LACTRIMS 2018

10—Obstetric outcomes in a Mexican cohort of patients with AQP4-antibody-seropositive neuromyelitis optica

Theme: Epidemiology
Theme 2: Clinical Research

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Background: Previous studies have investigated the influence of neuromyelitis optica (NMO) on pregnancy in other ethnic groups. However, there are potential variations among ethnic groups. The obstetric outcome of Mexican and Latin American patients with NMO and AQP4-IgG positivity (AQP4-IgG(+)) is currently unknown.
Objectives: To describe the obstetric history of Mexican patients with NMO and AQP4-IgG(+).
Methods: Patients with NMO and AQP4-IgG(+) were identified from the database of the Demyelinating Diseases Clinic. These patients were interviewed by telephone.
Results: Out of a total of 40 eligible patients, 29 (72.5%) were contacted and completed the survey. Of these, 19 (65.5%) patients reported at least one previous pregnancy. Their mean age was 45.8 ± 10.5 years. They presented their first clinical manifestation at 37.7 ± 9.3 years ($n = 18$). Mean age at diagnosis was 39 ± 9.2 years ($n = 17$). The median number of pregnancies was 2 (range: 1–6, interquartile range (IQR): 1–3.75). In total, 50 pregnancies were reported: 44 (88%) of them occurred ≥3 years before the first clinical manifestation, 1 occurred ≥1 year before, and 1 occurred after the first manifestation. The temporality of the rest is unknown. Of all pregnancies, 12 (24%) were pregnancy losses: 5 (10%) were classified as miscarriages and 3 as stillbirths. The temporality of the rest is unknown. Of all pregnancy losses, 10 (83%) occurred ≥3 years before the diagnosis and 1 occurred after the first manifestation. The temporality of the remaining loss is unknown. All pregnancy losses occurred in eight patients (Table 1). Only one patient reported a history of pre-eclampsia, and it occurred ≥3 years before the first manifestation of NMO.
Conclusion: Close to half of the patients with previous pregnancies reported at least one pregnancy loss, most of these occurred ≥3 years before the diagnosis. This percentage is higher than expected for their age group in our country.

17—Prevalence of depression in multiple sclerosis

Theme: Epidemiology
Theme 2: Quality of life

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Background: Multiple sclerosis (MS), a demyelinating disease of the central nervous system, with regard to its chronicity has been associated with other comorbidities, among which we can mention mood disorders such as depression, which according to literature is the most frequent emotional disorder associated with the disease.
Objectives: To describe the prevalence of depression in the population of patients of the Demyelinating Diseases Unit of the Social Welfare Institute, to characterize them by age, degree of depression, sex, duration of the illness, and scale of disability.
Methods: Observational, descriptive, cross-sectional study carried out during the months of January to July 2017. The instrument used was the self-implementation questionnaire, in its Spanish version, Patient Health Questionnaire (PHQ-9), which consists of nine items that evaluate the presence of depressive symptoms (corresponding to the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; DSM-IV) criteria) present in the last 2 weeks.
Results: A total of 112 patients were included, of which 79.46% (89) were of female sex, 52.95% of the patients were between 20 and 39 years old, and the mean time of diagnosis was 61.98 months; when analyzing by sex, it was observed that women had a diagnosis of depression of 61.8% and men 43.5%; when analyzing both populations, 41.96% of the patients presented mild depression, 33.8% moderate depression, 13.85% moderate to severe, and 8.8% severe. In the chi-square analysis between depression and disability scale, no differences were observed ($p = 0.315$).
Conclusion: A large percentage of patients with MS in this population present depressive features concomitant to their pathology, in their greatest frequency of a mild to moderate degree. In this case, no relationship was found between the degree of depression and high scores on the disability scale.

18—Clinical and epidemiological characterization of multiple sclerosis in the metropolitan area of Aburrá Valley, Antioquia, Colombia: 2010–2016

Theme: Epidemiology
Theme 2: Clinical Research

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Background: Multiple sclerosis (MS) is a demyelinating, neurodegenerative disease with diverse characteristics in its presentation and evolution. The lack of studies that account for the clinical characteristics of MS presentation in Colombia, the disease progression, and the lack of epidemiological information was the impetus behind this study.
Objectives: Our goal is to characterize clinically and socio-demographically the population of patients with MS in the Aburrá Valley.
Methods: This is a retrospective descriptive study that aims to characterize patients diagnosed with MS (code G35X) in the metropolitan area of Aburrá Valley, Antioquia, Colombia. The capture-recapture method was implemented, utilizing the Individual Health Service Delivery Registries (RIPS) and other sources, such as patient foundations dealing with MS and health institutions that directly consult with patients affected by MS.
Results: The information obtained thus far shows a total of 880 patients registered with the G35X code, of which 74.9% are women and 25.1% are men. The most affected age groups are adults aged 40–59 years (47%), followed by patients aged 20–39 years (31.8%). In a first approach to the clinical characterization of 54 patients analyzed so far, a total of 145 different symptoms were found in clinical consultations. The most frequent symptoms were headache, fever, abdominal pain, paresis, nausea, fatigue, and paresthesias. In terms of motor-type symptoms, 65% of patients presented with lower limb involvement and 41.3% with some form of compromise to lower extremity sensation.
Conclusion: The data obtained so far have been taken from RIPS database, which required clinical validation through patient histories, accounting for the current, varying clinical expression of MS in the Aburra Valley. The clinical findings show a diverse pathology that can present useful patterns in the diagnosis and follow-up of the pathology and that requires a systematic analysis of the findings of the Aburrá Valley population.

36—Prevalence of fatigue in patients with multiple sclerosis of Quito city and its effect on the quality of life

Theme: Epidemiology
Theme 2: Quality of life

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Background: Fatigue is a common yet complex symptom present in multiple sclerosis (MS). It has been reported in 90% of patients with MS. However, studies on the prevalence of fatigue in Ecuador are still unknown.
Objectives: To report the prevalence of fatigue in patients with MS of Quito city and to establish its effect on the quality of life (QOL).
Methods: Between January and April 2018, we performed a prospective and observational study of patients with MS who were admitted in the Department of Neurology at Carlos Andrade Marín and Eugenio hospitals of Quito. Only patients who met McDonald's 2010 criteria were included. Disease severity was evaluated using the Kurtzke's Expanded Disability Status Scale (EDSS). Fatigue was assessed using Modified Fatigue Impact Scale (MFIS). QOL was assessed by Multiple Sclerosis Quality of Life-54 (MSQOL-54). All quantitative measures were treated with parametric statistical analysis such as Student's *t*-test.
Results: The mean age of the patients was 40.3 (SD, ±12.45) years. The mean duration of illness was 8.5 (SD, ±6.8) years. Seventy percent of patients were female, and the female-to-male ratio was 2.3:1. The mean EDSS score was 2.9 (SD, ±1.9). The prevalence of fatigue in MS patients was 46% (46/100). Patients with MS and fatigue were significantly more impaired ($p < 0.05$). Thus, these patients, whose fatigue affected them both physically and psychologically, had a lower QOL than patients without fatigue.
Conclusion: In this study, the prevalence of fatigue was found to be high in patients with MS. However, it is lower in comparison to other reports. All areas of QOL were significantly more impaired in the group with fatigue than in those without fatigue.

44—Characterization of patients with multiple sclerosis in Colombia: Data from the daily clinical practice

Theme: Epidemiology
Theme 2: Quality of life

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Background: Multiple sclerosis (MS) is an inflammatory neurodegenerative disease that affects the population of productive age. It has multiple clinical manifestations, which generate progressive disability affecting social, family, and work life.
Objectives: To describe demographic and clinical characteristics of a cohort of patients with MS.
Methods: Description of a cohort of patients with MS in a specialized center in Colombia with follow-up from July 2012 to March 2018. Demographic and clinical variables are described. Categorical variables for descriptive analysis are

presented as absolute and relative frequencies and the continuous ones as median and interquartile ranges (IQR) or mean and standard deviation (SD).
Results: Of the 393 patients, 74.3% (292) were women with a median age of 44 years (IQR, 35–54 years). More than half, 51.9% (204) had couple and 44.1% (173) had higher education studies. Of the total of patients, 3.6% had first-grade familial history of MS. The most frequent comorbidities were high blood pressure (13.9%) and hypothyroidism (11.2%). Of 212 patients, 28% started with optic neuritis, and 22% with motor-sensory compromise. The median age at diagnosis was 34.5 years (IQR, 27–44 years), and the median time to disease progression was 7.6 years (IQR, 3.79–13.3 years). Of the patients, 37.2% (146) had disease progression greater than 10 years and 4.6% (18) had 1-year progression or less. Relapsing-remitting phenotype was found in 82.7% of the patients, 12.2% (48) had secondary progressive phenotype, and 2.5% (10) had primary progressive one. Of the total number of patients, 83.2% received some immunomodulatory drug, of those, 51% (165) with low-moderate effectiveness and 48.5% (156) high effectiveness; and 16.8% did not receive treatment. According to the Expanded Disability Status Scale (EDSS), the median income to the cohort was 2.27 (SD, 2.63), the final median was 2.58 (SD, 2.81), and average difference was –0.31 (95% CI, –0.13 to –0.48; $p = 0.001$).
Conclusion: A cohort of MS patients with 6 years of follow-up was characterized and observed for clinical stability evidenced by EDSS results, considering the natural history of the disease.

52—Prevalence of anxiety in multiple sclerosis

Theme: Epidemiology
Theme 2: Quality of life

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Background: Anxiety is a situation frequently related to multiple sclerosis; however, as far as we know, there are no reports of it in our population.
Objectives: To describe the prevalence of anxiety in the population of patients with multiple sclerosis of the demyelinating diseases unit of the Social Welfare Institute and to characterize them by age, sex, duration of the disease, and scale of disability.
Methods: Observational, descriptive study, transverse section, performed during the months of January to July 2017. The instrument used was the Hamilton Test in its latest version which consists of 14 items subdivided into psychic and somatic symptoms; for the analysis only the questions related to the psychic aspect were taken into account since the questions addressed within somatic symptoms can be confused with symptoms typical of the illness.
Results: A total of 112 patients were included, of which 79.46% (89) were of the female sex, 52.95% of the patients were between 20 and 39 years old, and the mean time of diagnosis was 61.98 months. Overall, 73.21% of patients present anxiety traits, and it is observed that the highest percentage of anxious traits is observed between the ages of 30 and 34 years. In the chi-square analysis, it was found that the lower the degree on disability scale, the higher the frequency of anxiety.
Conclusion: Anxiety traits occur frequently in this population and are in an inverse relationship with the degree of disability of the patient.

76—Dengue and multiple sclerosis

Theme: Epidemiology
Theme 2: Clinical Research

Sidney Gomes and Eliani de Lima Villas Gomes
Center of Neurology

Background: Dengue is the most common human arboviral infection with more than 50 million cases a year and 2 billion people at risk of contamination (World Health Organization (WHO)). The infection has classically as dengue fever severe self-limiting. In Asia, child's disease prevalence and characteristics of increased vascular permeability, plasma leakage, and bleeding manifestations of thrombocytopenia. Symptoms of dengue depend on the clinical presentation ranging from headaches to severe neurological complications. The classic dengue has the following symptoms: headache, fever, severe myalgia, joint pain, and hemorrhagic manifestations. The myalgia in dengue is due to the presence of perivascular mononuclear infiltration and fat accumulation. Neurologic complications of dengue can be explained by events such as cerebral edema, cerebral hemorrhage, plasma sodium drop, and release of toxic products. The infection of the nervous system by dengue requires the knowledge of the three situations and systemic viral infection: theory of sequential infection, hyperendemicity theory, and occurrence of gene combination. The pathogenesis of neurological manifestations results from immune complex deposition than the direct involvement of the virus in the brain.
Objectives: The objective of this work is to ascertain complications of dengue infection or worsening of the disease multiple sclerosis.
Methods: We report five cases of behavior of patients with multiple sclerosis in use of fingolimod or natalizumab who contracted dengue.
Results: There were no complications of dengue infection or worsening of the disease multiple sclerosis in this association of pathologies.
Conclusion: There was a need to suspend the medication of multiple sclerosis because of a severe lymphopenia in the presence of dengue.

78—Multiple sclerosis and extreme age

Theme: Epidemiology
Theme 2: Clinical Research

Sidney Gomes, Eliani de Lima Villas Gomes and Nelson Rafael Gomes
Center of Neurology

Background: Multiple sclerosis is an inflammatory and demyelinating disorder of the central nervous system that primarily affects young adults.
Objectives: To describe the patient's clinical picture of 67-year-old Brazilian, White, evolving for over 3 years with gear change.
Methods: To describe the patient's clinical picture of 67-year-old Brazilian, White, evolving for over 3 years with gear change.
Results: Multiple sclerosis is a slowly progressive disease characterized by spasticity and ataxia. LCR hiperproteinoraquia with the presence of oligoclonal bands, potential study evoked with demyelinating lesions and resonance skull with hyperintense lesions on T2-DP-Flair involving bilateral periventriular substance and corpus callosum demyelinating feature. column resonance with spinal cord injuries demyelinating substrate C2-D10.
Conclusions: Age is no longer a defining factor for understanding the involvement of multiple sclerosis, as the investigative armamentarium has increasingly found more patients over the age of 40/50 years with a primary diagnosis of the disease.

79—Headache and multiple sclerosis?

Theme: Epidemiology
Theme 2: Clinical Research

Sidney Gomes, Eliani de Lima Villas Gomes and Nelson Rafael Gomes
Center of Neurology

Background: Headache is not a multiple sclerosis symptom. The mechanisms to explain the headache in multiple sclerosis (MS) are the release of proinflammatory cytokines, serotonergic change, and location of the lesions in areas near the periaqueductal gray or cervical segments.
Objectives: Report if the headache is a prevalent and isolated symptom of a demyelinating disease like MS.
Methods: A female patient, 48 years old, with no history of headache, is afflicted with chronic daily headache long time. Pain located in the frontal and occipital region with compression characteristics and is also associated with intense photophobia.
Results: Magnetic resonance imaging shows multiple gadolinium lesions, radiologically isolated syndrome. Patients followed up for 6 months showed clinical signs of MS according to international protocols.
Conclusion: The headache of reporting as the only dominant and isolated symptom and after demyelinating frame opening type MS, open a discussion: a headache is a symptom or comorbidity of MS?

90—Factors associated with therapeutic inertia in multiple sclerosis care: Results from a cross-sectional study in Argentina

Theme: Epidemiology
Theme 2: Clinical Research

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Background: Therapeutic inertia (TI) is a common phenomenon in multiple sclerosis (MS) care defined as the lack of treatment escalation despite evidence of disease progression. TI may lead to poor patient outcomes. However, we have limited information on factors associated with TI.
Objectives: To evaluate factors associated with TI among neurologists caring for MS patients.
Methods: Cross-sectional study comprising 117 neurologists with expertise in MS who were invited to participate in an online study. Participants answered questions regarding their clinical practice, risk preferences, management of 10 simulated case scenarios, and complications associated with disease modifying agents. TI was defined as lack of treatment initiation or escalation when evidence of clinical and radiological activity (8 case scenarios, 720 individual responses). We created a score defined as the number of case scenarios that fit the TI criteria over the total number of presented cases (score range from 0 to 8). Candidate predictors of TI included demographic data, MS specialist versus general neurologist, practice setting, years of practice, volume of MS patients, and risk preferences.
Results: Overall, 90 participants completed the study (completion rate 76.9%). The mean age (SD) was 46.4 (10.3) years; 47.7% were female neurologists and 34.4% were MS specialists. Overall, 153 (21.3%) responses exhibit TI. Participants with aversion to ambiguity were more likely to exhibit TI (mean TI score 5.6 vs 4.3; $p < 0.05$). The multivariable analysis revealed that older age ($p = 0.02$), higher aversion to ambiguity ($p = 0.04$), being a general neurologist ($p < 0.001$), and lower years of practice ($p < 0.01$) were independent predictors of TI.
Conclusion: TI was observed in one out of five therapeutic decisions in MS care. Most common associated factors include older age, being a general neurologist with lower years of practice, and having aversion to ambiguity.

91—Is the primary use of generic (non-proprietary) DMTS associated with therapeutic inertia in multiple sclerosis care?

Theme: Epidemiology
Theme 2: Clinical Research

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Background: The use of generic (non-proprietary) compared to brand-name drugs is becoming popular in the management of multiple sclerosis (MS). Generics for MS are not necessarily less expensive than brand-name drugs, while generic companies have more flexible internal regulations. Argentina is one of the leading countries with higher availability of generic agents ($n = 16$; interferon, glatiramer, dimethyl fumarate, teriflunomide, and fingolimod).
Objectives: To determine the prevalence of therapeutic inertia (TI) between primary users of generics versus brand agents in the management of MS in Argentina.
Methods: We conducted an online study comprising 117 neurologists with expertise in MS. Participants answered questions regarding their clinical practice, most commonly used disease-modifying agents, and therapeutic choices of 10 simulated case scenarios. TI was defined as the lack of treatment initiation or escalation when evidence of clinical and radiological activity (8 case scenarios, 720 individual responses). We created the brand-name/generic score (BGS) according to the top five frequent use of brand-name ($n = 9$) versus generic ($n = 16$) drugs for MS, where scores lower than 1 indicate higher use of generics and scores >1 indicated higher use of brand agents. Candidate predictors of TI included demographic data, MS specialist versus general neurologist, practice setting, years of practice, volume of MS patients, risk preferences, and the BGS.
Results: Overall, 90 participants completed the study (completion rate 76.9%). TI was observed in 153 (21.3%) of participants' responses. The mean BGS score (SD) was 2.75 (2.1). Overall, 46 (51.1%) participants had a BGS equal to or lower than 1. The most common generic drugs used include interferon beta-1b (Blastoferon Biosidus) and fingolimod (Bago and Raffo). The evaluation of individual responses revealed that lower BGS scores were associated with higher TI (mean BGS 2.44 for TI vs 2.84 for no TI; $p = 0.04$). The multivariable analysis revealed that for every point increase in the BGS, there was a reduction in TI (odds ratio (OR), 0.64; 95% confidence interval (CI), 0.44–0.94); equivalent to a 56% (1/OR) significant increase in TI for generic-name use.
Conclusion: TI is a common phenomenon affecting one in five clinical situations. The primary use of generic-name drugs was associated with a 56% increase in the likelihood of TI. Further studies are needed to understand the underlying causes of this phenomenon.

92—Prevalence of therapeutic inertia in multiple sclerosis care in Argentina: Results from Educar MS

Theme: Epidemiology
Theme 2: Clinical Research

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Background: Therapeutic inertia (TI) is a common phenomenon in multiple sclerosis (MS) care defined as the lack of treatment escalation despite evidence of disease progression. The consequences of TI include poorer patient outcomes and diminished quality of life.
Objectives: To evaluate the prevalence of TI and its associated factors in Argentina.
Methods: A total of 117 neurologists with expertise in MS were invited to participate in an online study. Participants answered questions regarding risk preferences, management of 10 simulated case scenarios commonly encountered in clinical practice, and complications associated with disease-modifying agents. TI was defined as lack of treatment escalation when evidence of clinical and radiological activity (8 case scenarios). We created a score defined as the number of case scenarios that fit the TI criteria over the total number of presented cases (score range from 0 to 8).
Results: Of 117 invited neurologists, 90 (76.9%) completed the study. The mean age (SD) was 46.4 (10.3) years; 47.7% were female neurologists and 34.4% were MS specialists. TI was present in 74.4% of participants in at least one case scenario. The mean TI score (SD) was 1.7 (1.4). Specialists were less likely to exhibit TI compared to general neurologists (GN; mean TI score: 1.10 vs 2.02; $p = 0.003$). The analysis of individual responses (total = 720) showed similar results (TI 13.7% specialists vs 25.2% in GN; $p < 0.0001$).
Conclusion: TI is a common phenomenon in MS care affecting 7 out of 10 neurologists. Findings are similar as in other countries.

98—Practical aspects and recommendations concerning the approval and use of biosimilar drugs for the treatment of multiple sclerosis in Latin America

Theme: Epidemiology

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Background: The use of biosimilar drugs (BS) has become widespread in Latin America, with the goal of reducing costs of treatments for multiple sclerosis (MS), promoting the sustainability of healthcare systems and improving patient access to these therapies.
Objectives: Get up-to-date information from each country on: (a) approval of BS drugs by regulatory agencies; (b) use of BS, pharmacovigilance plans, and risk management; and (c) update in the knowledge of the different molecules.
Methods: A group of experts from Argentina, Brazil, Colombia, Ecuador, Costa Rica, Mexico, Panama, Peru, and Venezuela met to discuss the current situation regarding good practices and risks associated with the use of BS in their respective countries.
Results: Each country provided updated data on: (a) availability of BS: in Argentina and Mexico, either interferon or glatiramer acetate (AG) BS are available. Costa Rica, Ecuador, and Peru only have AG. Brazil, Colombia, Panama, and Venezuela do not have BS drugs; and (b) regulation, risk management plans, and pharmacovigilance in each country.
Conclusion: (a) Apply current regulations for the registration of BS products, ensuring quality, efficiency, and safety; (b) avoid interchangeability between original biological and biosimilar drugs; (c) implement a strong pharmacovigilance program to detect safety problems of biological and biosimilar drugs; and (d) conduct national and multinational clinical studies to demonstrate the similarity in safety, efficacy, and immunogenicity profiles of biological and biosimilar medicinal products.

100—Access barriers to disease-modifying therapies in Latin America: The impact of who makes treatment decisions, and when and why this is done

Theme: Epidemiology

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Background: Patients with multiple sclerosis (MS) who are prescribed with disease-modifying therapies (DMTs) may lack access to their medication for reasons such as provider interchangeability, copayment costs, pharmacy requirements, provider requirements, and insurance coverage changes and limitations. There is a need in Latin America (LA) to understand MS patients' perspectives on access barriers to DMTs. Very few MS registers exist to date in LA. Public authorities should be aware of the necessity to create such registers, not only for research but also as potential data source for shaping and adopting the most effective policies to improve the condition of people with MS in each country.
Objectives: To describe and to analyze problems for accessing DMTs in LA.
Methods: Responses to four questions were obtained from nine countries (Argentina, Bolivia, Brazil, Chile, Colombia, Mexico, Peru, Uruguay, and Venezuela): How do patients deal with their DMT access issues? What are the clinical and ethical consequences of DMT access barriers? Who is involved in helping patients access their DMTs? What percentage of patients has access to their DMTs?
Results: Innovative drugs, biosimilar drugs, follow-on drugs, and generics are available throughout LA, except for Venezuela. With the exception of Brazil, none of them requires clinical trials for regulatory approval. Access to treatment varies according to the regulations prevailing in each country.
Conclusion: The role that the experts play in therapeutic decision-making should be established. The full range of DMTs should be made available throughout LA. The access to DMTs should be improved. We are working together to make the consent process a more shared decision. We would want all aspects of health and social care to be delivered in a personalized way, delivering care in a way that is right both for patients and their families and that takes into account the therapeutic priorities.

