Cerebellar and Polysymptomatic Onset as Long Term Disability Factors in Mexican Multiple Sclerosis Patients

Ricardo Jorge García-Bermúdez, Alejandra Calderón-Vallejo, Raúl Carrera-Pineda and Brenda Bertado-Cortés*

Department of Neurology, Mexican Social Security Institute, Mexico City, Mexico

*Corresponding Author: Brenda Bertado-Cortés, Department of Neurology, Mexican Social Security Institute, Mexico City, Mexico.

Abstract

Introduction: Multiple sclerosis is one of the main causes of disability in young people. Multiple factors have been related with poor prognosis, including onset relapse. In Mexican population there are no studies about onset relapse and prognosis in multiple sclerosis.

Materials and Methods: We analyzed demographic and clinical characteristics of patients with multiple sclerosis diagnosis during hospitalization between January 2017 to December 2019, at Specialities Hospital of "Siglo XXI" National Medical Center, in Mexico city, Mexico, with a six months follow up and disability evaluation by EDSS. We performed chi squared of relapse onsets and smoking and the risk of developing an EDSS of 2.5 or higher (median EDSS of our population).

Results and Discussion: 75 patients were diagnosed with multiple sclerosis, but only 73 completed the six months follow up. By six months follow up, the RR for EDSS of 2.5 or higher in patients with cerebellar onset was 1.01 (p = 0.687) and for polysymptomatic onset 0.29 (p = 0.141). Motor onset had a RR of 2.46 (p = 0.027) and smoking patients had a RR of 2.89 (p = 0.007). Unlike other studies, in Mexican populations with multiple sclerosis cerebellar and polysymptomatic onset are not risk factors for a greater disability while motor onset and smoking have a similar risk with other populations.

Conclusion: Cerebellar and polysymptomatic onset are not risk factors for long term disability in our population, while motor onset and smoking are risk factors.

***Keywords:** Multiple Sclerosis; Cerebellar Onset; Polysymptomatic Onset; Smoking; Disability; Prognosis*

Abbreviations

MS: Multiple Sclerosis; MRI: Magnetic Resonance Image; CO: Cerebellar Onset; PO: Polysymptomatic Onset; EDSS: Expanded Disability Status Scale; MO: Motor Onset; SO: Sensitive Onset; BO: Braisteam Onset; ONO: Optic Neuritis Onset (ONO); SCO: Spinal Cord Onset; SPSS: Statistical Package for the Social Sciences; SD: Standard Deviation; RR: Relative Risk

Introduction

Multiple sclerosis (MS) is a chronic autoimmune demyelinating disorder which is one of the principal causes of disability in young people [1,2]. There are around 2,221,188 people with MS worldwide, with a prevalence of 30.1 cases per 100, 000 population; however, there is a wide range of prevalence of cases per 100, 000 population around the world, with the highest in North America with 164.6, and the lowest in Oceania around 2 [3]. The mean age of onset is at 30 years (20 - 40 years), with a sex ratio of 2:1 in favour of women [3,4].

Mexico's epidemiology is almost the same as worldwide, with a MS prevalence of 18 cases per 100, 000 population, a mean age of onset at 32 years and a sex ratio of 1.8:1 in favour of women [5,6].

Multiple factors have been associated with a poor prognosis and higher disability in MS. There are demographic and environmental factors (e.g. male sex, age, smoking), clinical factors (e.g. short relapse rate, polysymptomatic onset, early cognitive involvement), magnetic resonance image (MRI) features (e.g. high number of T2 lessons, gadolinium enhancing lessons), and biomarkers (e.g. oligoclonal bands, neurofilaments) [7]. Within clinical factors, relapses are a great predictor of disability, but there is not only important the number of relapses, but also onset relapse [7,8].

Patients with motor, brain stem, cerebellar (CO), spinal cord and polysymptomatic onset (PO) have a great possibility to reach a high disability sooner compared to sensitive and optic neuritis onset, which have a better prognosis [9-14].

In our country, there aren't studies about PO or CO in multiple sclerosis; even in Latin America, there aren't studies with one of them as a main objective. A Brazilian study shows that PO has a hazard ratio of 2.8 (95% CI 1.39 - 5.6) and p value 0.004 for reaching an expanded disability status scale (EDSS) of 6 or greater earlier; while a North-American study shows greater probability for reaching an EDSS of 6 or greater in the first 5 years of MS onset (p value 0.049) [15,16]. So it is important to identify if our population has the same risk factor for poor prognosis with PO or CO.

