraparesis (FM = 4 +/- 5 in the upper limbs and 3 +/- 5 in the lower limbs). Ophthalmologic examination revealed blindness and optic atrophy of the left eye and a decreasing of visual acuity of the right eye compatible with retrobulbar neuritis. During this last thrust, the positive dosage of the anti-NMO antibodies consolidated the diagnosis of Devic's Disease. After 5 days of corticosteroid bolus (methylprednisolone 1 g in IV), the evolution was marked by a slight recovery of the visual acuity of the right eye and a sequellar paraparesis (MS= 4 +/- 5). The oral relay was done with 1mg /kg / d of prednisone. We observed a normalization of the visual acuity of the right eye (AV = 10/10) after one month of corticosteroid therapy. However, at the end of October, the patient consults for a 5th thrust type of paraplegia occurred rapidly and progressively. New explorations carried out have made it possible to demonstrate secondary cortico-induced diabetes. The MRI performed again revealed a brain extension of the lesions (Figure 3), with a hypersignal in FLAIR peduncular bilateral and under ependymal. On the medullary plane, an extension of the lesions with an EST2 hypersignal from C3 to T11 was objectified. A new therapeutic orientation was taken. A treatment with azathioprine (100 mg daily) associated with methylprednisolone has been initiated and is ongoing.

III. DISCUSSION

NMO or Devic's disease is a rare autoimmune demyelinating inflammatory disease of the central nervous system which is accompanied by necrosis and axonal loss of the spinal cord and optic nerve. It affects women more often, begins in adulthood, sometimes in adolescence, with a peak incidence at the end of the third decade. Our patient, like the cases reported most often in the literature, presented the socio-demographic characteristics usually described [9]. NMO may occasionally be associated with other autoimmune pathologies including Sjogren's syndrome, systemic lupus erythematosus and Hashimoto's thyroiditis. The disease is clinically characterized by one or more episodes of optic neuritis and myelitis that is also reported in our observation. It evolves either in a monophasic form (delay between optic neuritis and myelitis less than one month) or in a relapsed form. [9]

Over some 15 years, the concept of NMO has evolved considerably. The presentation initially described was that of a monophasic form associating bilateral blindness and tetraplegia. If these forms still exist, they remain exceptional

today. The clinical and morphological explorations carried out in our observation made it possible to demonstrate a transverse extensive myelitis extensive longitudinal cervical and thoracic in our patient. This type of myelitis can occur in autoimmune, inflammatory and infectious diseases of the central nervous system, especially in association with HIV infection. But HIV serology in our observation was negative, which limited our field of investigation to inflammatory diseases. Associations between pulmonary tuberculosis (NMO) and pulmonary tuberculosis have been suggested and discussed by many reports and case series [3, 5]. *M. tuberculosis* is a rare cause of transverse myelitis. In more than 80% of patients, myelitis tuberculosis affects more than one metamer. Cervical and thoracic regions are most often affected [3, 5]. Given the history of tuberculosis, poor documentation of cases of myelitis due to autoimmune and inflammatory diseases in Cote d'Ivoire and especially in the service, myelitis tuberculosis was mentioned at first sight. The tests carried out made it possible to rule out the hypothesis of tuberculosis, although an association NMO-tuberculosis may exist [3, 5], as envisaged by *Rui li and al* in their work by showing clinical similarities between the two pathologies. In spite of the long duration of progression and the wandering diagnosis, the similarity of the clinical picture with certain tropical diseases like tuberculosis, frequent in our working context, in spite of the financial difficulties, we succeeded, after a long journey of radiological and biological investigations, to the diagnosis of Devic's neuromyelitis optic by the positive dosage of anti-NMO antibodies [1].

From a diagnostic point of view, *Wingerchuk and al* proposed first criteria in 1999 [10]. These included:

-**Three absolute criteria** (myelitis optic neuritis, and absence of involvement outside the optic nerve and the spinal cord),

- **And at least one of the three major criteria** (normal cerebral MRI at the onset, myelitis extended in more than three spinal MRI areas, and pleiocytosis with white blood cells greater than 50 / mm³ or more than 5 neutrophils / mm³ on cerebrospinal fluid analysis.

-**Or two of the three minor criteria** (bilateral optic neuritis, severe optic neuritis with visual acuity less than 20/200 fixed on at least one eye, severe motor deficit).