102—Clinical, radiological, and laboratory characteristics in a consecutive series of patients with longitudinally extensive transverse myelitis

Theme: Epidemiology

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Background: Longitudinally extensive transverse myelitis (LETM) is defined as a hyperintense spinal cord lesion extending over three or more vertebral levels on sagittal T2-weighted magnetic resonance imaging (MRI) of the spine. It is a frequently devastating syndrome associated with neuromyelitis optica spectrum disorder (NMOSD). However, LEMT is not pathognomonic of

NMOSD; therefore, it is important to investigate other causes of myelopathy in these patients.
Objectives: Our objective is to describe clinical, demographic, radiological, and laboratory characteristics in a consecutive series of patients with LEMT.
Methods: We enrolled 18 patients with LETM followed in two centers of Buenos Aires, Argentina.
Results: Of 18 patients, 2 were excluded (1 medullary tumor and 1 medullar infarction); 80% were women; and mean age at LETM onset was 47 years. Idiopathic LETM was the main diagnosis in our sample (8), followed by NMOSD (5). Other causes include Sjogren's disease (1), parainfectious disease associated with mycoplasma (1), and paraneoplastic disease associated with prostate cancer (1). The most frequent clinical manifestation was the combination of motor, sensory, and sphincter compromise (44%). The main MRI pattern was cervico-dorsal extension (40%) and central location (53%). In relation to the number of affected segments, 80% presented a compromise of 5 or more spinal segments and 46.6% 10 or more segments, without significant differences ($p = 0.8$) between idiopathic LETM (10.5 segments (SD, 6.1)) and NMOSD (11.6 segments (SD, 8.0)). Cerebrospinal fluid (CSF) showed protein elevation in 47%. In total, 33% of patients received a combined scheme: intravenous corticosteroids and plasmapheresis (1 NMOSD patient and 4 idiopathic). In relation to the therapeutic response, there was complete improvement in 56% (60% NMOSD and in 50% idiopathic).
Conclusion: LETM is an entity that may be due to different etiologies. Accurate diagnosis is important for correct treatment.

107—Clinical epidemiological aspect and predisposing factors to present relapse of multiple sclerosis in patients of the National Hospital Arzobispo Loayza-Peru

Theme: Epidemiology

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Background: In Peru, there are few epidemiological studies that focused on risk factors for relapsing multiple sclerosis (MS).
Objectives: To describe the clinical and epidemiological characteristics as well as the predisposing factors for relapsing MS.
Methods: Observational, cross-sectional, retrospective study of patients diagnosed with MS who met the 2010 McDonald criteria; a neurological clinical evaluation and a structured interview were conducted, which recorded demographic data, symptoms of onset and evolution, antecedents, course of the disease, and disability evaluated with the Expanded Disability Status Scale (EDSS).
Results: Of 15 patients evaluated, 60% were male, whose male-to-female ratio is 1.5:1; average age was 32.8 ± 11.5 years; the most frequent age group was 40–49 years, predominantly the relapsing remitting form. In total, 50% have EDSS between 0 and 2.0. The comparison by gender found higher values in women: 50% had a delay of diagnosis in at least 15.5 months and in 8 months of delay to start treatment, number of hospitalization due to MS (1.83 vs 0.89), and number of relapses (2.17 vs 1.7). The functional system most frequently affected at the beginning was pyramidal (73.3%) and sensitive (46.7%), being of monofocal origin (46.6%). For the benign course, the minimum EDSS was considered, with an age of 27.3 ± 13.8 years, men (60%), initial monofocal presentation (60%). The predisposing factors for relapse were considered as the frequency of intermediate and high relapse, with only one patient in high relapse, a woman who had a pregnancy from Piura, and intermediate relapse were men (62.5%), with 27.8 ± 15.3 years, the 25% antecedent of smoking and the 62.5% born in the North of Peru.
Conclusion: The proportion of men was higher, young adult age, recurrent remitting form, the most affected functional systems were pyramidal and sensitive; being of monofocal presentation of benign course, the high frequency of relapses complies with those reported in other series of studies.

108—Mortality in patients with multiple sclerosis in an Argentine cohort

Theme: Epidemiology

Carla Bolaño[1], Guido Vazquez[1], María Celeste Curbelo[2], Judith Steinberg[1], Blas Couto[1] and Adriana Carra[1,2]
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Background: Although mortality in multiple sclerosis (MS) is significantly higher than in general population (GP), there is great variability depending on the population tested. Approximately 50% of them result from related complications to MS and other similar percentage to unrelated causes. In Argentina, we have no data of how frequent is mortality related or not to MS among our patients.
Objectives: We aim to describe the causes of death in our MS patient population, not related to MS in relation to the GP.
Methods: We analyze a cohort of patients from a total of 931 obtained between 2007 and 2018 and compared with the national mortality rate of the last available national census corresponding to 2010.
Results: A total of 28 patients with MS died of another cause not related to MS: (1) according to clinical presentation = *n* (%): relapsing-remitting MS (RRMS): 9 (32.1); primary-progressive MS (PPMS): 5 (17.9); secondary-progressive MS (SPMS): 14 (50); (2) gender = *n* (%):17 men (60.7), 11 women (39.3); (3) average age of 49.32 years; (4) duration of MS at the moment of death: 15 years; and (5) causes of death = MS versus GP: cardiovascular causes 31.4% versus 43.7%; infections 35.7%, cancer was the least frequent. No suicides were observed, repeated etiology in other MS cohorts.
Conclusion: From our analysis, we observed that life expectation of patients with MS is significantly reduced compared to GP, now that the age of death in our case studies was 49.32, far from the expectation of life at birth (75.35). The SPMS phenotype was the most frequently affected. As MS specialists, we must learn about

potential MS complications/comorbidities to allow early and targeted interventions in order to reduce them.

109—The role of HLA and MS patients in Argentina: Can we consider it a biomarker?

Theme: Epidemiology

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[2]Instituto De Neurociencias, Fundación Favaloro, Buenos Aires, Argentina

Background: Epidemiological studies of multiple sclerosis (MS) have established a certain relationship involving HLADR subtypes and particularly human leukocyte antigen (HLA) II, but mechanisms of HLA and protection against the disease remain uncertain. HLA associations seem to differ between Northern-Southern Europe and correlate with the MS latitude prevalence distribution. Prevalence data in the Southern hemisphere differ from those in the Northern hemisphere. Some relationship between HLADRB1*15 and HLADQ with progressive MS have been described.
Objectives: To evaluate in this case–control study the association between HLAII and MS and to investigate the role of the genetic background in the clinical evolution of a group of MS patients in Buenos Aires (BA).
Methods: To evaluate the association between HLAII and MS in Argentina in a cohort of 126 patients with clinically definite MS (McDonald Criteria). Control group: 387 healthy individuals randomly collected in a Health Care Center in BA. The HLA frequency was compared by the chi-square test or Fisher's exact test, when the criteria were not fulfilled.
Results: A total of 126 patients with MS and 387 unrelated controls living in BA were studied. HLA frequency in MS patients and controls: the HI.A-DR2 gene associated with MS was compared to control and the difference was statistically significant (odds ratio (OR): 1.84 (1.19–2.85); $p = 0.005$). HLA II and protective factor: DRS was found to have the strongest protective effect against MS in all subjects (OR: 0.45 (0.22–0.90); $p = 0.02$). HLA frequency and clinical outcomes: all therapies show a significant efficacy; however, when we analyzed the frequency distribution of HI.A and a possible relationship between HI.A and response to therapy, we did not find any significance (PMS: $n = 24$; primary progressive MS (PPMS): $n = 7$; secondary progressive MS (SPMS): $n = 17$). Distribution about halotype: PPMS *n* (%): DR*15:2(28,6); DQ:5(71,4); DR*51:4(57); DR*52:1(14,3); SPMS *n* (%): DR*15:3(16,7); DQ:9(53);DR*51:1(5,88); DR*52:8(47).
Conclusion: Significant association between some HLAII alleles and MS was found in a group of MS patients in BA. Despite the high frequency of HLADR*15 in our group, we could not consider this as a condition to develop progressive forms of the disease in our population. Additional studies of this association may be carried out.

111—The impact of hard drug abuse as a risk factor prognosis in the clinical evolution of patients with multiple sclerosis

Theme: Epidemiology
Theme 2: Quality of life

María Curbelo[1], Carla Bolaño[2], Guido Vazquez[2], Judith Steinberg[1], Blas Couto[2], Alejandro Thomson[2], Galeno Rojas[2] and Adriana Carra[1,2]
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Background: There have been publications on the interaction of environmental, metabolic, infectious, and other risk factors for multiple sclerosis (MS) as well as their impact on patient's quality of life (QoL). Little is known, however, about the impact of illegal drug abuse (IDA) on the clinical course of MS. In our clinical approach, we must recognize IDA as a risk factor with severe consequences for the natural history of MS and take it into consideration when reaching a therapeutic decision.
Objectives: We aim to describe the impact of illegal drugs abuse on the clinical course of MS.
Methods: Retrospective case–control study. Data were collected from database 1999–2017, cut off November 2017. Diagnosis of MS was based on McDonald's criteria. Cohorts: IDA $n = 30$ versus control group without IDA (nIDA) $n = 30$. Demographic data, *n* of relapses in the first year, change in Expanded Disability Status Scale (EDSS), annual risk of relapses, and time to progression were compared between groups.
Results: Among 1250 referred to the MS clinic, (*n*) 30 were detected with IDA at baseline and $n = 30$ nIDA. We did not find significant difference in the demographic data between groups. Mean age: 43.6 years; duration of disease: IDA; mean 19.5 years versus nIDA mean: 11.9 years; onset IDA: mean 18 years. Significant difference between the two cohorts: pre-treatment IDA/nIDA: (1) *n* of relapses ($p < 0.04$); basal EDSS mean: 3.17/2.05 ($p < 0.01$), IDA reached EDSS 8 (16.7%) and EDSS 10 (10%) versus nIDA who did not reach those scores during the same follow-up. Lesion load MRI: *n* (15); cognitive disorders: *n* (15); psychiatric disorders: *n* (12). Analysis of neurophysiological test will be shown.
Conclusion: Our results show that IDA may coexist with MS and their presence may worsen the course of the disease. At the time of taking medical decisions with MS patients, we must include the screening for IDA with adequate information on the impact of addictions on disability progression and QoL.

128—Clinical and imaging characterization of patients with late-onset neuromyelitis optica and neuromyelitis optica spectrum disorder in the National Institute of Medical Sciences and Nutrition Salvador Zubirán, Mexico City, Mexico

Theme: Epidemiology

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Background: There are currently few studies regarding late-onset neuromyelitis optica (NMO) and neuromielitis optica spectrum disorder (NMOSD). Patients with late onset of the disease (considered >50 years) have a greater probability of developing motor disability; this related to the increase in frequency of longitudinally extensive myelitis at the initial event.
Objectives: To describe the distinctive characteristics of NMO and NMOSD in two age groups (under 50 years and over 50 years) in patients from the National Institute of Medical Sciences and Nutrition Salvador Zubirán in the years 2002–2017.
Methods: Descriptive, observational, retrospective study in a cohort. We studied 47 patients of 18 years with a diagnosis of NMO and NMOSD; most of the data were presented as simple relative frequencies in percentages, univariate analysis with Fisher's chi-square, with statistical significance $p < 0.05$.
Results: A total of 47 patients were studied, 79% (37 patients) were <50 years, 21% (10 patients) >50 years. In the patients >50 years, there was a female predominance (70%). In the group >50 years, optic neuritis (50%) and acute myelitis (30%) were observed as focal initiation events, 100% presented acute myelitis as a clinical event of relapses. The 100% had longitudinally extensive myelitis in magnetic resonance imaging (MRI) with a statistically significant difference in both age groups ($p = 0.013$). The 80% had positive aquaporin-4 antibodies (NMO-IgG). The 20% died due to complications associated with the sequelae due to myelitis.
Conclusion: The sequelae observed were similar in both age groups; visual involvement was predominantly observed at the extremes of life, considering 20% >50 years old had diabetes mellitus as an associated comorbidity. We concluded that the majority of elderly patients presented the classic NMO phenotype with positive NMO-IgG, which is an advantage since it favors the early diagnosis of this disease in this group of patients.

129—Coexistence of optic neuromyelitis and myasthenia gravis

Theme: Epidemiology
Theme 2: Quality of life

Natalia Gomez, Luis Alexander Granados and Lorena Arroyo
Neuronet Neurology Unit

Background: Myasthenia gravis (MG) and neuromyelitis optica (NO) are autoimmune channelopathies mediated by T cells and dependent on B cells and therefore, although they are rare pathologies, their coexistence is not exclusively due to chance. Like most autoimmune diseases, they are more prevalent in women and share characteristics such as genetic predisposition and environmental factors. Current theories about its pathophysiological basis initiate with the innate immunity that activates the adaptive immunity generating, among others, imbalance in Th1/Th2/Th17 helper T cells, aberrant secretion of cytokines, antibodies, and in the complement activation system.
Objectives: To describe the case of a male patient from the city of Bogotá-Colombia, in whom the association between seropositive MG and neuromyelitis optica spectrum disorders with aquaporin 4 was found.
Methods: Retrospective study with international ethical standards, previous signature of informed consent by the patient to collect and use their clinical data, paraclinical results, and diagnostic images.
Results: The male patient, without personal or family history of autoimmune diseases, developed diplopia and limb fatigability. MG was diagnosed and treated with thymectomy after 2 years, with adequate clinical response with pyridostigmine and corticosteroids. Three years after surgery, the patient presented an episode of right optic neuritis, with ipsilateral blindness and Expanded Disability Status Scale (EDSS) of 5.0. Imaging studies were performed, finding multiple confluent hyperintensity in the white matter and hyperintense cervical resonance in the C4-C5 column in the T2 and FLAIR sequences of the brain. The presence of AQP4 antibodies is evidenced, confirming the coexistence of MG and NO.
Conclusion: In the current literature, there are few case reports of patients with both pathologies, being mostly female. The documented case occurs in a male patient who follows the pattern described in previous reports, starting with mild to moderate MG, requiring treatment with adequate response to treatment and subsequently developing NMO. Every day the pathophysiological factors that explain this association are better understood, even demonstrating the presence of autoantibodies against AQP4 previous to the development of NMO clinical manifestations. Therefore, knowing a new case of the coexistence of these pathologies helps to sharpen the clinical suspicion to maintain a more strict follow-up in these patients, avoiding delays in their diagnosis and affecting their prognosis.

132—Clinical and imaging characterization of patients with late-onset neuromyelitis optica and neuromyelitis optica spectrum disorder in the National Institute of Medical Sciences and Nutrition Salvador Zubirán, Mexico City, Mexico

Theme: Epidemiology

Gloria Maria Alejandra Gramajo Juárez, Irene Treviño Frenk and Carlos Cantú Brito
Instituto Nacional De Ciencias Médicas Y Nutrición Salvador Zubirán, Mexico City, Mexico

Background: There are currently few studies regarding late-onset neuromyelitis optica (NMO) and neuromielitis optica spectrum disorder (NMOSD). Patients with late onset of the disease (considered >50 years) have a greater probability of developing motor

disability; this related to the increase in frequency of longitudinally extensive myelitis at the initial event.
Objectives: To describe the distinctive characteristics of NMO and NMOSD in two age groups (under 50 years and over 50 years) in patients from the National Institute of Medical Sciences and Nutrition Salvador Zubirán in the years 2002–2017.
Methods: Descriptive, observational, retrospective study in a cohort. We studied 47 patients of 18 years with a diagnosis of NMO and NMOSD; most of the data were presented as simple relative frequencies in percentages, univariate analysis with Fisher's chi-square, with statistical significance $p < 0.05$.
Results: A total of 47 patients were studied, 79% (37 patients) were <50 years, 21% (10 patients) >50 years. In the patients >50 years, there was a female predominance (70%). In the group >50 years, optic neuritis (50%) and acute myelitis (30%) were observed as focal initiation events, 100% presented acute myelitis as a clinical event of relapses. The 100% had longitudinally extensive myelitis in magnetic resonance imaging (MRI) with a statistically significant difference in both age groups ($p = 0.013$). The 80% had positive aquaporin-4 antibodies (NMO-IgG). The 20% died due to complications associated with the sequelae due to myelitis.
Conclusion: The sequelae observed were similar in both age groups; visual involvement was predominantly observed at the extremes of life, considering 20% >50 years old had diabetes mellitus as an associated comorbidity. We concluded that the majority of elderly patients presented the classic NMO phenotype with positive NMO-IgG, which is an advantage since it favors the early diagnosis of this disease in this group of patients.

134—Parainfectious AQP-4 negative NMOSD secondary to VZV

Theme: Epidemiology

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Background: Teiger first described parainfectious myelitis secondary to varicella infection with longitudinally extensive transverse myelitis (LETM) in 1946 in the Archives de pédiatrie. Since the upcoming of aquaporin-4 (AQP-4) Ab test, all of the cases have tested positive to AQP-4 antibodies.
Objectives: To report the first case of parainfectious AQP-4-negative neuromielitis optica spectrum disorder (NMOSD), secondary to varicella zoster virus (VZV).
Methods: A 20-year-old male, Hispanic patient arrived to clinic within 3 weeks of varicella onset and having been vaccinated against yellow fever while active for chickenpox. The chief complaint included 3 days of bilateral leg weakness and 2 days of urinary retention. Physical examination showed dyscalculia, left afferent pupillary reflex, partial facial palsy, paraparesis, dysmetria, and an hyperalgesia band on left T5–T6.
Results: Electromyography (EMG) was negative for peripheral disease; lumbar puncture showed crystal fluid, 1 leucocyte, glucose 79 mg/dL, and protein 21 mg/dL; oligoclonal bands IgG and IgM were negative as well as the infectious meningitis panel. Serum AQP-4 antibodies were negative 0.11, VZV IgM was positive, anti-TPO and thyroglobulin antibodies as well. On magnetic resonance imaging (MRI) foci of LETM were identified from C6 to T6 and L3–S2, both with contrast enhancement. Treatment was initiated with methylprednisolone and intravenous immunoglobulin (IVIG). At 3 weeks after treatment, patient worsened with lack of strength that reached upper extremities, dysthusia, dysphagia, dysautonomia as well as purpura and medullary aplasia. Administration of a second methylprednisolone cycle and cyclophosphamide, including rituximab, showed improvement. After 3 months, Expanded Disability Status Scale (EDSS) improved to 2.
Conclusion: This is the first case reported of parainfectious AQP-4-negative NMOSD secondary to varicella infection; patient's response to rituximab has been successful.

11—Epidemic characterization, clinic and the patients' imaging with multiple sclerosis: 2016–2017

Theme: Clinical Research

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Servicio de Neurologia, Hospital Provincial Arnaldo Milián Castro, Santa Clara, Cuba

Background: The multiple sclerosis is a demyelinating, degenerative, chronic, autoimmune, and inflammatory disorder that affects the central nervous system. It constitutes the first cause of neurological disability in young adults.
Objectives: To characterize the patients with diagnosis of multiple sclerosis assisted in the Service of Neurology of the Hospital "Arnaldo Milián Castro" of Villa Clara during the period of January from 2016 to December of 2017.
Methods: A descriptive, traverse study; the study population constituted 30 patients.
Results: The average of premier age was 38.7 years. The relationship among patients with color of white and not white skin was 9:1 and that of women and men of 14:1. The relapsing-remitting multiple sclerosis represented 70% and the minimum grade of disability 60%. 48.27%, 41.37%, and 37.93% of patients presented lesions supratentoriales, infratentoriales and in number from 2 to 4, respectively.
Conclusion: The feminine sex and the color of white skin predominated; the premier age was from 20 to 29 years. The most common symptoms were the alterations motorboats, sensitive and cerebelosas. The clinical form of predominant presentation was the relapsing-remitting multiple sclerosis and the grade of minimum was disability. The lesions supratentoriales and infratentoriales and the quantity of lesions in number from 2 to 4 were the most frequent; most of the cases presented change of intensity of the callous body.

20—Pregnancy outcomes in Chilean MS patients receiving interferon beta or glatiramer acetate: A longitudinal 8-year study

Theme: Clinical Research
Theme 2: Treatment

Bernardita Soler, Ethel Ciampi, Reinaldo Uribe San Martin, Elizabeth Vergara, Ana Reyes and Claudia Carcamo
Pontificia Universidad Católica De Chile, Santiago, Chile

Background: Since 2010, we have recommended patients in childbearing age to discontinue glatiramer acetate (GA) or interferon (IFN) only after confirmed pregnancy, avoiding wash-out periods or disease activity while they desire to become pregnant. Real-world information about perinatal outcomes are needed.
Objectives: To explore the effect of exposure to GA or IFN on pregnancy outcomes in Chilean patients.
Methods: A retrospective cohort of patients enrolled in the Programa de Esclerosis Múltiple UC between 2010 and 2018. The outcomes of women exposed to GA or IFN during pregnancy were compared with the registry of the anthropometric growth curves of Chilean newborns. Data were collected from clinical records and a standardized telephonic questionnaire was also performed.
Results: By May 2018, from a total of 663 multiple sclerosis (MS) patients, 433 were women and 215 were exposed to GA and IFN. From this sample, we only found 26 pregnancy from patients effectively receiving treatment with GA ($n = 8$) or IFN ($n = 18$) by the time of conception. During pregnancy, none of the patients presented with relapses. There were 12 vaginal births, 7 elective c-sections, and 4 emergency c-sections (2 placental abruption, 1 failed forceps, and 1 failed induction). One patient required in vitro fertilization. One first-trimester spontaneous abortion (IFN), one ectopic pregnancy (IFN), and one ongoing pregnancy were also observed. There were five preterm newborns: two at 36 weeks, two at 32 weeks (twins), and one at 25 weeks. Mean gestational age was 37 ± 3.4 weeks (median = 38, range = 25–40). When comparing weight and height according to gestational age, mean values were within the estimate for the Chilean population with a confidence interval of 95%; at 37 weeks: weight 3340 ± 640 g, size 49.25 ± 1.3 cm; at 38 weeks: weight 3272 ± 471 g, size 49.3 ± 1.3 cm; and at 39 weeks: weight 3164 ± 159 g, size 49.5 ± 0.8 cm; three newborns were outside the range, one small for gestational age (40 cm, 36 weeks), one overweight (3980 g, 37 weeks), and one with low birth weight (2570 g, 38 weeks). Mean exclusive breastfeeding time was 4.5 ± 2.9 months. During breastfeeding, three patients had a relapse: at third (brainstem), fifth (myelitis), and seventh (optic neuritis) months, suspending breastfeeding and re-starting DMT. By the time of this analysis, no congenital malformations were reported.
Conclusion: Pregnancy outcomes from patients who discontinued GA or IFN only after confirmed pregnancy seem comparable to epidemiological data of Chilean newborns, with no congenital malformations reported to date, supporting the safety of continuing GA or IFN until confirmed pregnancy.

27—Varicella-zoster virus in cerebrospinal fluid at relapses of multiple sclerosis is infective in vitro

Theme: Clinical Research

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Background: We have reported the presence of varicella-zoster virus (VZV) DNA and viral particles in the cerebrospinal fluid (CSF) of multiple sclerosis (MS) patients during exacerbation. It is not known whether these viruses are infective.
Objectives: To determine whether the VZV found in CSF of MS patients in exacerbation phases are infective.
Methods: Vero E6 cell cultures were incubated with CSF of five MS cases positive for VZV DNA, containing herpes-like viral particles. Localization of an immediate-early and a late structural VZV protein was monitored by confocal microscopy after 72 hours at 37°C. CSF from five non-inflammatory neurological patients was used as controls.
Results: A cytopathic effect was found in cultured cells inoculated with CSF from MS patients. Both structural VZV glycoprotein (gB) and immediate-early VZV protein (IE62) replicated in Vero E6 cultures with samples from all five MS cases. CSF from control patients produced no effect on Vero E6 cells.
Conclusion: When present in the CSF at relapses of MS, VZV is infective under in vitro conditions.