Materials and Methods

We performed a prospective cohort study at the Neurology service of Specialties Hospital of Siglo XXI National Medical Center of Mexican Social Security Institute, in Mexico city, Mexico. All patients whom MS diagnosis by 2017 McDonald diagnosis criteria were made during hospitalization between January 2017 and December 2019 were included. All patients were classified in base of onset relapse in one of the following groups: motor (MO), sensitive (SO), cerebellar, braisteam (BO), optic neuritis (ONO), spinal cord (SCO) and polysymptomatic onset. Demographic characteristics (gender, age, smoking, MS familiar history) were obtained from medical records. Disability was evaluated by EDSS, which was performed by diagnosis and after six months of follow up, dividing patients in two groups: EDSS from 0 - 2 and 2.5 or higher. These EDSS groups were created because the median EDSS of all our patients was 2. Patients who don't meet this time of follow up were excluded. The outcome measure was EDSS change from baseline to six months after diagnosis in patients with CO and PO.

Quantitative variables were expressed as means and standard deviations (SD); qualitative variables were expressed as frequencies and percentages. Pearson's chi-square test and Fisher's exact test were performed to test if CO or PO could influence long term disability, as well as smoking. p values less than 0.05 were considered as significant.

The Statistical Package for the Social Sciences (SPSS), version 24 for Windows was used.

Results and Discussion

From 75 patients with MS diagnosis between January 2017 and December 2019, only 73 completed the six months follow up. 37 (50.7%) patients were women and 36 (49.3%) were men. Mean age at MS diagnosis was 33 years (SD 11.6) and only 1 (1.36%) patient has MS familiar history. Smoking was found in 22 (30.1%) patients. Demographic characteristics are shown in table 1.

Characteristic	Value
Men n (%)	36 (49.3)
Women n (%)	37 (50.7)
Age* (SD)	33 (11.6)
Smokers n (%)	22 (30.1)
MS familiar history n (%)	1 (1.36)
MS Onset n (%)	
Motor	15 (20.5)
Sensitive	13 (17.8)
Optic neuritis	11 (15.1)
Spinal cord	9 (12.3)
Brainstem	9 (12.3)
Cerebellar	4 (5.5)
Polysymptomatic	12 (16.4)

***Table 1:** Baseline patients characteristics.*
*Media. MS: Multiple Sclerosis; SD: Standard Deviation.

MO was the most common onset relapse in 15 (20.5%) patients, followed by SO in 13 (17.8%), PO in 12 (16.4%), ONO in 11 (15.1%), SCO and BO in 9 (12.3%) each one, and CO in 4 (5.5%). By six months follow up (Table 2), the relative risk (RR) for EDSS of 2.5 or higher in patients with CO was 1.01 (p = 0.687), MO 2.46 (p = 0.027), SO 0.92 (p = 0.597), ONO 0.33 (p = 0.182), BO 0.88 (p = 0.611), SCO 1.42 (p = 0.389) and for PO 0.29 (p = 0.141). Instead, smoking patients had a RR of 2.89 (p = 0.007).

Onset relapse	RR	95% CI	p value
Cerebellar	1.01	0.17 - 5.82	0.687
Polysymptomatic	0.29	0.04 - 2.03	0.141
Motor	2.46	1.15 - 5.25	0.027
Sensitive	0.92	0.31 - 2.73	0.597
Optic neuritis	0.33	0.04 - 2.24	0.182
Brainstem	0.88	0.24 - 3.24	0.611
Spinal cord	1.42	0.51 - 3.96	0.389
Smoking	2.89	1.32 - 6.34	0.007

Table 2: *Relative risks with their corresponding 95% confidence interval and p value of onset*
relapses and smoking of reaching EDSS of 2.5 or higher by six months follow up.
RR: Relative Risk; CI: Confidence Interval.

The results of this Mexican study show that gender ratio female:male is 1.02:1, something different to all studies, in which gender ratio has been increasing over years as MS incidence in women increases, even greater than 2:1 [17]. Also, age at diagnosis in our patients is older than in other populations and there is fewer MS familiar history [18,19]. Another relevant result is the lower incidence of smokers compared with worldwide reports [20]. These data could be secondary to an emergency tertiary-care center attention like in our hospital.

The most important results of this study is that CO and PO are not risk factors for long term disability; however, MO and smoking are, as reported worldwide [21,22]. Furthermore, ONO and SO reported in other populations as good outcome factors [23,24], in our study they don't have an impact in long term disability. What is more, SCO and BO neither are long term disability risk factors, while in all populations reported they are [11,14].

Conclusion

In conclusion, from all relapse onsets evaluated, only MO is a long term disability factor, as well as smoking, which means that our population could have a great possibility to have a good outcome with other types of relapses.

Despite our results show controversial information compared with other studies, number of patients is lower and follow up time is shorter than these studies, so that this cohort of patients will be followed up for a longer time, as well as more patients with new MS diagnosis will be added in order to identify any modification in actual results that makes our population more similar to MS patients from other countries.

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Conflicts of Interest

The authors declare that there is no conflict of interest.

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