A major turning point was observed with the discovery of a very specific antibody of the disease (called anti-NMO antibody or anti-aquaporin 4), directed against aquaporin 4 (AQP4), predominant water channel in certain zones of the central nervous system (CNS) and in particular the astrocytic feet near the marrow and the optic nerves [10]. This discovery led to the revision of the *Wingerchuk* criteria in 2006 [10]. They therefore require the compulsory presence of the two major criteria (optic neuritis and acute myelitis) and at least two of the following three criteria:

1. Contiguous medullary lesion spread over 3 or more vertebral segments at MRI
2. Cerebral MRI not filling diagnostic criteria for MS
3. Presence of antibodies Ig G-NMO in the serum.

Our female patient fulfilling these criteria, the diagnosis of Devic disease could be retained. Recent studies have also shown that the NMO tropism may exceed the marrow and the optic nerves with the possible existence of peri-acqueructal, periventricular or, more rarely, acute disseminated encephalomyelitis lesions, as well as frequent cognitive disorders [10].

Thus, the "NMO spectrum" has recently expanded and enriched. The new nomenclature uses the unifying term of "spectrum of optical neuromyelitis ", which is stratified beyond the serological tests (NMO with or without anti-AQP4 antibodies) [8]. The main clinical features necessary for patients with NMO with presence of anti-AQP4 antibodies include clinical syndromes or MRI results related to brain, medullary or optic nerve damage [8]. With a brain extension of the lesions, our case agrees with the characteristics of the "spectrum of optical neuromyelitis" [8].

As for the therapeutic management, there is currently no consensus on the treatment to be implemented in the NMO. NMO thrusts are usually treated with bolus of glucocorticoids and / or by plasma exchange [12]. For background treatment, it is often considered immunosuppression with azathioprine, mycophenolatemofetil, cyclophosphamide, mitoxantrone, and rarely methotrexate. More recently, rituximab, tocilizumab and eculizumab are used [12].

Currently, some studies have shown that glatiramer acetate and interferon beta used in multiple sclerosis are ineffective in NMO [7].

Given the limited technical range, our management was initially summarized in the administration of corticosteroids type prednisone intravenously. The evolution of our female patient under corticosteroid therapy was made towards a partial recovery of its motor and visual functions. But secondly, in the face of the increasingly close of frequency, we currently associated an immunosuppressant, such as azathioprine, because of 3mg / kg / day under the bimonthly monitoring of the blood count (NFS) and transaminases; treatment is otherwise well tolerated by the patient up to now. The prognosis remains nevertheless pejorative in the developing countries, which do not have access to all new therapeutics tested in this disease.

IV. CONCLUSION

This observation of recurrent optic and medullary syndrome in a young black woman, adequately illustrates the recent diagnostic criteria of the NMO. It highlights the preponderant presence of anti-NMO antibodies, but also the diagnostic difficulties observed in tropical environment. Devic's neuromyelitis optic evolves through thrusts of optic neuritis and transverse myelitis, interspersed with remissions generally incomplete. With the use of MRI and the dosage of anti-NMO antibodies, it could be diagnosed early. The evolution is often pejorative, leading to blindness and severe motor sequelae.

LIST OF ABBREVIATIONS

- Ac-Ab: Antibodies
- AQP4: anti-aquaporin antibody
- BAAR: bacillus acidoalcoholo resistant
- BK: bacillus of Koch
- MS: muscular force
- IDR: intradermal reaction
- MRI: magnetic resonance imaging,
- CSF: cerebrospinal fluid
- MRC: medical research council
- NMO: neuromyelitis optic
- PCR-BK: polymerase chain reaction for mycobacterium tuberculosis
- MS: multiple sclerosis
- HIV: Human immunodeficiency virus.



Figure 1. Sagittal section MRI thoracic weighting T2 (May 2015)



Figure 2. Sagittal section MRI cervical weighting T2 (May 2015)

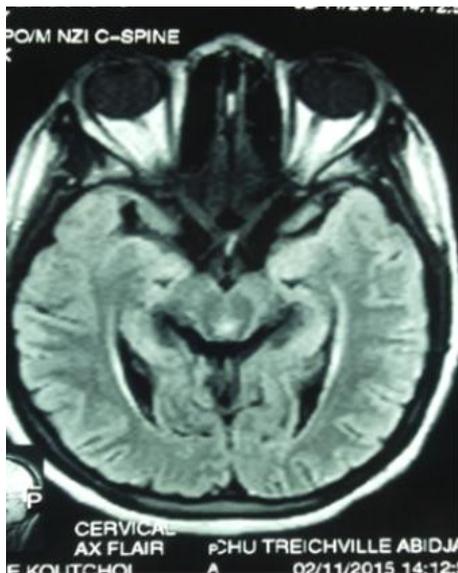


Figure 3. Axial section MRI Cranio-encephalic sequence FLAIR (November 2015)

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