30—Real-world performance of alemtuzumab in multiple sclerosis patients in Chile

Theme: Clinical Research
Theme 2: Treatment

Ana Reyes, Ethel Ciampi, Reinaldo Uribe San Martin and Claudia Carcamo
Pontificia Universidad Católica De Chile, Santiago, Chile

Background: In late 2014, alemtuzumab was approved in Chile for the treatment of multiple sclerosis (MS). Results of effectiveness and safety in real-world patients are necessary, with an underrepresentation of Latin American cohorts in previous studies.
Objectives: To describe real-world performance of alemtuzumab in MS patients with an emphasis on adverse reactions.
Methods: This longitudinal observational data collection study was performed at the Programa de Esclerosis Múltiple UC from January 2015 to May 2018. Demographic and clinical data from all of the 16 patients who had received treatment with alemtuzumab in our program were assessed. All patients received alemtuzumab infusion according to the recommended infusion protocol and prophylaxis with acyclovir was also prescribed.
Results: We included nine women and seven men, 100% relapsing-remitting MS, mean age at onset was 24.9 ± 4.8 years, median

baseline Expanded Disability Status Scale (EDSS) of 2.0 (range, 0–6.0), mean baseline annualized relapse rate 0.31 ± 0.5, and mean age and disease duration at the initiation of alemtuzumab 32.4 ± 5.1 and 7.6 ± 3.5 years, respectively. Indications for alemtuzumab were induction ($n = 1$), treatment failure ($n = 8$), switching from natalizumab with positive JCV ($n = 4$), adverse event to injectables ($n = 1$), highly active disease and desire to become pregnant ($n = 1$), and disease progression ($n = 1$). Mean follow-up was 19 ± 12 months (range, 6–41) with no evidence of disease activity (NEDA3) of 93.7%. A total of 16 patients have received their first infusion, 11 the second infusion, and 1 patient required a third infusion. First-cycle infusion-related adverse events were observed in 100% of the patients, 7/16 developed myalgia, 5/16 presented headache, 4/16 mild hypotension, 1/16 dysuria, and 16/16 patients developed pruriginous rash (focal or generalized) during one or more days of infusion. All adverse events were mild to moderate and respond quickly to symptomatic treatment. Second-cycle infusion-related adverse events were 2/11 myalgia, 3/11 headache, 3/11 fever, 2/11 mild-hypotension, and 8/11 rash. Between first and second cycle, one patient presented with influenza, one with sinus infection, and one with a psoriasiform plaque in the torso. During second year, one patient developed alopecia areata universalis and thyrotoxicosis requiring thyroidectomy, and one patient developed autoimmune hyperthyroidism. During third year, one patient presented with disseminated varicella zoster (28 months after first infusion, absolute lymphocyte count 1600) and two patients developed autoimmune thyroiditis. To date, no malignancies or progressive multifocal leukoencephalopathy cases have been observed, nor MS rebound in patients switching from natalizumab. Annualized relapse rate remain in 0 and only one patient has developed two new enhancing lesions requiring a third infusion. Median EDSS of 1.5 (range, 0–3) was observed in the 11 patients who received their second infusion. No patients have been lost to follow-up.

Conclusion: This is the first longitudinal cohort of Chilean MS patients receiving alemtuzumab. Adverse events are in line with those reported in clinical trials, although alopecia areata universalis had not been previously described within the pivotal studies. Effectiveness also support clinical data from long-term extension studies with a trend in EDSS improvement and high rates of NEDA3 by the end of the follow-up.

37—Ultrasound evaluation of blood flow parameters in the ophthalmic artery in acute and chronic phase of optic neuritis

Theme: Clinical Research
Theme 2: Radiology

Pavel Hradilek and Olga Zapletalova
University Hospital Ostrava, Ostrava, Czech Republic

Background: Optic neuritis (ON) is a common manifestation of multiple sclerosis (MS). It occurs due to immune-mediated inflammation of the optic nerve. Some vascular factors that could influence the blood flow in the ophthalmic artery (OA) have been suggested in the pathogenesis of ON as well.

Objectives: The purpose of our study was to evaluate and compare blood flow velocities and resistance index (RI) in the OA in both orbits in patients with acute and chronic phases of unilateral ON.

Methods: Ultrasound measurement of blood flow parameters (peak-systolic velocity (PSV), end-diastolic velocity (EDV), and RI) was performed in 35 consecutive MS patients during acute unilateral ON prior to corticosteroid treatment. The PSV, EDV, and RI were measured in the OA on both sides. We compared results from affected and unaffected orbits using paired *t*-test. The same measurements were performed in 114 MS patients with the history of acute unilateral ON at least 1 year before ultrasound examination.

Results: We found PSV ($p < 0.0001$) and RI ($p < 0.0001$) in the OA on the side affected with acute ON significantly higher comparing with the unaffected side. In chronic phase of ON, we did not observe any significant side difference neither in blood flow velocities nor in the RI ($p > 0.05$).

Conclusion: The changes of orbital hemodynamics during acute unilateral ON suggest the role of vasoconstriction of orbital vessels as one of the underlying pathophysiological mechanisms of acute ON. These changes however last shortly and are not observed in the chronic phase of ON.

38—Health-related quality of life in a sample of patients with multiple sclerosis in Peru

Theme: Clinical Research
Theme 2: Quality of life

Christie Fiorella Zamora Niño, Sebastián Alonso Serván Lozano, Brian Villafuerte Trisolini, Kevin Ray Duque Yupanqui, Fiorella Sofía Adrianzén Álvarez, Darwin Vizcarra and Joaquín Vizcarra Pasapera
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Background: Multiple sclerosis (MS) is recognized as one of the major causes of neurological disability, thus influencing health-related quality of life (HrQOL).

Objectives: To assess HrQOL and to determine its associated variables in patients with MS.

Methods: We assessed the HrQOL of 41 patients with MS who participated in an MS-nonprofit Organization meeting. They completed the Short Form (SF)-36 questionnaire and an ad hoc questionnaire about their clinical and socio-demographic data. Then, we examined the Peruvian population-normalized scores (2012 Database) for the SF-36, and the obtained results on HrQOL were compared between MS subgroups defined by disability level, which was measured by self-reported validated Expanded Disability Status Scale (EDSS). Other variables (gender, type of treatment, number of relapses within the last year, and course of disease) were also analyzed.

Results: Fifty-four percent of participants were female, with a mean age of 45 (28–55) years, and most of them (61.5%) obtained an EDSS score of 4. The median score of the eight health-related domains of the SF-36 questionnaire was calculated as follows:

physical functioning: 26.4 (0–46.7), role physical: 24.4 (15.2–54.1), bodily pain: 38.0 (25.4–44.3), general health: 39.7 (32.2–46.8), vitality: 34.0 (25.7–40.1), social functioning: 31.8 (18.6–39.9), role emotional: 34.6 (17.1–54.4), and mental health: 41.6 (19.6–45.6). All these results were significantly lower than those of the general population. Among the distinct variables evaluated across SF-36 domains, female patients and male patients with progressive forms of MS obtained lower scores in general health domain ($p < 0.001$). EDSS score >4 ($p = 0.001$) and compromise of pyramidal system ($p = 0.01$) were related to worse results in physical functioning domain, while patients not receiving disease-modifying therapy ($p = 0.02$) had worse outcomes in bodily pain domain.

Conclusion: Compared to the general population, patients with MS reported significantly lower scores in all eight domains of SF-36 HrQOL questionnaire.

39—Alemtuzumab improves clinical and MRI disease activity outcomes, including slowing of brain volume loss, in RRMS patients: 8-year follow-up of CARE-MS II (Topaz Study)

Theme: Clinical Research
Theme 2: Treatment

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Background: In CARE-MS II (NCT00548405), alemtuzumab (two courses; 12 mg/day; baseline: 5 days; 12 months later: 3 days) significantly improved outcomes versus subcutaneous interferon beta-1a (SC IFNB-1a) in relapsing-remitting multiple sclerosis (RRMS) patients with inadequate response to prior therapy. In a 4-year extension (NCT00930553), patients could receive additional alemtuzumab courses (12 mg/day on 3 days; at least 12 months apart) as needed for disease activity or receive another disease-modifying therapy (DMT; investigator discretion); efficacy was maintained with 50% receiving no additional alemtuzumab or DMT through Year 6. Following this extension, patients could continue in TOPAZ (NCT02255656), an additional 5-year extension.

Objectives: Evaluate alemtuzumab efficacy/safety through Year 8 in CARE-MS II patients.

Methods: In TOPAZ, patients can receive as-needed alemtuzumab (at least 12 months apart) or receive another DMT.

Results: 300/435 (69%) patients completed TOPAZ Year 2 (Year 8 post-alemtuzumab); 44% received neither additional alemtuzumab nor another DMT. In Year 8, annualized relapse rate was 0.18; 85% were relapse-free. From baseline through Year 8, 70% had stable/improved EDSS, mean change in EDSS was +0.17, 64% were free from 6-month confirmed disability worsening, and 47% achieved 6-month confirmed disability improvement. In Year 8, 70% were free of magnetic resonance imaging (MRI) disease activity; 58% achieved no evidence of disease activity. Median percent cumulative brain volume loss from baseline through Year 8 was –1.06%. Safety remained consistent through Year 8.

Conclusion: Alemtuzumab efficacy and safety were maintained through Year 8 in the absence of continuous treatment, with 69% of patients completing Year 8 post-alemtuzumab and 44% receiving no additional treatment after the initial two courses.

Study support: Sanofi and Bayer HealthCare Pharmaceuticals.

42—Psychological characterization of a cohort of multiple sclerosis patients in Chile

Theme: Clinical Research
Theme 2: Quality of life

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Background: Multiple sclerosis (MS) has a significant impact in the emotional life of people living with the disease. Although psychiatric comorbidities are recently being reported in epidemiological studies, ranging from 40% to 70% of the patients, there is limited knowledge about the psychological characterization of these patients and the real extent of the disease and other life events in their emotional well-being.

Objectives: To describe the psychological characterization of a cohort of MS patients under clinical care in the Programa de Esclerosis Múltiple UC in Chile.

Methods: Since 2011, as part of the multidisciplinary program developed for MS patients, we created a Psychological Program where treating neurologists were able to refer those patients who were diagnosed or at risk of developing emotional distress. Interventions performed included individual and group sessions (psychoeducation meetings, theme-specific workshops, storytelling workshops, and handcrafting workshops) and also telephonic follow-up. Clinical and demographical data were collected since November 2011 to December 2017. Psychological profile,

Outcome Rating Scale, Session Rating Scale, and a local qualitative appreciation questionnaire were performed for the different interventions.
Results: A total of 135 patients were assessed: 73% women, mean age of disease onset 31 years, mean age at first psychotherapy session 36 years, median Expanded Disability Status Scale (EDSS) 2.0, mean disease duration of 4.5 years, 90% relapsing-remitting, 3% secondary-progressive, 4% primary-progressive MS patients, 3% with other demyelinating diseases, and 77.3% are receiving disease-modifying treatment. On average, 22 new patients entered the Psychological Program each year, and reasons for referral were categorized in (a) difficulty dealing with MS diagnosis (35%) or (b) not related to the disease (65%). Psychological diagnosis included 57% major depressive disorder, 22% anxiety disorder, 6% adaptive disorder, 6% couple-related problems, 4% grief, 3% personality disorder, and 2% bipolar disorder. Since 2011, patients received a total of 1406 individual sessions of 1 hour, and the mean session number was 10.4 (range, 1–74) per patient. The group sessions began in 2013, 51% of the patients have participated in these activities and have shown interest for group psychoeducation meetings (6%), theme-specific workshops (6%), story-telling workshops (22%), and handcrafting workshops (18%). By the time of this analysis, 37% remain under regular therapy, 28% under irregular therapy, 34% have completed therapeutically goals, and 1 patient died due to glioblastoma multiforme. Outcome Rating Scale and Session Rating Scale were applied to 10 patients with a total mean score of 50/50 and 40/40, respectively. The local qualitative appreciation questionnaire indicated high significance of the intervention and long-term positive effect of the group sessions over mental health.
Conclusion: Patients with MS present with high level of psychiatric comorbidities, related or not to MS diagnosis, with a wide range of psychological manifestations. Multiple choices for psychological support seem to improve patient's outcomes and emotional distress.

47—Long-term outcomes in patients with progressive forms of relapsing MS treated with teriflunomide: Patient-level data from the TEMSO and TOWER extension studies and the real-world setting

Theme: Clinical Research

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Background: An unmet need exists in the treatment of patients with progressive forms of MS. In the phase 3 studies, TEMSO (NCT00134563) and TOWER (NCT00751881), teriflunomide 14 mg significantly decreased risk of confirmed disability progression versus placebo. These studies included a small number of patients with progressive forms of relapsing MS (PfRMS).
Objectives: To analyze individual long-term disability outcomes in teriflunomide-treated patients with PfRMS using data from ≤9 years' follow-up of TEMSO and TOWER and present real-world observational data from teriflunomide-treated patients with PfRMS.
Methods: Patients with relapsing forms of MS were randomized to receive placebo or teriflunomide 7 or 14 mg in TEMSO and TOWER. In the TEMSO extension (NCT00803049), teriflunomide-treated patients continued as randomized; placebo-treated patients were re-randomized to teriflunomide 7 or 14 mg. All patients received teriflunomide 14 mg in the TOWER extension. In a post hoc analysis, individual long-term Expanded Disability Status Scale (EDSS) outcomes were analyzed and listed descriptively. Chart reviews of patients with secondary progressive or progressive relapsing MS (SPMS/PRMS) receiving teriflunomide in the real-world setting for ≥2 years were performed and their long-term EDSS scores tabulated.
Results: TEMSO and TOWER included 122 patients with PfRMS at randomization (SPMS, $n = 60$; PRMS, $n = 62$); 66 (54.1%) completed the core studies and entered the extensions, of whom 41 (62.1%) completed the extensions. Baseline median EDSS score for patients with PfRMS was 4; at last follow-up (≤9 years), median change from baseline was 0. Over periods of up to 4 years, EDSS scores in patients in the real-world setting remained stable (8/13), improved (2/13), or worsened (3/13).
Conclusions: These findings, which need to be confirmed in larger cohorts, provide preliminary evidence that teriflunomide 14 mg may be associated with long-term stabilization of disease activity and lack of disability progression in patients with PfRMS.
Study support: Supported by Sanofi.

53—Speech profile of multiple sclerosis patients admitted to a neurorehabilitation unit

Theme: Clinical Research
Theme 2: Quality of life

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Background: The language, voice, speech, breathing, and swallowing disorders represent a group of pathologies few addressed in clinical multiple sclerosis (MS) studies.
Objectives: To analyze speech disorders profile in a group of MS patients who are admitted to a neurorehabilitation unit (NRU) and its relationship with clinical parameters.
Methods: Retrospective analysis of medical records of MS patients admitted to the NRU between 2010 and 2018. Age, gender, Expanded Disability Status Scale (EDSS), age at the beginning of the MS, years of MS evolution, presence and type of

language, voice, speech, breathing and swallowing disorder, and Functional Independence Measure (FIM) scale were recorded. A descriptive and correlational statistical analysis was performed using SPSS.
Results: Of 172 MS admissions into the NRU, 64 were referred by the neurologist to speech therapist. In total, 11 of them did not present speech pathology. 60.4%, 35.8%, and 3.8% were relapsing-remitting (RR), secondary progressive (SP), and primary progressive (PP), respectively; 67.9% women; average age: 46 ± 10 years, EDSS: 5.5 ± 1.5, years of evolution: 13 ± 8 years, age at the beginning of MS: 32 ± 10 years, and FIM: 89.5 ± 22.9. Of the 53 evaluations performed (41 patients), the most frequent pathology was language disorder in 68%, followed by swallowing disorders (56.6%). The most frequent type of language disorder was the decrease in verbal fluency (86%). 86.8% of evaluations showed more than one disorder. We found correlation between the total number of disorder in each patient with EDSS (r: 0.34, $p = 0.046$). We did not find correlation with years of evolution and FIM (r: –0.15 and r: 0.14, respectively).
Conclusion: Given the high frequency of speech disorders, it will be necessary to perform standardized evaluations to offer a comprehensive treatment to MS patients.

57—Transcranial magnetic stimulation may modify development of experimental autoimmune encephalomyelitis: Effects on bacterial lipopolysaccharide and oxidative stress biomarkers

Theme: Clinical Research

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Background: Multiple sclerosis (MS) is a neuro-inflammatory disease. Actually, it is very important to find new therapeutic strategies and treatments. Experimental autoimmune encephalomyelitis (EAE) is the most important animal experimental model for studying MS.
Objectives: The aim of this work was to evaluate the neuroprotective effect of transcranial magnetic stimulation (TMS), quantifying the clinical score, bacterial lipopolysaccharide (LPS), and biochemical biomarkers of oxidative stress.
Methods: A total of 35 male Dark Agouti rats were used for study, divided into five groups: (1) healthy animals (controls), (2) animals (control) treated with Freund's adjuvant (vehicle), (3) animals inoculated with myelin oligodendrocyte glycoprotein (MOG; EAE), (4) EAE treated with Mock (EAE + Mock), and (5) EAE plus transcranial magnetic stimulation treated (EAE + TMS). EAE was induced by subcutaneous injection of an emulsion containing MOG, phosphate-buffered saline (PBS), Freund's adjuvant, and inactivated *Mycobacterium tuberculosis*. Clinical score was determined 14 and 35 days after injection of MOG. Oxidative stress was evaluated by lipid peroxidation products (LPO), whereas the possible dysbiosis was determined by LPS levels.
Results: The data show that TMS reverses toward normality and the changes induced by EAE on clinical score, LPO, and LPS levels.
Conclusion: TMS effectively reduces motor alterations in EAE, and it modifies the content of LPO and LPS.

70—Low levels of alpha-synuclein in peripheral tissues are related to clinical relapse in relapsing-remitting multiple sclerosis

Theme: Clinical Research

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Background: The protein a-Syn has been linked to neuroinflammation and neurodegeneration, both involved in multiple sclerosis (MS) pathophysiology.
Objectives: To compare a-Syn positivity on skin and nucleated blood cells in patients with relapsing-remitting multiple sclerosis (RRMS) and healthy controls. We evaluated the effect of methylprednisolone on the level of a-Syn in RRMS patients and the association with the Expanded Disability Status Scale (EDSS).
Methods: In total, 34 healthy controls and 23 MS patients were sampled for skin biopsy and peripheral blood. Three different groups were made from the MS subjects: 15 in remission, 8 in relapse, and 8 in relapse after methylprednisolone therapy. By means of immunohistochemistry in skin and flow cytometry in nucleated blood cells, we measured the positivity in epidermis and the percentage of a-Syn-positive cells, respectively. We also assessed the EDSS of patients prior to sample collection.
Results: The presence of a-Syn in the skin was significantly lower in relapsing MS versus remitting MS and healthy controls (HC), both as percentage of a-Syn-positive area (HC: 222, interquartile range (IQR): 156–324; MS-remission: 218, IQR: 143–276; MS-relapse: 88, IQR: 54–173; $p = 0.021$) and staining intensity (HC: 45.5, IQR: 17.2–90.2; MS-remission: 59.5, IQR: 27.3–100.1; MS-relapse: 8.0, IQR: 2.8–16.9; $p = 0.004$). The percentage of a-Syn-positive lymphocytes (HC: 4.4%, IQR: 2–9.8; MS-remission: 3.8%, IQR: 2.1–9.6; MS-relapse: 3.3%, IQR: 1.4–5.4; $p = 0.69$) and the percentage of a-Syn-positive monocytes (HC: 5.2%, IQR: 2.3–8.1; MS-remission: 5%, IQR: 2.4–9.4; MS-relapse: 1%, IQR: 0.3–6.2; $p = 0.20$) were not statistically different between study groups. Acute therapy with systemic steroids did not change the

positivity to a-Syn in skin or nucleated blood cells. EDSS did not correlate with a-syn positivity.
Conclusion: a-Syn positivity is lower in peripheral tissues from MS-relapsing patients compared to MS-remission patients and HC. More studies are needed to evaluate a-syn as a possible biomarker in MS relapses.

75—A multiple sclerosis functional composite in a cohort of patients with multiple sclerosis in Quito, Ecuador, and its relationship to the expanded scale of disability

Theme: Clinical Research
Theme 2: Cognitive Commitment

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Background: Multiple sclerosis functional composite (MSFC) is a scale that offers a sensitive and specific assessment of disability in patients with multiple sclerosis (MS) which has been compared with the Expanded Disability Status Scale (EDSS). Previous studies have shown a moderately strong correlation between the two scales, but studies of equal magnitude have not been carried out in the Ecuadorian population.
Objectives: To establish the validity of the MSFC on the EDSS in a cohort of patients with MS in the city of Quito.
Methods: A total of 112 patients with MS who were treated at the Carlos Andrade Marín Hospital in Quito were included. The patients met the McDonald 2010 diagnosis criteria. Patients were classified by phenotype into remitting relapsing MS (RRMS), primary progressive MS (PPMS), secondary progressive MS (SPMS), and clinically isolated syndrome (CIS). The EDSS and the MSFC were applied to all patients. Correlations between the scores were calculated, and statistical analysis was carried out through the SPSS 24.0.
Results: A total of 80 patients were female (71.4%). The average age of the population was 42.79 years (SD, ±11.86). The average schooling was 15.6 years. In total, 100 patients had RRMS (89.3%), 5 PPMS (4.5%), 4 SPMS (3.6%), and 3 CIS (2.7%). The average EDSS was 3 (SD, ±1.87) and the MSFC average was negative (–0.60, SD ±0.86). The average of correct answers in 3-second paced auditory serial addition test (PASAT-3″) was 29.2 (SD, ±17.02). The average time to perform the 9-hole peg test (HPT) was 35.20″ (SD, ±40.18). The average time to perform the timed 25-foot walk was 16.5″. The correlation between the EDSS and the MSFC was moderate (–0.56), and the results were statistically significant ($p < 0.01$).
Conclusion: This is the first study on validity of MSFC in a cohort of patients with MS in Ecuador. The presented study demonstrates a moderate negative correlation between the EDSS and the MSFC. This result is very similar to that described in other studies despite the fact that the average of the MSFC in our cohort was lower than that published in other studies.

93—Impact of paternal multiple sclerosis on newborns

Theme: Clinical Research

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Background: Recent studies report on newborns (NBs) of mothers with multiple sclerosis (MS). However, little is known on the impact of paternal MS.
Objectives: To assess the impact of paternal MS on gestational age, weight, height, and presence of malformations at birth.
Methods: Retrospective study of our database, which included 1122 patients. In total, 18 male patients who had been fathers were identified. The following factors were assessed: MS duration, degree of disability according to Expanded Disability Status Scale (EDSS), comorbidities, and drug treatment received at the time of conception. The following were assessed among viable NBs: characteristics of birth, date of birth, gestational age, weight, height, and presence of malformations.
Results: In total, 31 NBs of 18 male patients with MS were identified. Fathers with MS $n = 18$. Clinical presentation n (%): relapsing-remitting multiple sclerosis (RRMS), 16 (89); secondary progressive multiple sclerosis (SPMS), 2 (11). At the time of conception, patients had the following features: mean ± SD: age 29.94 ± 5.96; EDSS: 1.5 ± 1.8; duration of the disease: 4.37 ± 6.73 years. Seven patients received treatment with immunomodulators (disease-modifying therapy (DMT)). NBs of fathers with MS $n = 31$. Mean ± SD: gestational age: 39.26 ± 1.26 weeks; weight: 3270.81 ± 342.53 g; height 50.26 ± 2.08 cm. One obstructed labor was identified; the rest were normal. One NB presented with congenital hearing loss. Five abortions were identified.
Conclusion: Although our study population is small, our findings suggest that MS and the DMT used to treat the disease have no significant impact on NBs. Given the scarce knowledge available on conception among fathers with MS, new studies will be necessary to clarify the role of the disease and its treatments before and during pregnancy.

97—Anti-Mog versus Anti-AQP4: Two independent entities. About two cases

Theme: Clinical Research

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Background: Myelin oligodendrocyte glycoprotein (MOG) is a protein expressed on the surface of the oligodendrocyte and myelin. Anti-MOG antibodies have been recently recognized as a cause

of acquired demyelination. Given its high density in the most superficial layers of the myelin sheath, MOG is considered a biologically plausible and accessible antigenic target for the action of autoantibodies. Recently, antibodies against MOG have been identified in patients with monophasic or recurrent optic neuritis, demyelinating syndromes, and negative anti-aquaporin-4 (AQP4) myelitis.
Objectives: We present two cases of adult patients with demyelinating disease and positive anti-MOG antibodies.
Methods: Patient 1: A 33-year-old male presenting with left optic neuritis progressing to the right eye within 48 hours. Orbital magnetic resonance imaging (MRI): thickening and T2 hyperintensity of both optic nerves, with slight bilateral enhancement. Patient 2: A 32-year-old male patient with paraparesis and left upper limb weakness, distal leg bilateral paresthesia, urinary retention, diplopia, left ptosis, and dysarthria develops progression of dysarthria, a T4 sensory level paraplegia. Brain MRI: T2 and FLAIR hyperintense lesions in the left thalamus, right cerebellar peduncle, and pons. In both patients, the cerebrospinal fluid (CSF) was negative for oligoclonal bands. Serum was negative for anti-AQP4 but positive for anti-MOG antibodies.
Conclusion: A possible association between anti-MOG antibodies and a set of heterogeneous demyelinating syndromes is recognized. Antibodies against MOG have recently been described in a subset of patients with anti-AQP4 seronegative neuromyelitis optica spectrum disorder (NMOSD) patients with a phenotype of optic neuritis and longitudinally extensive transverse myelitis. Cell-based assays using the complete human MOG protein as the antigen have proven to be the gold standard for its detection. Immune mechanisms are different in anti-MOG-and anti-AQP4, so these are independent demyelinating diseases.

101—Objective and subjective approach to depression in patients with multiple sclerosis and its correlation with apathy, aggression, and irritability

Theme: Clinical Research
Theme 2: Quality of life

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Background: Depression is a highly prevalent pathology in patients with multiple sclerosis (MS). There are no studies that address the relationship between objective depression evaluated by a psychiatrist and subjective depression perceived from MS patients.
Objectives: To analyze the presence of depression with objective and subjective instruments in a group of patients with MS and its association with apathy, irritability, and aggression.
Methods: A total of 37 MS patients of INEBA MS Clinic were evaluated by neurology and neuropsychiatry unit, including mini international neuropsychiatric interview (MINI), Beck Depression Inventory II (BDI-II), Hamilton scale; Yudofsky, and apathy and irritability scales. A statistical and inferential analysis was performed using the GraphPad Prism 6.
Results: In total, 75.7% were women; 94.7% relapsing-remitting MS and 5.4% secondary progressive MS; mean age: 43.9 ± 10.8 years, mean Expanded Disability Status Scale (EDSS): 2.5 ± 2.5, MS evolution: 8.2 ± 8.6 years. In total, 56.6% of MS patients had *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; DSMIV-TR) criteria for major depression, 73.3% with BDI-II and Hamilton. We found an association between the diagnosis of depression by DSMIV-TR with BDI-II and Hamilton (χ^2: 8.6; $p < 0.005$ in both cases); and high correlation between BDI-II and Hamilton scores (r: 0.7, $p < 0.0001$), and between Hamilton and BDI-II scores with apathy and irritability (r: 0.51, $p < 0.005$; r: 0.67, $p < 0.0001$; r: 0.42, $p < 0.023$; r: 0.45, $p < 0.015$). We did not find correlation with depression and aggressiveness scales.
Conclusion: In our population, we found a good perception of depression from MS patients in correlation with the objective evaluation, and higher correlation between depression, apathy, and irritability.

121—Factors for morbidity and mortality for patients with anti NMDAR encephalitis, in the National Institute of Neurology and Neurosurgery (INNN)

Theme: Clinical Research

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Background: The clinical risk factors prognosis in *N*-methyl-D-aspartate (NMDA) receptor encephalitis is varied among the reported clinical series. In Dalmau (577 patients), the following are reported as good prognostic factors: early onset of immunomodulatory treatment, Rankin £ 2 at 4 weeks after initiation of symptoms, and not having intensive care unit stay. In French series (36 adolescents): age > 12 years and Rankin's at admission ≤3. In China (51 patients), older age, cerebrospinal fluid (CSF) abnormality, prolonged hospital stay, hypoventilation, impaired wakefulness and memory, and intrahospital complications are reported as poor prognosis factors.
Objectives: To identify morbidity-mortality factors in Mexican patients with defined anti-NMDAr encephalitis.
Methods: Descriptive study. At the National Institute of Neurology and Neurosurgery, from 2006 to 2017, 32 patients with definitive anti-NMDAr encephalitis from 70 with clinical suggestive of

autoimmune encephalitis were included. In descriptive analysis, we calculated means and proportions with standard deviation and ranges as appropriate. Univariate analysis was calculated with Fisher's chi-square and multivariate analysis using binary logistic regression and actuarial model by Kaplan–Meier method.
Results: The number of patients included was 32, of whom, 19 were women (59%), and the average age was 26 years. The most frequent initial symptom was seizures (44%). The most frequent symptom was psychiatric disorder (97%), followed by ovarian teratoma in 13%. In the multivariate analysis, the absence of status epilepticus ($p < 0.001$) and admission Rankin <3 were identified as independent risk factors for discharge Rankin <3 ($p < 0.001$). Admission Rankin <3 was the independent risk factor identified for Rankin <2 at 3 months ($p < 0.001$), Rankin <1 ($p = 0.014$) and <2 ($p = 0.003$) at 6 months; as Rankin <2 at 12 months ($p = 0.008$). In the actuarial analysis, a significant difference was observed for Rankin <3 at discharge, among patients compared by presence versus absence of status epilepticus (LogRank $p = 0.007$), admission Rankin <3 versus >4 (LogRank $p = 0.012$) and presence versus absence of intrahospital complications (LogRank $p < 0.001$). Risk factors for death were the presence of central hypoventilation and status epilepticus during their in-hospital stay.
Conclusion: The status epilepticus and admission Rankin were the most important risk factors prognosis in NMDA receptor encephalitis in our population.

122—Characteristics of PET-CT FDG brain in patients with encephalitis anti-NMDAR

Theme: Clinical Research
Theme 2: Radiology

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Background: In the *N*-methyl-D-aspartate receptor (NMDAr) encephalitis, the brain PET-CT FDG findings are heterogeneous. Initially, temporal lobe hypermetabolism was reported in limbic paraneoplastic encephalitis. Later, a heterogeneous pattern with hypermetabolism in the base nuclei and hippocampus hypometism was described. Finally, a series of 22 patients with predominance of lobar hypometabolism with a higher frequency in the parietal lobe, followed by occipital.
Objectives: To identify the characteristics of brain PET-CT FDG in patients with defined anti-NMDAr encephalitis.
Methods: We documented the findings observed in each of the patients, describing the presence of hypo or hypermetabolism in each brain cut and nuclei of the base using the visual (qualitative) method with validation of the institution's Nuclear Medicine department. Finally, we calculated the proportion of hypo or hypermetabolism of each region of interest and in the case of patients with a control study, we contrasted with the clinical evolution of the patient. The mean time elapsed from onset of symptoms to brain FDG PET-CT was calculated.
Results: The brain PET-CT FDG was performed in 30 patients with anti-NMDAr encephalitis, being observed abnormal in all of them. The mean time to onset of symptoms was 138 days (95% confidence interval (CI), 48–227). An abnormality of the occipital metabolism (88% hypometabolism vs 3% hypermetabolism) was observed in 27 patients, followed by temporal cortex affection in 24 (hypometabolism 53% vs 47% hypermetabolism) and parietal in 26 patients (hypometabolism 77% vs hypermetabolism 33%). The alteration in the nuclei of the base was observed in only 23 patients (52% hypermetabolic vs 48% hypometabolism).
Conclusions: The findings identified by the visual method (qualitative) in PET-CT FDG cerebral suggests an evolutionary radiological pattern characterized by initial affection of temporal and occipital cortex, followed by parietal cortex, frontal and finally nuclei of the base; observing the biological coherence of the dynamic brain pattern PET-CT FDG and the evolution of the disease. This qualitative observation was possible given the observation of the clinical status of the patient, the time of disease evolution, and the findings are presented in the brain PET-CT FDG; as well as in brain PET-CT FDG replication in 5 of the 30 patients with anti-NMDAr encephalitis during their hospitalization.

123—Characteristics of the electroencephalogram associated with the clinical prognosis of patients with anti-NMDAR encephalitis, in the National Institute of Neurology and Neurosurgery (INNN)

Theme: Clinical Research

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Background: Anti-*N*-methyl-D-aspartate receptor (NMDAr) encephalitis is the second cause of autoimmune encephalitis in children and the first in adults. Seizures are the most frequent initial symptom in young people. The electroencephalogram (EEG) abnormality is documented in 80%–90%, due to slow focal or generalized activity, epileptiform activity, and Delta Brush Extreme pattern (EEG-DBE). EEG-DBE has been observed in 33% of patients, being associated with severity.
Objectives: To identify the association of the EEG characteristics and the clinical prognosis of patients with anti-NMDAr encephalitis.
Methods: Review of records with diagnosis of NMDAr encephalitis treated at the National Institute of Neurology and Neurosurgery (INNN). EEG characteristics were recorded at admission, clinical characteristics in hospitalization, and clinical follow-up up to 12 months after discharge.
Results: The EEG was abnormal in 31/32 patients (97%), 29 with severe generalized dysfunction (53%). We observed epileptic activity in 22%, EEG-DBE in 22% and epileptic status in

16%. The average time from onset of symptoms to EEG was 56 days (95% confidence interval (CI), 24–89). The EEG-DBE was associated with greater clinical severity during hospitalization ($p = 0.015$, OR = 1.58, 1.12–2.23) with positive predictive value (PPV): 100%, negative predictive value (NPV): 52%, sensitivity: 36%, and specificity: 100%. Epileptic activity was associated with mechanical ventilation ($p = 0.032$, OR = 4.76, 95% CI = 1.09–20.83), Rankin ≥2 to 6 ($p = 0.013$, OR = 6.66, 95% CI = 1.59–27.89) and 12 months of discharge ($p = 0.046$, OR = 6.0, 95% CI = 2.45–14.76). Status epilepticus was associated with death ($p = 0.02$, OR = 10, 95% CI = 3.4–29.41). In actuarial analysis by Kaplan–Meier method, difference was observed for Rankin outcome at discharge ≤3, between patients with and without status epilepticus (Log-Rank test $p = 0.007$).

Conclusion: The EEG is a very useful tool in the evaluation of patients with anti-NMDAr encephalitis, which can estimate the patient's prognosis during their hospitalization and in the short term after hospital discharge.

142—High CD4+ and CD8+ T-cell response to varicella zoster virus in patients with multiple sclerosis

Theme: Clinical Research

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Background: The etiology of multiple sclerosis (MS) is unknown, but it has been related to genetic and environmental factors. In the Mexican population, it has been related to varicella zoster virus (VZV) since high numbers of VZV particles have been found in cerebrospinal fluid and peripheral blood mononuclear cells (PBMC) of MS patients, but its role in the disease has not been established.

Objectives: The aim of this study was to evaluate the response of MS patients' T cells to the stimulation with VZV, both during relapse and remission.

Methods: PBMC from relapsing and remitting MS patients ($n = 30$) and healthy controls ($n = 38$) were stimulated with VZV, adenovirus (AV), and Epstein–Barr virus (EBV). Proliferation of CD4+, CD8+, and regulatory T cells was evaluated by the incorporation of bromodeoxyuridine using flow cytometry. In addition, the cytokines released to the cell culture supernatant stimulated with VZV and EBV were quantified, and the IgG and IgM antibodies against these viruses were determined in the serum of patients and controls.

Results: In relapsing patients, we found a high proliferative response of CD4+ and CD8+ T cells stimulated with VZV, but not with AV. In contrast, no significant difference was found in the proliferative response to EBV in any of the study subjects. Quantification of cytokines showed a predominance of Th1 cytokines in the cell cultures of remitting patients stimulated with VZV. Finally, a high concentration of IgG against VZV was found both in patients and healthy controls.

Conclusions: In sum, results obtained in this study showed an exacerbated response of CD4+ and CD8+ T cells from MS patients to VZV stimulation, suggesting the participation of this virus in the immunological alteration of MS.

25—The relationship between memory and executive functions in relapsing-remitting multiple sclerosis patients

Theme: Cognitive Commitment
Theme 2: Clinical Research

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Background: Cognitive impairment is a frequent feature in multiple sclerosis (MS), with prevalence rates ranging from 40% to 65%. Some research work on memory impairment in MS suggests that the main difficulty would be in the initial learning of verbal information (verbal memory), being the visuo-spatial memory spared. However, other researchers suggest that the main issue would be in verbal memory information acquisition and in visual memory acquisition and storage. Despite the attempt to compare MS patients performance on verbal memory and visual memory tasks, the studies show contradictory results and do not analyze in detail the possible relationship between both types of memory and executive functioning.

Objectives: To evaluate the relationship between visual and verbal memory impairment and executive functions in relapsing-remitting multiple sclerosis patients.

Methods: A complete neuropsychological test battery was performed on 25 relapsing-remitting MS patients and 27 healthy controls.

Results: We found significant differences in the performance on Rey auditory verbal learning test immediate recall ($p < 0.00$) and delayed recall ($p < 0.00$), and in Aggie Figure learning Test immediate recall ($p < 0.02$) and delayed recall ($p < 0.04$) between MS patients and controls. We also found significant differences in the performance on IFS ($p < 0.01$), digit symbol substitution test ($p < 0.01$), and in processing speed index (Wechsler Adult Intelligence Scale III (WAIS-III); $p < 0.01$) between the two groups. Significant correlations were observed on memory tests and executive function tests performance.

Conclusion: Our study shows that memory impairment in relapsing-remitting MS patients is a complex phenomenon. Both types of memory were affected in similar way, and slow processing speed and executive dysfunction play an important role in the performance in memory tasks.

26—The relationship between incidental learning and executive functions in relapsing-remitting multiple sclerosis patients

Theme: Cognitive Commitment

Theme 2: Clinical Research

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Background: Cognitive impairment is a frequent feature in multiple sclerosis (MS), with prevalence rates ranging from 40% to 65%. Executive functions (EFs) are frequently affected in MS. Incidental learning refers to the ability of learning new information without having the intention to do it. EFs are necessary for incidental learning; however, to date, there are no studies about the relationship between them in relapsing-remitting MS patients.
Objectives: To evaluate the performance on EF and incidental learning task in relapsing-remitting MS patients in order to get a deeper understanding of their cognitive profile.
Methods: A complete neuropsychological test battery was performed on 30 relapsing-remitting MS patients and 30 healthy controls. This battery included the digit symbol substitution test (Wechsler Adult Intelligence Scale III (WAIS III; incidental learning), Rey complex figure test (incidental learning), and an ecological incidental learning test.
Results: We found significant differences in the performance on executive screening tests ($p < 0.00$), phonemic verbal fluency ($p < 0.01$), 3-second paced auditory serial addition test (PASAT-3″; $p < 0.00$), symbol search test ($p < 0.00$), digit symbol substitution test ($p < 0.00$), processing speed index ($p < 0.00$), Rey complex figure test (incidental learning, $p < 0.00$), and in the ecological incidental learning test ($p < 0.00$) between MS patients and controls. Positive correlations were observed on the incidental learning test, executive screening test, working memory test, and processing speed index.
Conclusion: The incidental learning is impaired in relapsing-remitting MS patients and it is influenced by executive dysfunction. These results are important to understand these patients' cognitive profile in clinical setting, especially in rehabilitation context.

29—Is there a relationship between incidental learning and self-temporal projection in relapsing-remitting multiple sclerosis patients?

Theme: Cognitive Commitment

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Background: Cognitive impairment is a frequent feature in relapsing-remitting multiple sclerosis (RRMS), which generally affects attention, memory, executive functions, and processing speed with prevalence rates ranging from 40% to 65%. This cognitive impairment has a high impact in activities of daily living.
Objectives: The aim of this study is to assess the performance on incidental learning and self-temporal projection in RRMS patients and describe the relationship between both constructs.
Methods: A complete neuropsychological test battery was performed on 23 RRMS patients and 19 healthy controls. This battery included the Digit Symbol Substitution Test (Wechsler Adult Intelligence Scale III (WAIS III); incidental learning), the Rey–Osterrieth Complex Figure Test (ROCF; incidental learning), and Self-temporal Projection test.
Results: Significant differences were found in the performance on digit symbol substitution test (incidental learning; $t(36,081) = -3035$, $p < 0.01$) and the ROCF (incidental learning; $t(40) = -3290$, $p < 0.01$) between RRMS patients and controls. Significant differences between groups were found in the performance on future STP, but not on past STP. Positive correlations were observed on the incidental learning test (ROCF) and past and future STP.
Conclusion: Incidental learning is impaired in RRMS patients and has a relation with self-temporal projection. These results are important to understand these patients' cognitive profile in a clinical setting, especially in a rehabilitation context.

56—Clinical parameters at multiple sclerosis diagnosis and cognitive performance in relapsing-remitting multiple sclerosis patients

Theme: Cognitive Commitment
Theme 2: Clinical Research

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Background: Cognitive impairment in multiple sclerosis (MS) has a high prevalence of and its relationship with clinical parameters at MS diagnosis is still unknown.
Objectives: To analyze the association between clinical parameters at diagnosis of MS (Expanded Disability Status Scale (EDSS) and relapses) and cognitive performance in patients with relapsing-remitting multiple sclerosis (RRMS).
Methods: A total of 124 RRMS patients were assessed with Brief International Cognitive Assessment in MS (BICAMS) and Beck Depression Inventory (BDI). Gender, age, education, EDSS, disease evolution, total relapses, and EDSS at diagnosis were registered. A descriptive and inferential analysis using SPSS was performed.
Results: 86% were women. Age mean (±SD): 38.48 ± 11.38 (years), education mean: 13.96 ± 3.2 (years), disease evolution mean:

9.57 ± 8.1 (years), EDSS mean: 2.5 ± 1.6, total relapses mean: 2.9 ± 1.5, relapses at diagnosis mean: 1.71 ± 0.84, EDSS at diagnosis mean: 1.9 ± 0.97. Correlations between EDSS, total relapses, and relapses at diagnosis with Brief Visual Memory Test–Revised (BVMT-R), Symbol Digit Modalities Test (SDMT), and California Verbal Learning Test-II (CVLT-II) were not found. EDSS at diagnosis significantly correlated with BVMT-R, CVLT-II, and SDMT ($r = -0.67$, $p < 0.001$; $r = -0.68$, $p < 0.001$; $r = -0.69$, $p < 0.001$, respectively).
Conclusion: Worse EDSS at MS diagnosis correlates with low cognitive performance in RRMS. The results suggest the need to consider cognitive decline from MS diagnosis.

60—Performance on a digital neuropsychological test battery in individuals with relapsing-remitting multiple sclerosis and healthy controls. Normative values

Theme: Cognitive Commitment

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Background: The INECO digital neuropsychological test battery is a valid tool for the assessment of attention, episodic memory, working memory, and processing speed in multiple sclerosis (MS) patients. This battery allows us to make an adequate remote assessment of patients' cognitive status, being more efficient in terms of costs and time.
Objectives: To compare the performance on the INECO digital neuropsychological test battery in individuals with relapsing remitting MS and healthy controls, in order to obtain normative values.
Methods: The INECO digital neuropsychological test battery and a standard neuropsychological assessment were administered to 33 relapsing-remitting MS patients and 70 healthy controls in Buenos Aires, Argentina. Mean age: 39.16 years old (9011). Every subject had at least 12 years of education. We used *T* test to evaluate the differences between the groups. Alpha score established was 0.05.
Results: Groups did not differ with regard to demographic variables (age, sex, and years of education). We found significant differences in the performance on IFS, phonemic verbal fluency, processing speed index (Wechsler Adult Intelligence Scale III (WAIS-III)), Rey auditory verbal learning test, and Rey complex figure test between MS patients and controls, in the standard assessment. We also found significant differences between the two groups in the performance on computerized test that assessed attention, working memory, processing speed, and episodic verbal and visual memory. Normative values were matched by age according to the interval superposition strategy.
Conclusion: The INECO digital neuropsychological test battery is a sensitive tool for the assessment of attention, executive functions, and episodic memory in relapsing-remitting MS patients. We obtained normative values for adults (18–60 years old).

61—Normative values for PASAT-3″ and PASAT-2″ in Argentina

Theme: Cognitive Commitment

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Background: The paced auditory serial addition test (PASAT), a test of working memory and processing speed, is a sensitive measure of cognitive dysfunction in multiple sclerosis (MS) and has been included in several cognitive batteries that are used in its assessment. Most of these batteries include two versions of the test: PASAT-2″ and PASAT-3″, which differ mainly on the velocity of stimulus presentation. In Argentina, we only have normative values for PASAT-3″.
Objectives: To obtain normative values for PASAT-2″ and PASAT-3″ in healthy controls in Argentina and to evaluate the effect of demographic variables on these results.
Methods: PASAT-3″ and PASAT-2″ were administered to 114 healthy controls of 18–58 years old ($M = 31.7$; SD = 10.654) in Buenos Aires. Every subject had at least 12 years of education ($M = 16.62$, SD = 2.858). To evaluate the impact of age and education, we performed a correlational analysis. We used T test to evaluate the differences between men and women. Alpha score established was 0.05.
Results: Mean results for PASAT-3″ were 46.45 (8.516) and for PASAT-2″ were 34.34 (7.519). The age and years of education did not influence performance on either test. We found significant differences between men and women in PASAT-3″ ($t(54,783) = 2241$; $p < 0.005$; bilateral) but not in PASAT-2″.
Conclusion: The results obtained for PASAT-3″ are similar to data reported in previous studies in Argentina. Normative values obtained for PASAT-2″ and PASAT-3″ enable their use in Argentina.

62—The reduced version of the Reading the Mind in the Eyes test. Its utility in evaluating complex emotion recognition in relapsing-remitting multiple sclerosis

Theme: Cognitive Commitment

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Background: The Reading the Mind in the Eyes test (RME) evaluates the ability to recognize emotions in 36 photos of eyes. This test is used to evaluate theory of mind in multiple pathologies, but it is criticized due to its length and low internal consistency. It has been reported that patients with relapsing-remitting multiple sclerosis (RRMS) may have difficulties in complex emotion recognition. However, its evaluation in a clinical context is infrequent due to the lack of accessible tools with acceptable psychometric properties.
Objectives: To evaluate the internal consistency and convergent validity of the reduced version of the RME test in an Argentinian population. To compare the psychometric properties of both test in RRMS patients.
Methods: A complete neuropsychological test and the complete RME test (RME-36) were administered to 35 RRMS patients and 106 healthy controls. A reduced version of the RME test, composed of 24 stimuli (RME-24), was then created through an internal consistency analysis. Convergent validity was assessed by correlating with the Mini-SEA facial emotions recognition test. We compared the psychometric properties and functioning of both test versions in MS patients and controls.
Results: RME-24 had a superior internal consistency than RME-36 (Cronbach's alpha value 0.539 vs 0.415). We found a significant correlation between RME-24 and the Mini-SEA facial emotions recognition test ($p = 0.007$; $r = 0.351$). We found significant differences in the performance on RME-36 (t (139) = –4.931; $p < 0.001$; bilateral) and RME-24 (t (139) = –4.126; $p < 0.001$; bilateral) between MS patients and controls.
Conclusion: The reduced version of the RME test has better psychometric properties than the complete version and proved to be sensitive to evaluate the recognition of complex emotions in RRMS patients. We recommend its use due to its reduced extension and better psychometric properties.

65—Prevalence of cognitive impairment in patients with multiple sclerosis from the Andean region of Ecuador

Theme: Cognitive Commitment
Theme 2: Epidemiology

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Background: Cognitive impairment (CI) is frequent in patients with multiple sclerosis (MS). Several studies have shown that the prevalence of CI is between 40% and 70%. However, there have been no studies on the prevalence of CI in Ecuador. For this reason, we will present the first report of the prevalence of CI in patients with MS from the Andean Region of Ecuador.
Objectives: To establish the prevalence of CI in a cohort of patients with MS from the Andean Region of Ecuador.
Methods: We included 119 patients with multiple sclerosis who met the McDonald 2010 diagnostic criteria and who attended the third-level referral centers in the Andean region of Ecuador, such as Carlos Andrade Marín hospital in Quito and the José Carrasco Arteaga Hospital in Cuenca. Cognitive function was evaluated through the following scales: cognitive screening in multiple sclerosis, Rey Auditory Verbal Learning Test, Wechsler Adult Intelligence Scale III (WAIS-III) digit span, Digit symbol test, and the Hamilton rating scale for depression and anxiety. Disability was measured through the Expanded Disability Status Scale (EDSS). Statistical analyses were made using the statistical program SPSS.
Results: The prevalence of cognitive impairment in our cohort of patients was 31%, of which 16.81% was mild, 10.8% moderate, and 4.20% severe. The cognitive functions most commonly affected in our cohort were immediate memory (87.4%), executive function (75.6%), and information processing speed and sustained attention (60.5% in both functions). Anxiety disorder was present in 21.8% and depression in 13.4%.
Conclusion: This is the first study on CI in Ecuador. This study shows that the prevalence of CI is lower than that reported in the literature. However, the domains most frequently affected are the same found in other studies. The prevalence of anxiety is similar to that of other reports, while depression was less frequent.

86—Lower levels of empathy among patients with multiple sclerosis may reflect attention deficits

Theme: Cognitive Commitment
Theme 2: Social

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Background: Patients with multiple sclerosis (MS) have been reported to show lower degrees of empathy toward other individuals and situations. This finding seems to be independent of anxiety and depression traits and it is not necessarily related to neurological disability or disease duration.
Objectives: The objective of this study was to investigate whether these lower levels of empathy might be correlated with lower degrees of attention, since the latter could generate difficulties in interpreting the environmental surroundings of the patient.
Methods: Patients with MS ($n = 40$) were assessed using the Trail Making Test (TMT) and the Empathy Coefficient (EQ). TMT is a good tool for assessing the degrees of attention, visual search and scanning, sequencing and shifting, psychomotor speed, abstraction, flexibility, ability to execute and modify a plan of action, and ability to maintain two trains of thought simultaneously.
Results: Patients with low degrees of empathy had low scores in the TMT evaluation. Only six patients who presented average levels of empathy also showed average skills in the attention test. There were no cases of average (or above average) attention scores among patients with low degrees of empathy.

Conclusion: It is possible that the low levels of empathy observed among patients with MS are in fact a reflection of their difficulties in other skills, such as maintaining sustained attention, exercising flexibility in interpreting the environment, and working with strategies.

99—Cognitive impairment and relapses in multiple sclerosis: Is there a relationship?

Theme: Cognitive Commitment
Theme 2: Quality of life

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Background: Cognitive impairment (CI) in multiple sclerosis (MS) has a prevalence of 43% in our country. The information processing speed (IPS) is one of the most affected cognitive functions. The relationship between CI and clinical issues is the subject of discussion in the current research. In particular, the relationship with relapses is unknown.
Objectives: To study the relationship between parameters related to MS relapses and performance in IPS in patients with MS.
Methods: A total of 232 patients with RRMS were studied using two tests that evaluate IPS: Symbol Digit Modalities Test (SDMT) and Auditory Serial Addition Test (PASAT). Demographic and clinical data were recorded: total relapses (TR) and relapses in the first 2 years of the disease (or early relapse, ER), inter-relapse interval mean (IRI), partial recovery (PR) of at least one early relapse, requirement at least one early course of intravenous corticosteroids, and age at first relapse.
Results: 63.8% were women, age mean: 41.2 ± 12.3 years, education: 13.4 ± 3.3 years, TR mean: 2.14 ± 0.81, IRI mean: 9.1 ± 5.7 months; 33.6% had at least one relapse with PR; and 41.1% required at least one intravenous corticosteroids course. We did not find a correlation between TR, IRI, and requirement of steroids with values of SDMT and PASAT 2 and 3. We found a statistically significant difference between presence and absence of PR with values of PASAT 2 and 3 and SDMT ($p < 0.0001$ in the three cases). We also found a correlation between age at first relapse and the same tests (r: –0.163*; r: –0.164*; r: –0.314**).
Conclusion: The lower recovery of relapses could be associated with a worse performance in the IPS. The higher age at first relapse correlates with lower test scores. More studies are needed to confirm these findings.

110—Study of inhibitory processes in patients with multiple sclerosis

Theme: Cognitive Commitment

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Background: Inhibition implies the ability of controlling attention, thoughts, and behaviors. Such mechanism is essential for learning and for adapting our behavior to the demands of the environment. Three kinds of inhibition are considered: perceptual, cognitive, and behavioral, which have not been analyzed in patients with multiple sclerosis (MS) yet.
Objectives: (1) To investigate the association between the tasks which assess inhibitory processes and the clinical variable of patients with MS, (2) to study its association with cognitive performance, and (3) to analyze inhibitory processes in patients with and without alteration of attention.
Methods: A total of 15 patients with clinical form relapsing-remitting MS were studied. Mean age: 41.73 ± 13.91; education: 13.20 ± 3.93 and 86.7% women; years of illness evolution: 9.43 ± 7.87; Expanded Disability Status Scale (EDSS): 1.96 ± 0.84; Beck's Depression Inventory: 15.07 ± 11.40. Administered measures: Cognitive Self-regulation Tasks, BICAMS (California Verbal Learning Test, Symbol Digit Modalities Test–Oral Version, Brief Visuospatial Memory Test), PASAT, Spatial Recall Test 7/24, EDSS, Fatigue Severity Scale, and Beck's Depression Inventory.
Results: A negative and significant association was found between cognitive inhibition and a verbal memory task (rho = –0.737; $p = 0.002$) and between behavioral inhibition and an attention test (rho = –0.630; $p = 0.012$). Besides, a positive relation was found between cognitive inhibition and depression (rho = 0.535; $p = 0.040$). Finally, it was found that patients without alteration of attention (Mdn = 1.66) have a better performance in the perceptual inhibition task than patients with alteration of attention (Mdn = 6.66; $U = 7.00$; $p = 0.012$).
Conclusion: Perceptual, cognitive, and behavioral inhibition are associated with cognitive performance and patients' mood. Patients with an alteration of attention show greater difficulty inhibiting environmental stimuli.

113—Neuropsychological evaluation in patients with multiple sclerosis undergoing treatment with REBIF

Theme: Cognitive Commitment

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Objectives: To describe the behavior of the Superior Psychic Functions in patients with multiple sclerosis (MS) treated and not treated with Rebif and to identify the most affected functions.

Methods: We studied 26 patients treated at the International Center for Neurological Restoration, divided into two groups: 13 patients with MS (treated with Rebif) and 13 untreated patients. Clinical variables, such as subtype of MS, duration of disease, medication, and neuropsychological profile were analyzed.
Results: The study showed that most of the patients treated and not treated with Rebif presented cognitive alterations. The most affected functions were attention, long-term memory, and executive functions. Patients treated with Rebif reported fewer symptoms of depression than those not treated. No relationship was found between clinical variables and cognitive impairment.
Conclusion: The Superior Psychic Functions are affected in patients with MS treated and not treated with Rebif. Depression was lower in patients treated with Rebif.

117—Neuropsychological profile and disability degree in patient with relapsing-remitting multiple sclerosis

Theme: Cognitive Commitment

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Background: Multiple sclerosis is a chronic inflammatory demyelinating disease of the central nervous system. It is considered as the most prevalent and disabling non-traumatic disease affecting the population of young and middle-aged adults. The presence of cognitive affections in these patients is known. Many studies are characterized by a high level of heterogeneity in the composition of the samples in terms of clinical variables, as well as variability in the methodology used.
Objectives: To evaluate the neuropsychological profile and the disability degree in a group of patients diagnosed as relapsing-remitting multiple sclerosis subtype.
Methods: We studied 26 patients treated at the International Center for Neurological Restoration, diagnosed as relapsing-remitting multiple sclerosis subtype. The attention functions, memory, language, visuo-spatial abilities, and executive functions were evaluated, as well as their possible relationship with the disability degree.
Results: The study showed a cognitive in 88.46% of patients. The verbal auditory memory, the front executive functions, and in smaller measure the attention were the most affected functions. The affectation of the disability degree oscillated between light and moderate and there was no relationship between the cognitive impairment and the disability.
Conclusion: The Psychic highest functions were affected in a different manner in patients with multiple sclerosis, beside the disability degree.

118—Multitasking in multiple sclerosis: An ecological approach to patient's impairment

Theme: Cognitive Commitment
Theme 2: Quality of life

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Background: Multiple sclerosis (MS) patients show cognitive and motor deficits. These deficits are regularly assessed separately; however, recent studies have found an interaction when these tasks are performed simultaneously (cognitive-motor interaction, CMI). The research in CMI allows a more ecological approach to the description of MS symptoms.
Objectives: (1) To compare CMI performance between MS patients and healthy controls. (2) To examine the relationship between CMI and activities of daily living (ADL).
Methods: Seventy-one patients with relapsing-remitting MS and 20 healthy controls were included. Patients' age: 39.0 ± 11.14; education: 13.48 ± 3.51; controls age: 34.00 ± 14.25; education: 14.75 ± 2.17. Expanded Disability Status Scale (EDSS): 2.45 ± 1.29. Disease evolution: 9.53 ± 9.02. Outcome measures: Clinical variables: EDSS; Depression Inventory II. ADL: MS Quality of life (MusiQol) ADL subscale. Cognitive variables: BICAMS Battery. Dual tasks: Two cognitive–motor interaction tasks (walking while performing verbal fluency/sums). The measure of the difference between subject performances in the simple task versus dual task was obtained. It was quantified as: time, number of steps, and cognitive performance. Parametric and nonparametric statistics were used; a value of $p < 0.05$ was accepted to define significance.
Results: Patients and controls were matched by age and education ($p = 0.268$; $p = 0.083$). Significant differences were found between patients and controls in CMI, in the time and number of steps of the task of sums ($p = 0.023$, $p = 0.005$), and in the performance of both cognitive tasks (fluency $p = 0.017$; sums $p = 0.001$). Significant negative correlations were found between CMI and ADL ($r = –0.557$ to $–0.568$). CMI constituted as a predictor of performance in ADL (R^2: 0.529, p: 0.002).
Conclusion: Patients with MS show alterations in cognitive-motor tasks. This performance has an impact in ADL that should be considered in patient's treatment.

144—Brief International Cognitive Assessment for Multiple Sclerosis (BICAMS): Regression-based norms to the Brazilian context

Theme: Cognitive Commitment

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Background: Brief International Cognitive Assessment for Multiple Sclerosis (BICAMS) is a screening protocol recently validated and reliable to the Brazilian context. BICAMS allows to predict the functional performance, treatment efficacy by screening of cognitive impairment. The BICAMS is known to have relations with a number of impaired gray matter regions, with right superior frontal lobe atrophy, hypointensity on T2-weighted images of both the caudate and globus pallidus (SDMT), left frontal lobe atrophy (CVLT-2), and right frontal lobe atrophy (BVMT-R).
Objectives: The objective of this study is to derive regression-based norms for the BICAMS to the Brazilian context and to obtain additional estimates of validity.
Methods: A total of 127 multiple sclerosis (MS) patients and 602 healthy controls (HC) were assessed. Group differences, Cohen's *d*, chi-square test, and associations between the individual neuropsychological tests and vocational status were tested with multiple regression models adjusted for age, sex, education, Expanded Disability Status Scale (EDSS), and anxiety and depression disorders. Bayesian path analysis was used to identify predictors of demographic variables on BICAMS. Corrections for demographics were calculated using multivariable linear regression models.
Results: No statistical significant difference of age (HC: 41.03 ± 12.71; MS group 41.77 ± 12.33) and education (HC: 11.75 ± 4.22; MS: 10.91 ± 4.30) were found. 50%, 31%, and 17% of MS were evaluated as impaired by one, two, and three BICAMS tests, respectively. After accounting for demographic variables and depression in a stepwise logistic regression, the full model significantly predicted employment status (chi-square = 43.98, df = 7, $p < 0.0001$). Bayesian path analysis showed that high levels of education and younger age had better performance on BICAMS tests.
Conclusion: This study provided regression-based norms of the BICAMS for the Brazilian population, confirming good estimates of additional psychometric properties, improving its use in daily clinical practice.

12—Epidemic characterization, clinic and quality of life in patients with multiple sclerosis. Hospital Arnaldo Milián Castro: 2015–2017

Theme: Quality of life

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Background: The multiple sclerosis is a demyelinating, degenerative, chronic, autoimmune, and inflammatory disorder that affects the nervous central system. It constitutes the first cause of neurological disability in young adults
Objectives: To characterize the patients with diagnosis of multiple sclerosis and their association with the quality of life assisted in the Service of Neurology of the Hospital "Arnaldo Milián Castro" of Villa Clara during the period of January 2015 to December 2017.
Methods: A descriptive, traverse study; the study population constituted 30 patients.
Results: The average of premier age was 38.7 years. The relationship among patient with color of white and not white skin was 9:1 and that of women and men of 14:1. The relapsing-remitting multiple sclerosis represented 70% and the minimum grade of disability 60%. 48.27%, 41.37%, and 37.93% of patients presented lesions supratentoriales, infratentoriales and in number from 2 to 4, respectively. The components of the quality of life that more they were affected they were; the physical component of the state of health, the impact of the fatigue and the effects of the pain.
Conclusion: The feminine sex and the color of white skin predominated; the premier age was from 20 to 29 years. The most common symptoms were the alterations motorboats, sensitive and cerebelosas. The clinical form of predominant presentation was the relapsing-remitting multiple sclerosis and the grade of minimum disability. The lesions supratentoriales and infratentoriales and the quantity of lesions in number from 2 to 4 were the most frequent; most of the cases presented change of intensity of the callous body. The time of evolution of the illness associated with the physical component of the state of health. The primary progressive clinical form associated with the physical component of the state of health and the exacerbating remittent form with the effect of the pain. The disability associated statistically with the physical component of the state of health.

15—Lifestyle in people with multiple sclerosis, comorbidities, and health-related quality of life

Theme: Quality of life

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Background: The unhealthy lifestyle and associated comorbidities would be related to poor evolution and lower health-related quality of life (HRQoL) in people with multiple sclerosis (PwMS).
Objectives: To evaluate the lifestyle in PwMS, comorbidities, and its relationship with HRQoL.

Methods: Descriptive, cross-sectional study, PwMS completed an online survey on demographic and disease aspects, HRQoL, comorbidities, and habits. The data were analyzed using Student's *t* test or Mann-Whitney test, chi-square or Fisher's exact test, and multivariable linear regression.
Results: 220 PwMS, age: 41.86 years (SD: 10.5), 76% women, 72% relapsing-remitting MS. 13.2% reported hypertension, 10.5% hypercholesterolemia, 5.5% diabetes, 31.8% overweight, and 17.3% obesity. 22.7% were smokers, 10.5% had hazardous alcohol use. 45.9% reported inadequate diet, 74.5% reported physical activity lower than that recommended for the general population, 25% high stress level, and 24.1% insufficient social network. Lack of physical activity was associated with lower values in the SF12-physical component summary (PCS-SF12; $p = 0.018$). High level of stress and insufficient social network was associated with lower values in the mental component (MCS-SF12; $p < 0.001$, $p = 0.006$). In the multivariable linear regression, relapses, degree of disability, and lack of physical activity were related to lower PCS-SF12 (beta = –0.20/–0.63/–0.12, $p < 0.01$; $R^2 = 0.48$). Relapses, stress, and insufficient social network were associated with lower MCS-SF12 (beta = –0.14/–0.35/–0.12, $p < 0.05$, $R^2 = 0.22$).
Conclusion: An appreciable percentage of PwMS presents unhealthy characteristics of their lifestyle but, except for physical activity, stress and insufficient social network, no association was found with HRQoL. More data will be obtained from the longitudinal follow-up of these patients.

35—Relapses and the level of disability are associated with lower quality of life in people with multiple sclerosis: A cross-sectional study based on an online survey

Theme: Quality of life

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Background: Self-perception of health status and health-related quality of life (HRQoL) provides useful information for the evaluation of patients. HRQoL is affected by multiple factors that include the characteristics of the own disease.
Objectives: To evaluate the impact on HRQoL of the occurrence of relapses and the level of disability in people with relapsing-remitting multiple sclerosis (PwRRMS).
Methods: Cross-sectional study based on an online survey with PwRRMS. Questions about health and demographics, including Short Form Health Survey-12 (SF-12).
Results: 160 PwRRMS, 78% women, age 40.4 years (SD: 10.2), years of diagnosis: 8 (SD: 6.5). 45.6%–54.4% moderate to severe disability (M/SDis). 38.8% presented activity (one relapse or more: R+). The percentage with regular or bad general health (GH) is higher in M/SDis compared to without disability or mild disability (w/mDis) (42.5% vs 9.6%, $p < 0.001$, odds ratio (OR), 6.97 (2.8–16.94)) and in the R+ versus no relapses (40.3% vs 19.4%; $p = 0.006$, OR, 2.8 (1.37–5.73)). M/SDis is associated with worse PCS-SF12 (47.5 vs 34.3, $p < 0.001$), without significant difference in MCS-SF12. R+ is associated with worse PCS-SF12 and MCS-SF12 (43.2 vs 35.8, $p < 0.001$, 47.5 vs 41.7; $p < 0.001$), also in the subgroup of lower disability. These data are verified in the multivariate analysis.
Conclusion: HRQoL in people with RRMS is affected by the occurrence of relapses and the level of disability. Both affect the perception of GH and the physical component, but the mental component is only affected by relapses. This is also verified in the subgroup without disability/mild disability, which demonstrates the importance of the control of the clinical activity of the disease in relation to quality of life.

45—Clinical evolution of patients with multiple sclerosis in a Colombian cohort

Theme: Quality of life
Theme 2: Epidemiology

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Background: Kurtzke's Expanded Disability Status Scale (EDSS) score is a measure to assess the status of disability and progression of patients with multiple sclerosis (MS).
Objectives: To analyze clinical evolution using EDSS score according to phenotype and evolution time.
Methods: Longitudinal study of historical cohort of patients with MS in a multicentric institution in Colombia, from September 2014 to March 2018. Data were obtained from electronic clinical records with baseline EDSS ≥= 1.0 upon admission of the program. Incidence rate of clinical improvement was estimated and the survival analysis was performed using Kaplan–Meier curves, the outcome was the time to clinical improvement defined as reduction >1 point in patients with baseline EDSS <5.5 and reduction of 0.5 points with baseline EDSS ≥ 5.5. Categorical variables are presented as absolute and relative frequencies; and continuous variables as median and interquartile range (IQR).
Results: Of the 229 patients, 73.4% (168) of the patients were women, with median age of 46 years (IQR, 37.3–57.7 years), and 35 years median age at diagnosis (IQR, 28.1–45.0 years), median time to disease progression was 8 years (IQR, 4.7–15.3 years). Low-moderate efficacy drugs were used in 40.6% (93) of the patients. According to the EDSS, on admission, 45.4% (104) had values <3.0, 32.3% (74) between 3.5 and 6.0, and 22.3% (51) ≥6.5. Currently, 43% (98) of patients remain with EDSS <3.0, 28.4% (65) with EDSS between 3.5 and 6.0, and 28.8% (66) ≥6.5. Median time to clinical improvement, according to disease evolution, was: <2 years: 8.2 months (IQR, 3.2–13), between 2 and 5 years: 4.7 (IQR, 1.6–7.9), between 5 and 10 years: 7.9 (IQR, 5.2–10.8), and ≥10 years: 24.8 (IQR, 11–38.6; $p = 0.004$); according to the

phenotype: relapsing-remitting 7.13 months (IQR, 3.03–16.34), and progressive 24.03 months (IQR, 6.56–40.53; $p = 0.004$). When analyzing by subgroups according to baseline EDSS, improvement incidence rate for values <5.5 was 12.62 (95% CI, 10.28–15.34) for each 100 person-month, and values ≥5.5 was 4.30 (95% CI, 3.11–5.79). No significant differences depending on disease evolution time or phenotype were found.
Conclusion: Time to clinical improvement in MS patients, measured by change in EDSS score, was faster in patients with evolution of the disease between 2 and 5 years and in relapsing-remitting phenotype patients; those patients who enter with EDSS ≥5.5 have a slower clinical improvement.

59—The value of multiple sclerosis caregiver BURDEN Scale. An Argentinean population

Theme: Quality of life
Theme 2: Social

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Background: The caregivers of patients with multiple sclerosis (MS) may present with the so-called caregiver burden syndrome. The Zarit Scale has been applied in prior studies. However, this scale was designed for caregivers of patients with dementia, and patients with MS constitute a population with different symptoms.
Objectives: To analyze the psychometric properties of a version of the Zarit Scale tailored for the caregivers of patients with MS.
Methods: We drafted 10 questions related to symptoms specific to MS that may lead to discomfort in caregivers, which were incorporated into the Zarit Scale. This version was administered to 40 informal caregivers of patients with MS along with the Neuropsychiatric Inventory (NPI), the Beck Depression Inventory (BDI-II), the Stait Trait Anxiety Inventory, and an actual patient dependency scale.
Results: Caregivers had a mean age of 52.1 years (SD = 18); 58% were women. The modified Zarit Scale had a Cronbach's alpha of 0.97; Guttman's split-half was 0.95, and all item-total correlations were >0.50. Positive Pearson's correlations >0.60 were found between the scale and total NPI, the NPI of caregiver burden, and the actual dependency scale and BDI-II. An abridged version with 16 questions comprising the items with the highest discrimination power had a Cronbach's alpha of 0.95, and similar correlations as the ones found with the full version, with NPI of the caregiver, dependency, and BDI-II.
Conclusion: Although the study population is small, the data suggest that both the full and the abridged versions of the scale are adequate to measure the burden of the caregivers of patients with MS, showing adequate reliability and convergent validity rates. Conducting further studies with this population will provide a better understanding of the psycho-social issues that trigger caregiver stress in this population.

64—Vocational monitoring and clinical and cognitive variables. Argentinian adaptation of the BUFFALO Vocational Monitoring Survey

Theme: Quality of life
Theme 2: Cognitive Commitment

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Background: The Buffalo Vocational Monitoring Survey (BVMS) is a tool to characterize work-challenged patients and identify patients for intervention.
Objectives: Given the lack of an instrument in Spanish, we have proposed: to evaluate the adaptation of the Spanish version of the BVMS; to describe findings from this survey; to analyze the relationships between both negative events and clinical and cognitive variables, as well as accommodations and clinical and cognitive variables.
Methods: A total of 83 MS patients (95.2% relapsing-remitting (RR), 1.2% secondary progressive (SP), 3.6% primary progressive (PP)) were included. 59% female; age: 39.51 ± 10.00 years; education: 14.20 ± 2.92 years; Expanded Disability Status Scale (EDSS): 2.56 ± 1.90; disease evolution: 10.03 ± 7.23. Outcomes measures: BVMS, EDSS, BDI, Fatigue Scale. Outcomes measures: BICAMS comprises the SDMT, CVLT, and BVMT-R; 7/24 Visuospatial Scale, PASAT2″-3″, verbal fluency. Two factors were obtained: clinical factor (EDSS-fatigue-depression) with a Cronbach's $\alpha = 0.358$); Cognitive factor (SDMT-CVLT-BVMTR) with a Cronbach's $\alpha = 0.792$. Psychometric evaluation included a professional translator, face and content validity procedure performed by an expert, a field test to verify the understanding of the contents and external criterion validity.
Results: Regarding external criterion validity, between employees (dependent and self-employed) versus unemployed (unemployed-retired) significant differences were obtained: Cognitive factor ($p = 0.021$), SDMT ($p = 0.009$), BVMT-R ($p = 0.005$), PASAT-3 ($p = 0.005$), and PASAT-2 ($p = 0.001$). Of 66.3% employee, 39.8% are in a dependency relationship, 19.3% are self-employed of informal works, and 7.2% are self-employed composed of university professionals. 16.9% are unemployed. 7.2% refer decrease of scheduled work hours, 4.2% removal of job responsibilities, 3.6% asked to work additional hours, and 2.4% formal discipline for a mistake. Regarding

accommodations, flexible work hours, access refrigerator, memory aids, and use of air condition are the most frequently used. Depression (p = 0.044), Fatigue (p = 0.017), Clinical Factor (p = 0.005), Verbal Fluency (p = 0.016), PASAT-3 (p = 0.004), and PASAT-2 (p = 0.008) differentiate patients with and without negative events. Verbal memory (p = 0.335) and cognitive factor (p = 0.407) presence of accommodations.
Conclusion: This Spanish version is a new tool to monitor employment difficulties in Spanish-speaking MS patients.

66—Influence of physical disability on driving in patients with multiple sclerosis

Theme: Quality of life
Theme 2: Social

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Background: Driving improves quality of life in most people by providing with autonomy. The variability of clinical manifestations in multiple sclerosis (MS) is of great relevance when driving a car.
Objectives: To assess the relationship between Multiple Sclerosis Composite Functional (MSFC) Scale, Expanded Disability Status Scale (EDSS), and driving tests in MS patients compared to healthy controls.
Methods: A total of 30 driver MS-patients were evaluated: 16 women, mean age of 35 (24–51) and 8.1 years of evolution of MS (2–32 years). This sample has 27 relapsing-remitting, 2 primary progressive, 1 secondary progressive, with a mean EDSS score of 2.4 (0–7). We included 15 healthy controls. We collected a specific questionnaire (symptoms, changes in driving, traffic accidents), MSFC, and driving test (speed of anticipation and bimanual coordination measuring number of errors and time to perform) in both groups and EDSS in patients.
Results: Six patients and three controls have had traffic accidents, four patients were not driving at the moment, and eleven of them had changed their driving habits. MS patients had more problems performing the driving test due to motor symptoms and fatigue than controls. MSFC-Z Score was –0.88 for patients and 1.79 for controls. We found correlation between MSFC and both bimanual coordination test time (r = –0.505, p < 0.05) and EDSS (r = 0.513, p < 0.05). The number of errors in the driving test was significantly correlated with both MSFC (r = 0.684, p < 0.01) and EDSS (r = 0.669, p < 0.01).
Conclusion: Driving problems in MS patients are more frequent than in controls. The physical limitations assessed by EDSS and MSFC correlate with the driving test used. Because of the variability of neurological manifestations and the unpredictable course of the disease, periodical medical examination should be performed in patients with MS who drive.

73—Employment and quality of life in Argentina: Current perspectives

Theme: Quality of life
Theme 2: Cognitive Commitment

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Background: Cognitive and clinical symptoms can have significant negative effects on employment status. The identification of these factors will allow mitigating unemployment in multiple sclerosis (MS) patients.
Objectives: To examine the relationship between employment status (no employment, part-time employment, and full-time employment) and clinical and cognitive variables, to analyze the relationship between work hours and clinical and cognitive variables, and to investigate the relationship between employment status and quality of life.
Methods: A total of 83 MS patients (95.2% relapsing-remitting (RR), 1.2% secondary progressive (SP), 3.6% primary progressive (PP)) were included. 59% female; mean age: 39.51 ± 10.00 years; mean education: 14.20 ± 2.92 years; Expanded Disability Status Scale (EDSS): 2.56 ± 1.90; disease evolution: 10.03 ± 7.23. fatigue: 4.13 ± 1.76; depression: 13.34 ± 10.56. Outcomes measures: Argentina adaptation of the Buffalo Vocational Monitoring Survey, EDSS, Beck Depression Inventory II (BDI II), Fatigue Scale, and MusiQol. Cognitive outcomes: Brief International Cognitive Assessment in MS (BICAMS) (SDMT-CVLT-BVMTR); 7/24 Visuospatial Scale, PASAT 2″-3″ and Verbal fluency.
Results: 18.75% are unemployed and 81.25% employees, of which 36.05% are full-time employees. Education (p = 0.026), cognitive factor (p = 0.007), SDMT (p = 0.009), BVMTR (p = 0.003), PASAT-3 (p = 0.026), PASAT-2 (p = 0.008), 7/24 and Visuospatial Scale (p = 0.007) differentiate the unemployed patients from the employed patients. EDSS (p = 0.002), disease evolution (p = 0.003) and depression (p = 0.022) differentiate between full-time and part-time employees. According to working hours, it differentiates patients who work more than 30 hours per week, EDSS (p = 0.023), disease evolution (p = 0.002), CVLT (p = 0.047), and SDMT (p = 0.018). Regarding quality of life, significant differences were found between the employed and unemployed patients and the total index of the scale (t = –3.11, p = 0.003) and symptom (t = –2.4, p = 0.018).
Conclusion: Cognitive factors differentiate between employed and non-employed patients, while physical disability, disease evolution, and depression differentiate between full-time and part-time patients. Processing speed and verbal memory, together with the physical disability and disease evolution, influence the number of hours worked.

77—Prevalence and factors associated with anxiety in an Argentinian cohort of patients with multiple sclerosis

Theme: Quality of life
Theme 2: Social

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Background: There is scarce information in Argentina and Latin America regarding the prevalence of anxiety in patients with multiple sclerosis (MS) and its association with different clinical-demographic factors.
Objectives: The goal of this study is to determine the prevalence of anxiety in Argentinian MS outpatients and to analyze associated factors.
Methods: A total of 36 consecutive MS patients were included. Anxiety was evaluated according to the anxiety subscale of the Hospital Anxiety and Depression Scale (HADS-A): scores greater than 8 points were considered positive. We analyzed clinical-demographic variables, co-occurrence of depression according to the Patient Health Questionnaire-9 (PHQ-9), and health-related quality of life through the COOP-WONCA questionnaire. Statistical methods: Student's *t*-test, Fisher's test, and Spearman's correlation coefficient. $p < 0.05$ was considered significant.
Results: Women: 66% ($n = 24$). Mean age: 46.7 years (range: 24–75). Relapsing-remitting: 80% ($n = 29$), secondary progressive: 13% ($n = 5$) and primary progressive: 5% ($n = 2$). Mean Expanded Disability Status Scale (EDSS) on evaluation: 2.9 (range: 0–8.5), mean time since diagnosis: 10.4 years (range: 1–30). Anxiety was present in 47% ($n = 17$) of the population (52% mild, 35% moderate, 11% severe). Depression was found in 22% ($n = 8$). The presence of anxiety was associated with higher values on EDSS ($p = 0.02$), history of psychiatric disorders ($p = 0.002$), comorbid depression ($p = 0.003$), and worse health-related quality of life ($p < 0.001$). A positive correlation was observed between EDSS and HADS-A scores ($r = 0.50$, $p = 0.007$).
Conclusion: Anxiety is a very frequent disorder in Argentinian outpatients with MS and is associated with disability, depression, and poor quality of life. Our results highlight the impact of psychiatric comorbidity in this population.

85—Dietary behavior, body image, and sedentarism among patients with MS

Theme: Quality of life

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Background: Healthy dietary habits and physical activity are recommended for all individuals, irrespective of age or disease. Apart from disease prevention, these healthy habits may also be associated with psychological characteristics like pleasurable relationships, good body image, self-esteem, self-confidence, and personal satisfaction. On the other hand, sedentarism and unhealthy dietary habits are associated with chronic pain, illnesses, diabetes, dyslipidemia, cardiovascular disease, and obesity. Among patients with multiple sclerosis (MS), attitudes toward diet and exercising may make a remarkable difference to quality of life and, therefore, to the mid- to long-term prognosis.
Objectives: The objective of this study was to assess aspects of diet and exercising among patients with MS.
Methods: Patients with MS ($n = 40$) and control subjects ($n = 40$) were individually assessed using the Eating Attitude Test (EAT-26), Body Shape Questionnaire (BSQ), and Baecke Physical Activity Questionnaire. All scores obtained through these tools were progressive, meaning that higher values reflected better results.
Results: Patients with MS were less concerned about their dietary habits (median score = 9 vs 16 for control subjects), had worse perception of their body image (median patients' score = 44 vs score = 68 for control subjects) and had lower levels of physical activity (total patients' score = 5.85 vs total control subjects' score = 9.5).
Conclusion: A multidisciplinary approach toward patients with MS is essential when considering the long-term success of disease management. Improvement of the patients' dietary habits and physical activity programs may prove important in treating these individuals.

112—Employment rate in people with multiple sclerosis: A multicenter study from Argentina

Theme: Quality of life

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Background: Unemployment is a significant problem for people with multiple sclerosis (pwMS). During critical years of work life, pwMS show both high unemployment rate and burden of disease. This rate varies between 24% and 80% and is associated with worse quality of life.
Objectives: The aim of our study was to investigate the employment status in pwMS and assess factors associated with unemployment.
Methods: A cross-sectional study was carried out in Argentina, based on a self-administered questionnaire, between August and December 2017. A total of 219 pwMS were assessed by their employment status. We also evaluated demographic, disease course, disability status, comorbidities, level of education, current treatment, health insurance, and burden of MS characteristics, within the last 12 months. These variables were compared between pwMS employed versus unemployed.
Results: A total of 185 (85%) pwMS were employed (full-time: 59%), 34 (15.5%) were unemployed, and 15 (6.8%) were retired due to MS. We found that age at disease onset, gender, disease duration and course, comorbidities, pension due to MS, and both neurological visit and neuro-images frequency in the last year were similar in both groups. Moderate level of disability was significantly associated with unemployment ($p = 0.04$). Current use of MS medication and low level of education were significantly associated with unemployment ($p = 0.01$, $p = 0.04$, respectively). In the unemployed group, 24 pwMS had certified disability retirement or disability benefits ($p < 0.01$). Fourteen pwMS of this group have state-run health coverage.
Conclusion: In this cohort, the rate of unemployment was 15.5%. In addition, this study revealed that the group of pwMS employed has reduction in working hours, salary, working licenses, and disability certificates due to MS.

116—Benefits of assistance dogs in the quality of life of multiple sclerosis patients

Theme: Quality of life

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Background: The number of people with multiple sclerosis (MS) who have assistance dogs (ADs) is growing every year. Although they are appropriate companions for everyone in the general population, people with MS have daily activities that need some help to do it. The decision to acquire an AD makes a challenge to improve the quality of life (QoL) of MS patients.
Objectives: To train ADs focused on patients with mobility difficulties, especially wheeled patients, patients with attention and behavioral difficulties, and patients with poor adherence to pharmacological treatment.
Methods: Prospective study by members of Bocalan ARG, MS clinic, and the department of occupational therapy. Activities were developed through workshops (WS) aimed at patients with MS, relatives and/or assistants who through objective evaluations pre- and post-WS experienced how ADs can impact on three areas of QoL: (1) mobility, (2) adherence to treatment, and (3) social behavior. The dog must pass a series of commands and tasks.
Results: A total of 24 patients with MS and Expanded Disability Status Scale (EDSS) 6–7.5 and 18 relatives and/or assistants were evaluated before and after WS: (1) they improved mobility trough facilitation in daily life activities (DLA) such as access to difficult places; motor rehabilitation through play to increase range of motion in the upper extremities and/or other DLA like brushing, stroking, or throwing an object for the dog to retrieve improving muscle strength in upper extremities; (2) exercises to improve adherence to treatment through an special training system; and (3) to improve thinking/emotional/behavioral patterns.
Conclusion: There are few and small number of studies with methodological limitations published till now. However, despite the methodological limitations, we show that therapy dogs as part of the health care team can help to improve the social, mental, and physical conditions providing emotional support. This is the preliminary report of a prospective study in our MS clinic.

131—Efficacy of occupational therapy approach of the upper limb functionality in patients with multiple sclerosis in Argentina

Theme: Quality of life

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Background: In total, 66% of people with multiple sclerosis (PMS) present dysfunction of the upper limbs that strongly influences their quality of life and activities of daily living (ADL). There is no information in our country about the effectiveness of specific upper-limb (UL) sensorimotor training programs in PMS (according to levels of body functions and activity of the International Classification of Functioning, Disability and Health (ICF-2001, WHO)).
Objectives: To investigate the effects on function of upper limb after activity-centered intervention (activity level ICF) in PMS attending to a MS specialized center.
Methods: A total of 69 ($n = 69$) PMS with motor limitation of UL were evaluated at the beginning and after 3 months of an integral neurorehabilitation program of activity-oriented and person-centered

treatment. Measures: Nine-Hole Peg Test (NHPT), grip dynamometry, key pinch (KP), and Functional Independence Measure (FIM). A descriptive and inferential statistical analysis was performed using the SPSS 21.
Results: Average age: 46.23 years, Expanded Disability Status Scale (EDSS) 5.5 ± 1.62; 58% were women; 60% presented relapsing-remitting MS, 18.8% primary progressive MS, and 18.8% secondary progressive MS. 47.14% of patients significantly improved NHPT ($p < 0.001$), 45.4% improved FIM ($p < 0.001$), and 49.27% the grip dynamometry ($p < 0.001$). Of the latter, 47% improved in the FIM score. In addition, 47.83% improved KP ($p < 0.001$), 45% of which improved FIM.
Conclusion: Sensorimotor-specific training programs for upper limbs, activity-oriented and person-centered, have proved to be an effective tool to address the functional limitations of UL in PMS.

135—The effect of MS disability and symptoms on patients in Brazil

Theme: Quality of life
Theme 2: Social

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Background: In Brazil, there is little knowledge of how multiple sclerosis (MS) disabilities affect patients' work productivity and quality of life.
Objectives: To estimate the impact of MS disabilities and symptoms on patients' work productivity and quality of life.
Methods: This evaluation was part of a multinational burden-of-illness study carried out in Europe and Latin America in collaboration with MS patient organizations. Data collected included disability (EDSS), age, working status, symptoms, and their effects on work productivity; measures of cognition impairment and fatigue by visual analogue scales (VAS; range 0–10) and health-related quality of life (QoL) using EQ-5D. The VAS and EQ-5D scores were calculated as means and presented according to the EDSS subgroups 0–3, 4–6.5, and 7–9.
Results: In total, 694 Brazilian patients were included in the study between April 2016 and December 2017, 94% were below retirement age (65 years for men and 60 years for women) and 46% were active workers. The percentage of patients below retirement age who were working ranged between 68% for EDSS 0 to 0% for EDSS 9.
Conclusion: Work productivity and QoL were negatively impacted in patients at higher levels of disability according to the EDSS, mainly due to fatigue, low mood, and cognitive impairment.

23—Abnormal network connectivity related to social cognition in relapsing-remitting multiple sclerosis

Theme: Radiology
Theme 2: Clinical Research

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Background: Multiple sclerosis (MS) is a source of disability and cognitive declining in young patients. Social cognition and its subcomponents, Social Perception and Theory of the Mind, have focused an increasing interest. Nevertheless, the definition of a specific pattern of socio-cognitive impairment and the underlying structural and functional correlates remain undefined.
Objectives: To better understand the underlying structural and functional correlates of Social Cognition impairment in MS.
Methods: Relapsing-remitting (RR) MS patients and healthy controls underwent a full neuropsychological evaluation including traditional domains and Social Cognition tasks. Structural and functional magnetic resonance images (MRI) were acquired in a 3T scanner. Volumetric analysis included SIENA and voxel-based morphometry, while functional included resting state analysis. Correlations between neuropsychological performance and structural and functional MRI were assessed.
Results: We recruited 118 subjects (50 healthy controls and 68 RR-MS patients) obtaining a young sample (37.43 ± 11.2 years old vs 37.97 ± 10.76 years in control group, p-value = 0.765), with a short disease duration (Median, 4.5 years), and higher functional, educational, and job status. This was also a low disability sample. Even in the absence of significant traditional cognitive impairment, lower performance in social cognition tasks was observed among patients. The structural analysis has shown regional compromise of areas such as insula, caudate, cingulate, and medial frontal gyrus and also correlated with performance in the considered tasks. On the other hand, the same areas found in structural analysis exhibit functional changes in patients, showing both increase and decrease in functional connectivity, representing facilitated and impaired information flow between relevant cortices.
Conclusion: Social cognition exhibits a specific pattern of impairment since earliest stages of the disease even when physical or cognitive disability is absent. It appears to be related to the preferential structural compromise of cortical areas strongly involved in the processing of social information. Functional findings support this notion by reflecting the altered flow of information from socially relevant nodes to the entire brain. Also, our results are compatible with the principles of neural compensation as observed in different cases of brain damage.

63—Sporadic adult-onset leukoencephalopathy with neuroaxonal spheroids a primary microgliopathy

Theme: Radiology
Theme 2: Cognitive Commitment

Sidney Gomes and Joseph Brooks
Center of Neurology

Background: A 53-year-old woman presented with a 12-year history of progressive neuropsychiatric symptoms (depression, anxiety, and aggressiveness), apraxia and memory impairment, and earlier history of numbness, clumsiness, and gait impairment. She was diagnosed with multiple sclerosis and treated with beta interferon without any benefit. The disease progressed and she was bedridden at 52 years of age. Her family history was unremarkable. Axial cranial computed tomography (CT) scan, Flair and SWI-weighted magnetic resonance imaging (MRI) showed frontal cortical and subcortical atrophy, confluent periventricular white matter lesions, and punctate calcifications (Figure 1). Genetic sequence analysis for the colony stimulating factor 1 receptor (CSF-1R) gene showed a mutation in exon 20 c.2654+1G>T. Her neuropsychiatric symptoms are interpreted as components of leukoencephalopathy with neuroaxonal spheroids and may correlate with the severity of this primary microgliopathy. Attention to this clinical-radiologic correlation may help physicians make correct diagnoses.
Objectives: Sporadic adult-onset leukoencephalopathy with neuroaxonal spheroids a primary microgliopathy—case.
Methods: Her family history was unremarkable. Axial cranial CT scan, Flair and SWI-weighted MRI showed frontal cortical and subcortical atrophy, confluent periventricular white matter lesions, and punctate calcifications.
Results: Genetic sequence analysis for the CSF-1R gene showed a mutation in exon 20 c.2654+1G>T.
Conclusion: Her neuropsychiatric symptoms are interpreted as components of leukoencephalopathy with neuroaxonal spheroids and may correlate with the severity of this primary microgliopathy. Attention to this clinical–radiologic correlation may help physicians make correct diagnoses.

80—Magnetic resonance and clinical characteristics in old adults with single-phase demyelinating diseases

Theme: Radiology

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Center of Neurology

Background: Acute disseminated encephalomyelitis (ADEM) is a widespread monophasic inflammatory disease affecting the central nervous system, which usually follows an infection or vaccination.
Objectives: In this study, we present an analysis of magnetic resonance imaging (MRI), cerebrospinal fluid (CSF), and clinical aspects in four patients with clinical diagnosis of ADEM.
Methods: In addition, we have shown that early treatment with methylprednisolone after the initial symptoms was effective for improving clinical manifestations as well as for reducing MRI lesions. An 81-year-old woman had an acute onset of generalized seizures and encephalopathies and behavioral disturbance. Fluid-attenuated inversion recovery (FLAIR) images of brain magnetic resonance showed high-intensity multifocal lesions of the white matter. Within a few days after treatment with intravenous methylprednisolone (1000 mg/day for 5 days), improvement of clinical symptoms and recovery of MRI findings were observed. Six months after withdrawal of oral steroid therapy, recurrent lesions were observed at the same sites initially revealed on admission.
Results: The presence of MRI demyelinating lesions was crucial, but not in itself sufficient for definitive diagnosis. Clinical and MRI follow-up, in order to exclude new lesions and to re-evaluate the former ones, as well as CSF, were important for the differential diagnosis with other demyelinating diseases, particularly multiple sclerosis. Despite the temporary remission after resumption of oral steroid therapy, reduction of oral steroid dosage resulted in new formation of the lesion, in addition to the initial locations.
Conclusion: Based on clinical features, magnetic resonance imaging findings were diagnosed with multiphasic disseminated encephalomyelitis (MSA). ADEM is one of the common causes of demyelinating disease among children. However, the multiphasic form of ADEM is particularly rare in adult patients. Here, we report a rare case of ADEM in the elderly, in which the clinical, radiological characteristics were described, and the efficacy of steroid therapy.

115—Utility of the Matthews's criteria to differentiate MS from NMOSD at disease onset in a Latin American population

Theme: Radiology

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Background: Multiple sclerosis (MS) and neuromyelitis optica spectrum disorders (NMOSD) may present with similar symptoms at disease onset. Recently, Matthews's criteria (MC) were published to differentiate lesion distribution on magnetic

resonance imaging (MRI) of MS and NMOSD. However, these criteria were not evaluated in non-Caucasian population.
Objectives: We aimed to evaluate the utility of these criteria in a Latin American population.
Methods: The MC (lesions adjacent to the lateral ventricle, inferior lesions of the temporal lobe, S-shaped/curved U-fiber lesions and Dawson's fingers) were applied by a blind evaluator in the MRI of a Latin American cohort (Argentina, Brazil, and Venezuela) of patients with MS and NMOSD (diagnosed previously with gold standard criteria). The sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of the MC were determined.
Results: A total of 282 patients were included (MS = 188 and NMOSD = 94, ratio 2:1). Patients were evaluated at disease onset in Argentina (MS = 92, NMOSD = 38), Brazil (MS = 55, NMOSD = 27), and Venezuela (MS = 29, NMOSD = 41). The MC applied to the whole range showed a sensitivity of 97.8%, specificity 82.9%, PPV 92.0%, and NPV 95.1% in differentiating MS from NMOSD. The sub-analysis applied only to non-Caucasian patients (mestizos, natives and zambos, MS = 89 and NMOSD = 47) was 100% sensitivity, 80.8% specificity, PPV 90.8%, and NPV 100%.
Conclusion: These findings suggest that the MC are useful for differentiating MS from NMOSD at disease onset in a Latin American population.

124—Evaluation of brain and spinal MRI lesions to distinguish MS from NMOSD with different serostatus in Latin American patients

Theme: Radiology

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Background: The Matthews's criteria (MC) are based on the shape and distribution of brain lesions in magnetic resonance imaging (MRI), to distinguish multiple sclerosis (MS) from neuromyelitis optica spectrum disorder (NMOSD). However, the study analyzed patients only with NMOSD positive aquoporin-4 antibodies (AQP4-Ab) and spinal cord MRI was not included.
Objectives: We aimed to evaluate MC in positive (P-NMOSD), negative (N-NMOSD), and unknown (U-NMOSD) AQP4-Ab patients, as well as to analyze the utility of spinal cord MRI at disease onset.
Methods: Medical records, brain and spinal MRI of patients with MS and NMOSD from Argentina, Brazil, and Venezuela (previously diagnosed with the validated criteria) were analyzed and scored by a blind evaluator according to the MC (lesions adjacent to the lateral ventricle, lower lobe temporal, S-shaped U-fibers, and Dawson's fingers). Short transverse myelitis (STM: <3 segments) was added as a new criteria. Sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of classic MC and MC plus STM were determined and stratified according to the serological status of AQP4-Ab in patients with NMOSD.
Results: A total of 282 patients were included (EM = 188, NMOSD = 94, ratio 2:1). The sensitivity, specificity, PPV, and NPV of MC and MC plus STM, for EM versus P-NMOSD-P (n = 55) were 97.8%, 70.9%, 92.0%, and 90.6%; and 100%, 58.1%, 89.0%, and 100%, respectively. For EM versus N-NMOSD (n = 28) were 97.8%, 82.1%, 97.3%, and 95.1%; and 100%, 82.1%, 97.4%, and 100%, respectively. For EM versus U-NMOSD (n = 21) were 97.8%, 85.7%, 98.3%, and 81.8%; and 100%, 76.1%, 97.4%, and 100%, respectively.
Conclusion: The study shows that MC are sensitive and specific to distinguish MS from NMOSD at disease onset, regardless of serological status. The aggregate of the STM lesions has no raised sensitivity or specificity in this distinction.

125—Bilateral hemispheric brain lesions in a patient with neuromyelitis optica spectrum disorder: A case report

Theme: Radiology

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Background: Neuromyelitis optica spectrum disorder (NMOSD) is an inflammatory disease of the central nervous system (CNS) characterized by episodes of demyelination and axonal damage, mainly involving the optic nerves and the spinal cord. Brain lesions are present in 50%–60% of cases. However, the presence of extensive hemispheric brain lesions, which are associated with high levels of AQP4 antibodies, are rare.
Objectives: To report a patient with NMOSD who showed extensive hemispheric bilateral brain lesions.
Methods: The medical record and brain and spinal cord magnetic resonance imaging (MRI) of a patient with extensive hemispheric bilateral brain lesions were reviewed, which lead to the diagnosis of NMOSD.
Results: We present a case report of a 51-year-old female patient. Her symptoms started at age 18 when she presented tetraparesis. At 24, she presented bilateral blindness. At 28 years, she presented tetraparesis and bilateral blindness. Subsequently, she was diagnosed with multiple sclerosis, but she did not receive treatment. At 37 years, she developed systemic symptoms which were compatible with SLE. After the diagnosis of SLE was made, she began treatment with azathioprine. At 38 years, she developed urinary

incontinence and partial bilateral blindness. Finally at 49 years, she presented tetraparesis. The patient received treatment with methylprednisolone in each relapse, and partial recovery was seen. The Expanded Disability Status Scale (EDSS) was 6. Serum AQP4 antibodies were positive. The brain MRI showed diencephalic, mesencephalic, thalamic, and hypothalamic lesions. Additionally, extensive hemispheric bilateral brain lesions were seen in the MRI. The cervical spinal cord MRI showed a longitudinally extensive myelitis. After these findings, the diagnoses of NMOSD were made. The patient continues to be treated with azathioprine.
Conclusion: It is the first report from Ecuador of a patient with NMOSD who presented extensive hemispheric brain lesions in the brain MRI. In a previous study, we showed that brain abnormalities were infrequent at 8.4%. Therefore, extensive hemispheric brain lesions are rare in patients with NMOSD.

136—Lesion burden and brain volume measure in clinical research: Can it become a routinary practice?

Theme: Radiology
Theme 2: Clinical Research

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Background: Multiple sclerosis (MS) is a chronic, inflammatory, and neurodegenerative disease. Treatment efficacy is considered based on clinical and radiological outcomes. Lesion count, lesion burden, and brain volume are not often measured outside of clinical trials as they are time-consuming, expensive, and require technical skills. Volbrain is an automatized, open-access, quick, easy-to-use, online software for volumetric brain analysis and lesion count.
Objectives: To evaluate Volbrain usefulness in lesion count and volume, and brain volume analysis, as well as its potential technical advantages.
Methods: Retrospectively, we collected data of seven patients with MS treated with natalizumab. We included data on relapses, Expanded Disability Status Scale (EDSS), and gadolinium-enhancing lesions on magnetic resonance imaging (MRI). Niftii T1W 3D and T2 FLAIR images were analyzed using Volbrain for lesion count (lesionBrain 1.0 pipeline) and brain volume (volBrain 1.0 pipeline). All data were collected and processed by clinicians. Descriptive statistics are reported.
Results: We report the following means: age: 34 years old; ARR: 0.46; EDSS: 2.5; progression rate: 0.41; gadolinium-enhancing lesions: 0.85; lesion number: 24; lesion volume: 26.19 cm^3, brain volume: 1048.39 cm^3, white matter volume: 347.44 cm^3, thalamus volume: 6.82 cm^3. It takes about 20 minutes to train a clinician to learn how to use Volbrain. Afterward, 3–5 minutes are required to upload images per patient. Analysis time is 18–25 minutes for lesion count and volume and 10–12 minutes for brain volume.
Conclusion: Volbrain software allows for objective measures of lesion count and volume and brain volume analysis. Volbrain might allow to routinely and objectively measure lesion and brain volume in MS patients. This would make easier to evaluate disease-modifying therapy (DMT) radiological efficacy outcomes in clinical research, real life studies, and maybe eventually, it will become a tool to help guide decision making in daily clinical practice.

54—Environmental enrichment improves cognitive function and anxiety-like symptoms and decreases neuroinflammation in a focal cortical model of progressive multiple sclerosis

Theme: ICR
Theme 2: Treatment

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Background: The beneficial effects of environmental enrichment (EE) were demonstrated in several neurodegenerative diseases, psychiatric disorders, aging, and brain injury. The combination of both cognitive and physical activities enhances the cognitive performance in multiple sclerosis (MS) patients (Jimenez-Morales et al., 2017). EE reduces the expression of pro-inflammatory cytokines (mainly interleukin (IL)-1b and tumor necrosis factor (TNF)-a) in lipopolysaccharide (LPS)-stimulated animals (Williamson et al., 2012). Additionally, EE ameliorates the peripheral and neuroimmune responses and improves remyelination during experimental autoimmune encephalomyelitis (EAE) progression in mice (Souza et al., 2018; Magalon et al., 2007). The chronic expression of IL-1b in the cortex along with peripheral stimulation induces cognitive impairment, anxiety-like symptoms, neuroinflammation, neurodegeneration, demyelination, and meningeal inflammation that lasts for 50 days (Silva et al., 2018).
Objectives: To study the influence of EE in the recovery of inflammatory focal cortical lesions induced by IL-1b on peripheral stimulated rats.
Methods: Adult rats injected in the cortex with adenovirus-expressing IL-1b or bgalactosidase as control were peripherally stimulated with the same adenoviruses (Silva et al., 2018). The animals were distributed in either enriched environment or standard cages (SC) for 30 days. The enriched environment includes toys, tunnels, hiding places, and running wheels. Therefore, we can evaluate the main enrichment paradigms: social interaction, cognitive, and physical enrichment. We performed behavioral tests (novel object recognition, T Maze, sucrose preference, open field) and immunohistochemical analyses of the lesions.

Results: EE improves cognitive impairment and anhedonia and reduces anxiety-like symptoms in peripherally stimulated IL-1 injected animals compared to control ones. Additionally, EE statistically attenuates the microglia and astroglia activation along with a diminished demyelination in EE animals compared to SC animals.
Conclusion: Environmental enrichment attenuates cortical neuroinflammation and improves cognitive function along with a reduction in anxiety-like symptoms. Therefore, EE may act synergistically with other therapeutic agents to facilitate brain repair and general welfare.

89—Systematic review on the roles of IL23/TH17 and IL27/TREG in the pathogenesis of multiple sclerosis

Theme: ICR
Theme 2: Treatment

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Background: In the last decade, a new lineage of Th has been discovered: inflammatory Th17, which is a subset of CD4+ lymphocytes. Two specific isoforms of Orphan Nuclear Receptor (RORyt and RORa) are transcription factors that promote Th17 differentiation. Both RORyt and RORa are highly expressed in Th17 cells, compared with Th1 and Th2. Regulatory T cells (Tregs) are a T cell subset that possesses important immunosuppressive properties. The transcription factor Forkhead Box P3(FOXP3) acts as a key regulator of T cell differentiation to Tregs in the thymus and positively affects the cells' maturation and function. Interleukin 23 (IL23) is an important regulator of Th1/Th17 differentiation. On the other hand, IL27 is an anti-inflammatory cytokine that regulates Treg responses.
Objectives: The objective of the present review was to better understand data from the literature on the role of IL23/Th17 and IL27/Treg in the pathogenesis of multiple sclerosis (MS).
Methods: We individually searched for records in the PubMed database. The terms "IL23" OR "Th17" AND "MULTIPLE SCLEROSIS" OR "MS" "IL 27" OR "Treg" AND "MULTIPLE SCLEROSIS" OR "MS" were used. A time limit from 1 January 2015 to 31 August 2017 was set. Articles reporting exclusively on experimental autoimmune encephalopathy (EAE) were excluded from the review, since the animal model is not perfectly equal to the human condition.
Results: The initial search generated 622 papers: 436 on IL23 and 186 on IL27. After reading the titles of these papers and their abstracts, 80 articles were selected for this review. There were 34 papers with original data obtained from patients with MS: 33 non-systematic reviews and 1 systematic review of the literature. The authors of 27 articles suggested that therapies targeting the Th17/Treg balance were potentially beneficial. The systematic review included clinical trials and papers with very recent data from the United States, the United Kingdom, China, Germany, Belgium, Iran, and Argentina.
Conclusion: The roles of IL23/Th17 and IL27/Treg in the pathophysiology of MS have been widely studied over the last decade but are not yet fully understood. Research in the field of neuroimmunology has concluded that reaching a balance of Th17/Treg cells with subsequent predominance of IL 27 over IL 23 constitutes a promising path for the future of MS therapeutics.

13—Therapeutic characterization with therapy modifier of the illness in patient with relapsing-remitting multiple sclerosis. Hospital Arnaldo Milián Castro: 2016–2017

Theme: Treatment

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Background: The multiple sclerosis is a demyelinating, degenerative, chronic, autoimmune, and inflammatory disorder that affects the central nervous system. It constitutes the first cause of neurological disability in young adults.
Objectives: To characterize the patients with diagnosis of multiple sclerosis assisted in the Service of Neurology of the Hospital "Arnaldo Milián Castro" of Villa Clara during the period of January from 2016 to December of 2017.
Methods: A descriptive, traverse study; the study population constituted 30 patients.
Results: The average of premier age was 38.7 years. The relationship among patients with color of white and not white skin was 9:1 and that of women and men of 14:1 and the minimum grade of disability 60%. 48.27%, 41.37%, and 37.93% of the patients presented lesions supratentoriales, infratentoriales, and in number from 2 to 4, respectively. 100% of the patients took treatment with rebif. He executes global it was of 88%, without difference signifcative as in function of TME, and notre riero seasonal changes 91%. The trust worthy patients presented significantly smaller disability values and of time of diagnosis, and bigger satisfaction with the treatment and their effectiveness. The nuisances and the symptoms were the most frequent reasons for fulfillment.
Conclusion: The feminine sex and the color of white skin predominated; the premier age was from 20 to 29 years. The most common symptoms were the alterations motor boats, sensitive and cerebelosas. The lesions supratentoriales and infratentoriales and the quantity of lesions in number from 2 to 4 were the most frequent; most of the cases presented change of intensity of the callous body. The execution grade satisfaction is high, especially for those of diagnosis recent, less disabled and with less changes.

16—Peruvian clinical practice guideline for treatment of multiple sclerosis in adults

Theme: Treatment
Theme 2: Clinical Research

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Background: The recent introduction of new disease-modifying therapies (DMT) for multiple sclerosis (MS) treatment implies a continuous effort to keep up with advances in its therapeutic strategy in Peru.
Objectives: To evaluate the efficacy, safety, and tolerability of DMT and to develop a treatment algorithm for MS as a Clinical Practice Guideline (CPG).
Methods: The Peruvian Neurological Society assembled a panel of experts to elaborate an adapted CPG. A CPG peer-review research about clinically isolated syndrome (CIS), relapsing-remitting MS (RRMS), and progressive forms of MS was conducted from 2010 to 2015, which were assessed by AGREE II tool. CPG of CEMCAT 2012 had the best score in all of its domains (score >60%) and was considered "recommendable." PICO model (Population, Intervention, Comparator, Outcome) was used to define clinical questions for literature search of studies after 2012 and the evidence until 2017 was evaluated through a meta-analysis using Revman 5.3 software. Finally, recommendations were developed using modified Delphi process. A risk-benefit assessment influenced the direction of recommendations according to GRADE: strong, weak, good clinical practice.
Results: Experts' panel made 11 recommendations about the profile of safety and efficacy in CIS, RRMS, and progressive forms of MS. Eight recommendations were considered strong, and three were considered weak.
Conclusion: For patients with CIS or RRMS, it is recommended to initiate treatment with an injectable immunomodulator (interferon-β, glatiramer acetate) or teriflunomide; and according to tolerability, lateral switch from one drug to another may be possible. In case of suboptimal response to these agents, or aggressive onset RRMS, fingolimod or a monoclonal antibody (natalizumab, alemtuzumab) could be employed. If all previous regimens have a poor response, the use of rituximab is suggested. Finally, in progressive forms of MS with no inflammatory activity, it is not recommended to use immunosuppressors, immunomodulators, fingolimod, or monoclonal antibodies.

0019—Real-world performance of fingolimod in Chilean patients: A longitudinal 7-year study

Theme: Treatment
Theme 2: Clinical Research

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Background: In 2011, fingolimod was approved in Chile for the treatment of multiple sclerosis (MS). Results of effectiveness and safety in real-world patients are necessary, with an underrepresentation of Latin American cohorts in previous studies.
Objectives: To describe real-world performance of fingolimod in MS patients with a long-term follow-up.
Methods: This prospective longitudinal observational data collection study was performed at the Programa de Esclerosis Múltiple UC and Unidad de Esclerosis Múltiple y Neuroinmunología Hospital Dr. Sótero del Río in Chile from July 2011 to May 2018. Demographic and clinical data from 177 consenting patients who had received treatment with fingolimod were analyzed.
Results: We included 121 women, 56 men, 170 relapsing-remitting, 7 active secondary progressive MS, mean age at onset 28.7 ± 8.7 years, median baseline Expanded Disability Status Scale (EDSS) 2.0 (range, 0–7.5), mean baseline annualized relapse rate (ARR) 0.93 ± 0.9, mean age, and disease duration at fingolimod start of 35.7 ± 10.1 and 10.3 ± 6.4 years, respectively. Indications for fingolimod were de-novo/naïve 8% (aggressive MS, bad prognosis factors), second line 67% (failure to 1 line treatment), adverse events 23%, others 3%. In total, 73% of patients remain using fingolimod with a mean treatment duration of 27.3 ± 20.3 months. Under fingolimod, 71% of patients remained free from relapses and 60% remained without new MRI lesions. Mean ARR during treatment was 0.23 ± 0.5 at 12 months (*n*: 123, 70%), 0.20 ± 0.7 at 24 months (*n*: 90; 51%), and 0.17 ± 0.5 at 36 months (*n*: 71; 40%). Reasons from the 47 patients who stopped treatment at the end of follow-up were as follows: 28 (60%) treatment failure, 10 (21%) adverse events, 8 (17%) pregnancy, and 1 (2%) death not related to fingolimod. No patients were lost to follow-up.
Conclusion: In this Latin American Chilean MS cohort, over 60% of patients under fingolimod treatment showed freedom from relapses and no new MRI lesions and sustained with low annualized relapse rates. In addition, treatment retention rate over 24 and 36 months was high, with a small proportion of patients stopping fingolimod due to treatment failure or adverse events.

0021—Alopecia areata universalis, other autoimmune adverse event related to alemtuzumab

Theme: Treatment
Theme 2: Clinical Research

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Background: Autoimmune diseases are severe adverse events related to alemtuzumab. Most frequent autoimmunity involves thyroid disorders, but any autoimmune disorder could potentially develop.
Objectives: To report a case of alopecia areata universalis in a patient receiving alemtuzumab.
Methods: Clinical and demographical data, as well as biopsy studies were reviewed.
Results: A 41-year-old Chilean man, active smoker, with a daughter with type 1 diabetes mellitus since age 3, was diagnosed with relapsing-remitting multiple sclerosis (MS) in 2009. At that moment, other autoimmune disorders were ruled out. He began disease-modifying therapy with glatiramer acetate and presented with two brainstem relapses at month 3 and 6, with new T2 and T1 gadolinium-enhancing lesions, deciding to switch to Rituximab 1000 mg for two times (14 and 28 September 2009) as induction therapy. Then, he continued with glatiramer acetate. In 2011, he reported progressive urinary symptom, memory complaints, and restless leg syndrome. Control magnetic resonance imaging (MRI) showed new T2 lesions and decided to switch to fingolimod in September 2011. He continued with regular controls with a stable Expanded Disability Status Scale (EDSS) of 3.0, without relapses, but progressive memory complaints. Control MRI in December 2014 showed new spinal cord lesions, so he decided to switch to alemtuzumab. After the first cycle in February 2015, he developed extensive pruritic maculopapular rash that increased after the second cycle. At 8 months of the second cycle, on February 2016, he reported abundant hair loss with complete alopecia 3 months later. Dermatologist confirmed the diagnosis of alopecia areata universalis with skin biopsy showing skin with orthokeratosis, normal epidermis. Decrease in the number of follicular units per mm^2 (up to 7 follicles), predominantly anagen, without miniaturization. Dermis with superficial, perivascular, and isthmic perifollicular lymphocytic infiltrate, with concentric peri-isthmic fibrosis. Follicular bulbs without alterations. Sequential and serial histological sections were examined. He was offered treatment with systemic immunosuppression, but patient withheld treatment. Two months later, he developed autoimmune thyrotoxicosis requiring thyroidectomy in August 2017.
Conclusion: Treating physicians should be aware of any autoimmune adverse event during the immune reconstitution period. It is still unknown whether some of patients with familiar autoimmune diseases could be more susceptible to develop this kind of complications.

0022—Efficacy, safety, and tolerability of IB-MS versus placebo in patients with progressive forms of MS: Preliminary results from a phase II, randomized, placebo-controlled, double blind, proof-of-concept study

Theme: Treatment
Theme 2: Clinical Research

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Background: A number of effective treatments have emerged for treating relapsing-remitting MS, with less impressive results in patients with progressive forms (PrMS). IB-MS is a labdane dipertene isolated from a medicinal plant that has been proposed effective in the treatment of autoimmune diseases.
Objectives: To compare the efficacy and safety of IB-MS versus placebo in patients with inactive PrMS.
Methods: Patients with clinical/radiological inactive PrMS, >18 years old, without disease-modifying therapy for at least 6 months, Expanded Disability Status Scale (EDSS) <8 and Mini-Mental State Examination (MMSE) >24 were randomly assigned to IB-MS 140 mg po twice a day or placebo. The main outcome was to determine the efficacy of IB-MS in reducing brain atrophy as measured by SIENA over a period of 24 months with an estimated sample size of 68 patients. Secondary outcomes included Expanded Disability Status Scale (EDSS), cognitive assessment, fatigue, and quality of life. Safety, tolerability, and adverse events were also assessed. The study was approved by Ethical Committee from Ministry of Health Chile and registered at clinicaltrials.gov NCT02273635.
Results: A total of 43 patients were recruited (23 IB-MS, 20 placebo) in a single center, and 29 patients (17 IB-MS, 12 placebo) completed the study with the two time-point magnetic resonance imaging (MRI). Percentage brain volume change was –2.0% ± 1.1% in the IB-MS and –2.2% ± 1.3% in the placebo group ($p = 0.8$). IB-MS group had a lower 24-month mean EDSS compared to placebo ($p = 0.036$). Placebo group had 41.6% of patients with confirmed disability progression compared to 29.4% in the IB-MS group ($p = 0.02$). Adverse events included dysgeusia, mild rash, herpetic encephalitis, and acute coronary syndrome in the IB-MS, and sepsis, depression and acute coronary syndrome in the placebo group.
Conclusion: Clinical studies in PrMS patients represent a huge challenge for clinical research with limited resources. Although we were not able to achieve our primary endpoint nor achieve our expected sample size, progression and disability outcomes suggest a potential role of IB-MS in reducing neurodegeneration in inactive PrMS. Tolerability and safety seem comparable between the groups. Larger multicenter studies are still needed to determine the magnitude of the contribution of IB-MS in reducing neurodegeneration.

41—Treatment-related adverse events in multiple sclerosis patients in Colombia: Data from daily clinical practice

Theme: Treatment
Theme 2: Epidemiology

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Background: Pharmacological therapy for multiple sclerosis (MS) has made progress in development of effective drugs for reduction of activity and symptomatology, which leads to potential problems in safety profile.
Objectives: To analyze the occurrence of adverse drug reaction (ADR) and therapeutic failure (TF) in a group of patients with MS.
Methods: Longitudinal study of a group of patients with MS in a multicentric Colombian institute, from January 2017 to March 2018. Outcome was estimated by incidence rate and survival analysis using Kaplan–Meier curve; events were defined as ADR or TF. Categorical variables for descriptive analysis are presented as absolute and relative frequencies, and the continuous ones as median and interquartile ranges (IQR) or mean and standard deviation (SD).
Results: Of 114 patients, 83.3% (95) were women, with a median age of 38 years (IQR, 31–47), the median time to disease progression was 4.4 years (IQR, 1.7–9.5); relapsing-remitting phenotype was found in 87.7%. High-efficacy medication was used in 65.8% (75). Fingolimod was the most widely used medication, 43.9% (50), followed by natalizumab, 21.9% (25), and dimethyl fumarate, 7.9% (9). During the follow-up, 14 non-serious ADRs were observed, the median time of occurrence was 6.17 months (IQR, 3.65–10.4) and 21% (3) of them were definitive (2-application site and 1-cardiovascular disorder). According to the affected system, 28.6% (4) were infections, 21.4% (3) dermatological alterations or in the application site, 14.3% (2) hepatobiliary disorders and 35.7% (5) in other systems. Overall incidence rate was 1.7 per 100 people-month (95% CI, 0.9–2.9); Dimethyl fumarate 10.7 (95% CI, 2.0–31), interferon beta 2.0 (0.5–7.0), fingolimod 1.0 (95% CI, 0.3–3.0), and natalizumab 1.0 (95% CI, 0.1–4.0), no statistical differences were found ($p = 0.103$). On the other hand, three patients presented therapeutic failure to low-moderate ($n = 2$) and high-efficacy ($n = 1$) drugs, the median time of occurrence was 8.3 months (IQR, 4.5–11.7), with no statistical differences ($p = 0.627$). Incidence rate was 0.3 per 100 people-months (95% CI, 0.07–1.0), with glatiramer acetate being the drug that fastest presented TF, with an average of 11 months (95% CI, 10.02–12.58).
Conclusion: This study presents the results of a Colombian group of patients with MS, where no serious ADR were observed during the follow-up period, the most associated drug was dimethyl fumarate and the most common type of ADR were infections; in addition, there was a low incidence of TF, with no significant differences by medication.

46—Medical cannabis in multiple sclerosis – Preliminary clinical experience in Uruguay

Theme: Treatment
Theme 2: Clinical Research

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Background: The phytocannabinoids THC (tetrahydrocannabinol) and CBD (Cannabidiol) have demonstrated efficacy in the symptomatic treatment of multiple sclerosis (MS). Recent legislation authorizing the use of medical cannabis (MC) in Uruguay increased medical consultations related to this topic. At present, the products are imported from Switzerland.
Objectives: To describe the access to use, the therapeutic efficacy, and safety of cannabis on patients with MS.
Methods: Observational, descriptive, and retrospective study of MS patients who consulted between August 2016 and December 2017 for advice on use of medical cannabis. Suggested treatment was oil with high content of CBD (5.25% or 7%) and low THC (0.2% or 0.9%) We contacted these patients 6 months after the first appointment to evaluate: (a) access to the drug and treatment at present (b) patient-reported outcomes of symptoms: (1) pain and spasticity (Likert scales), (2) sleep (Pittsburgh's index), and (3) quality of life (WHO-five well-being Index).
Results: A total of 20 patients with MS consulted, 13 women and 7 men. Average age was 44 years (24–66). In total, 45% had relapsing-remitting multiple sclerosis (RRMS), 35% secondary progressive multiple sclerosis (SPMS), and 20% primary progressive multiple sclerosis (PPMS). We have follow-up data of 10 patients. Of them, five could not afford the treatment or suspended it early due to high costs and laborious logistics to obtain the product. Only four patients (20%) continue with treatment at present and they reported improvement of symptoms and quality of life with no adverse events. One patient stopped treatment after presenting a non-severe adverse event (rash).
Conclusion: The access to Medical Cannabis in Uruguay is still difficult due to high costs and complex logistics. Those patients who continue treatment show improvement of symptoms and good tolerance as well as better of quality of life.

0055—Expert consensus on standards for multiple sclerosis care: Results from a modified Delphi process

Theme: Treatment

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Background: The importance of prompt intervention in multiple sclerosis (MS) was described in the widely endorsed report, Brain health: time matters in multiple sclerosis.
Objectives: This study aimed to define standards for the timing of key steps in the care pathway.
Methods: An international group of 29 MS neurologists was recruited from regions with high MS prevalence to participate in a modified Delphi process. Across five rounds, they defined "core," "achievable" and "aspirational" time frames (to reflect a minimum, good, and high standard of MS care, respectively). A 31-member Reviewing Group of MS nurses, experts with MS and allied healthcare professionals reviewed the results and provided feedback to four Chairs.
Results: Consensus was reached (≥75% agreement; $n = 21$) on core, achievable and aspirational time frames for events spanning the MS care pathway. Here, we will present 21 achievable standards related to referral, diagnosis, treatment decisions, monitoring and managing new symptoms. For example, the Panel agreed that most MS teams should be aiming to (1) complete a diagnostic workup for MS within 4 weeks of a patient being referred to a neurologist, (2) assess patient eligibility for a suitable disease-modifying therapy within 3 weeks of diagnosis, (3) perform follow-up clinical evaluations every 6 months, and (4) offer an annual magnetic resonance imaging (MRI) scan.
Conclusion: These standards will inform tools for clinics and people with MS and act as a potential future benchmark for established and developing MS clinics across the globe aiming to deliver the highest quality care.

69—Subacute transverse myelitis post infectious secondary to mumps

Theme: Treatment
Theme 2: Epidemiology

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Background: The central nervous system is the most common extraglandular site to be affected by mumps. Transverse myelitis (TM) is a disorder characterized by sensory, motor, and/or autonomic dysfunction of acute onset/subacute usually bilateral secondary to spinal demyelination. There is a history of viral infections in 50% of the cases. Post vaccination TM has also been documented.
Methods: A 62-year-old male with HIV since 2010 treated with tenofovir + emtricitabine/lopinavir + ritonavir. Patient refers upper respiratory tract infection 2 months prior to his hospitalization, which he later presented with mumps treated with nonsteroidal anti-inflammatory drugs. Starts with lancinating pain at the xiphoid level with ascending paresthesia, ataxic gait, and urinary retention. On physical examination: T8 sensory level, ataxic gait, muscle strength in upper and lower extremities 4/5, osteotendinous reflexes +++, and bilateral extensor plantar response. Normal complete blood count and biochemical profile: intradermal reactions for tuberculin and coccidiodin, febrile reactions, VDRL, ESR, PCR, ANAs, anti-SSA, anti-aquaporin 4 negative. Serum antibody IgG for parotiditis positive. Cervico-thoracic MRI: T2 hyperintensities at C5-C7, T8-T11 level with contrast enhancement (Image 1). CSF: 5 leucocytes/field, negative: BAAR, chine ink, oligoclonal bands, viral panel, anti-MOG and coagglutinins. IgG normal CSF index. Paraneoplastic panel (antibodies CRMP-5 IgG, anti-Ri, anti-Hu, anti-Yo, anti-phiphysin, anti-NMDA, anti-GAD 65, nuclear antiglial, anti-AMPA, anti-GABA, purkinje cells, Ca+ channels dependent on voltage, anti-striated muscle) and infectious (IgG and IgM: EBV, Cryptococcus, Antibody. Encephalitis equinus, coccidioides immitis, histoplasmosis, VDRL, sporothrix schenckii, Antibody anti syphilis, ACE, HTLV, Hepatitis C. PCR: Parvovirus B19, toxoplasma gondii, enterovirus, flavovirus, arbovirus, HSV 1, 2, VVZ, mumps, Gene Xpert TB, CMV) in serum/CSF: Negative.
Results: Patient treated with steroid pulses improving gait, strength, and urinary continence.
Conclusion: The approach of TM in immunocompromised patients that should be considered are infectious, postinfectious, autoimmune, and paraneoplastic causes. Mumps is a rare cause of TM.

74—Use of rituximab as a treatment in patients with neuromyelitis optica spectrum disorder. Hospital Instituto De Previsión Social (IPS)

Theme: Treatment

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Background: Neuromyelitis optica spectrum disorders (NMOSD) are uncommon but very aggressive autoimmune and demyelinating entities, characterized by recurrent optic neuritis and episodic myelitis. It constitutes an autoimmune disease that leads mainly to demyelination and axonal damage at the level of the optic nerves and the spinal cord. Immunosuppression is suggested as a treatment, and therapy with rituximab is an option (Grade 1C).
Objectives: To evaluate the efficacy and safety of rituximab treatment according to the annualized relapse rate (ARR) and the Expanded Disability Status Scale (EDSS) score per patient.
Methods: Observational, retrospective, descriptive, and cross-sectional study based on the follow-up of 19 patients diagnosed with NMOSD during the period from March 2010 to March 2018, according to the International consensus diagnostic criteria for

NMOSD established in the 2015, in treatment with rituximab for more than 18 months. For the data analysis, the statistical package SPSS version 23 was used.
Results: A total of 19 patients were included, mostly women (78%), average age 37.6 years. The mean follow-up time was 3.6 years, a reduction in ART was found in 90% of the patients, mean ARR was reduced from 1.53 pretreatment to 0.39 post-treatment with rituximab, 40%(9/19) remaining free of relapses for more than 18 months. All patients required maintenance doses, with an average frequency of 1.4 infusions per year, indicated by an increase in CD19 >2% or clinical relapse. In 94% of the patients, the disability scale improved or stabilized, the average modification of the EDSS was 4.8 pretreatment at 3.6 post-treatment. There were no clinically significant adverse effects that required discontinuation of the therapy or complications in a longer period.
Conclusion: The rituximab demonstrated in this population its effectiveness and safety in the management of NMOSD, and these results strengthen the knowledge and give a personalized and profitable approach to reduce relapses and disability.

130—An open-label, survey-based, multicenter study to determine patient satisfaction with AVONEX®PEN auto-injector in Brazilian multiple sclerosis patients

Theme: Treatment

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Background: The AVONEX® Pen is the first single intramuscular (IM) IFNβ-1a auto-injector for long-term treatment of multiple sclerosis (MS). The device was designed to overcome the barriers of self-injection and minimize technical aspects of the injection delivery process.
Objectives: The study evaluated Brazilian MS patient's satisfaction with the AVONEX® during the first 12 weeks of treatment as well as the flu-like symptoms (FLS) management through the patient support program provided by Biogen Brazil (BIA program).
Methods: Questionnaires were used to assess patient satisfaction, on a scale varying from 0 to 10 points at the beginning and end of the study.
Results: A total of 70 patients were included, 74.3% were women and 85.7% were treatment naive. Adherence to short-term treatment was 88.6% and discontinuation was mainly due to loss of follow-up. In general, the majority of patients (>85%) had high levels of satisfaction with the device (>6 points) in both evaluations. Patients demonstrated a high perception of efficacy and satisfaction with the BIA guidelines (7.91 and 7.98 points). Regarding the presentation, understanding, and detail of written instructions to self-administration provided by the BIA, the mean score of satisfaction scale was ≥8.6 points. The ease of self-application, handling, and preparation of the device were the main attributes related to a higher satisfaction rate. The low pain sensation was the second most important factor, corroborating the results from previous similar studies. The management of FLS has demonstrated to be important in the adherence to therapies.
Conclusion: The results are in agreement with international studies related to the device autoinjection satisfaction and adherence to treatment. The perception of satisfaction can contribute to easing barriers faced by patients using injectable therapies and support adherence in the short term.

0137—Ocrelizumab in patients with multiple sclerosis. Descriptive study of a case series in Chile

Theme: Treatment

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Background: Ocrelizumab (OCR) is the only multiple sclerosis (MS) drug that has been approved by the US Food and Drug Administration (FDA) not only for patients with relapsing-remitting multiple sclerosis (RRMS) but also for patients with primary progressive (PP) MS. OCR is a humanized anti-CD20 monoclonal antibody that can deplete the targeted B cells through antibody-dependent cellular cytotoxicity. Treatment involves administration by intravenous infusion every 6 months. OCR can cause long-lasting B-cell depletion and change the pool of reconstituted B cells. The safety and efficacy of OCR in patients with MS has been demonstrated in clinical trials. However, due to the limitations of these trials, it is important to know local experiences in clinical practice.
Objectives: To report the clinical features of a series of patients with MS in treatment with OCR in Chile.
Methods: We performed a retrospective, observational, and descriptive study of all the patients with MS treated with one or more doses of OCR in Clinica Las Condes, Chile. The data are obtained from the patient database of the Multiple Sclerosis Unit of our Center, registering demographic data, time of illness, previous treatments, number of OCR infusions received, and adverse reactions.
Results: The study included 41 patients, with a follow-up period of up to 18 months; 20 female and 21 males; ages between 18 and 64 years; age mean 43.3 ± 12.1 years; mean duration of MS of

9.7 ± 7 years. The number of infusions between 1 and 4, average 2.8 ± 0.9 infusions. OCR was well tolerated, without serious adverse reactions. Five patients presented allergic rash, four headache, and one nausea during the infusion. All these were mild reactions to the infusion that were given with simple analgesic, antihistamines, or reduced infusion rate.
Conclusion: Although the follow-up time and the number of patients do not yet allow us to present statistical data regarding effectiveness, a well-tolerated treatment has resulted, without significant adverse effects, highlighting that this series is the first to be published in Latin America.

33—Impact of multiple sclerosis on the occupational status in developing countries: An experience in Argentina

Theme: Social
Theme 2: Quality of life

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Background: The negative impact of multiple sclerosis (MS) on the occupational status of patients is well known. For this reason, there are questionnaires (Q) on the impact of MS on the occupational status of working employees (W).
Objectives: (a) To develop a Q on the occupational status of MS that is useful for developing countries; and (b) to describe the changes that patients must do in order to keep their occupational status.
Methods: A structured questionnaire was developed ad hoc to compile information on the occupational status of MS patients. The Expanded Disability Status Scale (EDSS), the Fatigue Severity Scale, Rao's Neuropsychological Battery, and Beck's Depression Inventory II were administered as well. The results were compared with a control group with the same basal characteristics.
Results: Of a total of 60 patients with MS, mean age 45.1 (±10.6), mean school education 14.4 years (±3.6), EDSS 2.5 (±2), 33.3% full-time jobs, 29.4% part-time jobs, 5.9% were housekeepers, 2% were retired, 15.7% retired early, 7.8% were under sick leave, 2% were under sick leave for other causes, and 3.9% were unemployed. Unemployee causes: 76% impaired locomotion, 38% impaired hand motility, 46% urinary incontinence, 61% fatigue, 46% pain, and 7% cognitive impairments. No housekeeper mentioned MS as a cause of their occupational status. Of working patients, 46.6% made changes in their work in order to keep it: 5 simplified tasks, 7 tasks with lower physical involvement, 2 worked from home, 4 cut down their working hours, 7 spent more time in developing tasks, 9 took more frequent rests, and 3 changed their working hours.
Conclusion: The Q developed recorded the occupational status of patients and showed how the disease affected them. Understanding these issues allows setting interventions to prevent the loss of job and to reduce the impact of MS on the occupational status of patients.

43—The socioeconomic burden of multiple sclerosis in Uruguay: Resource use and costs

Theme: Social

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Background: Uruguay has the highest prevalence rate of multiple sclerosis (MS) in Latin America. MS is a disabling disease without definitive cure that mainly affects young people. So far, there is no study that measures the socioeconomic burden of MS in Uruguay.
Objectives: Quantify the health and non-health resources use and the annual cost per patient of MS in Uruguay.
Methods: Observational cross-sectional cost study. Tangible (direct and indirect) and intangible costs will be estimated from a societal perspective, using a bottom-up approach, and data from online surveys and personal interviews with patients and caregivers. The study will collect the use of health care resources (medical and pharmacological), orthotics expenditure, home and automobile adaptations, formal and informal care at home, the labor productivity loss, and all the subsidies and other transfers received from the government. The instruments to collect the data will be reviewed and validated by the consensus of the local clinical experts who participate from the study, and the Uruguayan MS patient association (EMUR). A pilot survey will be done with patients to confirm validity of the questionnaire and operational feasibility. A descriptive and bivariate statistical analysis will be performed by disease disability groups according to the Expanded Disability Status Scale (EDSS) and type of MS (relapsing-remitting, secondary progressive, and primary progressive MS). Multivariate analysis will be done using the annual cost per patient as the dependent variable, adjusted by the control variables previously identified.
Results: In line with previous evidence, as a result, a high rate of non-health care costs over total costs is expected, as well as significant differences in MS costs by disability status and MS type.
Conclusion: This innovative study will estimate for the first time in Uruguay the socioeconomic burden of MS, providing useful information for decision making and future policy design.

68—Coping strategies in patients with multiple sclerosis how do patients cope the disease?

Theme: Social
Theme 2: Clinical Research

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Background: Coping was defined as cognitive and behavioral efforts to deal with situations appraised as stressful. Adaptation to chronic diseases depends on the effectiveness of coping.
Objectives: The objectives of this research were (a) to examine coping strategies that people with multiple sclerosis use; (b) to evaluate the relationship between coping strategies and clinical variables (disability, depression, fatigue, and disease duration) and demographics variables, and (c) to explore the relationship between coping strategies and clinical variables in two groups according to the stressor: "diagnosis of MS" and "other stressors."
Methods: A total of 31 MS patients with relapsing-remitting form were included; 74.2% were women, the mean age was: 45.48 ± 13.45 years; the mean level of education was: 12.90 ± 4.15; EDSS: 2.18 ± 1.65; disease duration 12.26 ± 11.35 years, depression 14.03 ± 12.72; fatigue 3.50 ± 1.58. Outcomes measures: Coping Responses Inventory CRI-A, to assess eight different coping strategies in stressful life events, Expanded Disability Status Scale, Beck Depression Inventory, and Fatigue Severity Scale.
Results: The coping strategies mostly used by patients with MS were Problem Solving: 1.92 ± 0.61; Seeking Social Support: 1.76 ± 0.60; Positive Reappraisal: 1.75 ± 0.75 and Seeking Alternative Rewards: 1.64 ± 0.73 and the least used were Avoidance: 1.53 ± 0.72; Logical Analysis: 1.46 ± 0.75; Acceptance/Resignation: 1.41 ± 0.63 and Emotional discharge: 1.15 ± 0.60. A negative association was found between Avoidance coping and disease duration (r = –0.418), Seeking Alternative Rewards and Fatigue (r = –0.558) and between Acceptance and disability (r = –0.423). In the group with the stressor "diagnosis of MS," a significant negative correlation was found between Avoidance and years of evolution (r = –0.1000) and Search for alternative gratifications and disability (r = –0.928) and positive significant correlation between problem solving and years of evolution (r = 0.883) and between positive Revaluation and schooling (r = 0.812).
Conclusion: Patients with MS used more problem-focused coping strategies than emotion-focused coping strategies. Patients with short disease duration used more avoidance coping.

71—Prevalence of social anxiety in multiple sclerosis population

Theme: Social
Theme 2: Quality of life

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Background: Multiple sclerosis (MS) is a chronic progressive neurological illness affecting individuals primarily in the third and fourth decades of life. Although studies have found that people with MS experience relatively high rates of anxiety and depression, there are limited reports about social anxiety in people living with this disease.
Objectives: The aim of this study was to estimate the prevalence of social anxiety symptoms in individuals with MS and the association with demographic and clinical characteristics in Latin America.
Methods: An observational, descriptive, transversal study was performed. We included patients with MS seen in a large safety net hospital either during a regularly scheduled visit or hospitalized during 6 months from November 2017 to April 2018. All included patients completed a Social Phobia Inventory (SPIN) and the Depression, Anxiety and Stress Scale with 21 items (DASS 21, Anxiety >6, Depression >7, Stress >10). We evaluated neurological disability in MS by neurologist ratings on the Expanded Disability Status Scale (EDSS). We defined clinically significant social anxiety symptoms as SPIN score of 19.
Results: A total of 56 patients completed self-report scales of anxiety, depression, and stress symptoms. Only 48 patients provided sufficient data for analysis. The prevalence of clinically significant social anxiety was 29.2%; 95% CI, 17–44. Of those patients with social anxiety, 78.5% had general anxiety, 71.4% had depression, and 71.4% had stress symptoms. Severity of social anxiety symptoms had a positive correlation with general anxiety, depression, and stress, but not related to socio-demographic variables, neurological disability, and subtypes of multiple sclerosis.
Conclusion: Up to a third of patients with MS have social anxiety. This condition is unrelated to neurological disability and subtype of multiple sclerosis, but usually associated with other psychiatric comorbidities. These factors should be considered simultaneously when evaluating effects of treatment this population.

84—Social skills among patients with multiple sclerosis

Theme: Social
Theme 2: Quality of life

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Background: Social skills are the determinants of a healthy link between one person and all others in their milieu. When this link is weak or dysfunctional, interpersonal relations can be damaged.

This leads to distress and loss of quality of life. Individuals with chronic illnesses may have a more passive attitude towards their milieu, expecting others to take a front role in developing social relations on their behalf. Coping strategies, executive functioning, emotional regulation, and assertive planning are all conditions that may be negatively affected when an individual takes a passive role in society.
Objectives: The objective of this study was to assess the social skills of patients with multiple sclerosis (MS) in order to further elucidate the complex psychological traits of this disease.
Methods: Patients with MS (n = 40) and socioeconomically matched control subjects (n = 40) were individually assessed using the Social Skills Inventory (IHS-Del-Prette).
Results: Patients with MS scored significantly worse in social skills than did control subjects. While 100% of the control individuals presented average or above-average skills, 65% of the patients with MS were below average for these skills. In percentages, 60.2% of the controls scored well for social skills, in comparison with 26.6% of the patients.
Conclusion: The psychological aspects of MS that may affect quality of life go beyond mood disorders. Social skills may be important components for rehabilitation of patients with MS who need to improve their personal and professional lives.

114—Access, barriers, and unmet needs to multiple sclerosis care among different health coverage: A cohort of Argentinean Patients

Theme: Social

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Background: Multiple sclerosis (MS) has a low prevalence in Argentina. However, it leads to a high burden of disease, which implies frequent neurological visits, magnetic resonance images (MRI), and chronic MS medication during the follow-up, with a high impact on the healthcare system. Therefore, MS care is essential in order to optimize disease management and improve patients' outcome.
Objectives: The aim of this study was to evaluate the access and barriers to health care in the previous 12 months in an Argentinean cohort of patients with MS.
Methods: A cross-sectional study based on a self-administered survey was carried out from August to December 2017. A total of 217 MS patients were divided into three groups as follows: prepaid health coverage (PHC), social health coverage (SHC), and state-run health coverage (SRHC), and they were assessed in order to detect differences in demographics, disease severity, and access and barriers to MS care (neurological visit, MRI, and MS medication).
Results: Among the 217 MS patients, 132 had SHC, 45 PHC, and 40 SRHC. No statistical differences were found in disease severity, frequency of neurological visit, waiting time for neurological visit as well as frequency and waiting time for MRI. MS patients with SRHC had a longer waiting time (first prescription and during follow-up) and inappropriate delivery of MS medication during follow-up in comparison to MS patients with PHC and SHC. A total of 8/45 in PHC, 17/40 in SRHC, and 25/132 in SHC do not receive the MS medication as properly as prescribed for their neurologists. PHC was independently associated with appropriate delivery of MS medication (odds ratio (OR) = 0.81, p = 0.01).
Conclusion: This study showed that MS patients had barriers in the access to receive the MS medication, especially those with SRHC.

139—Multiple sclerosis a silent burden of costs to the healthcare system in Colombia

Theme: Social

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Objectives: To analyze the costs and use of MS (multiple sclerosis) resources in Colombia from the third payer, between 2000 and 2018 in line with the existing publications.
Methods: A wide review of the literature was done focused on the costs of MS in Colombia, in databases like Medline, Embase, EconLit, Health Technology Assessment Database (INAHTA), and SciELO, with published articles in Spanish and English between January 2000 and June 2018, and from grey literature of academic event posters. All costs were expressed in prices for 2014 in order to be comparable. Additional findings were contrasted versus systematic revisions of Latin America in order to compare studied costs.
Results: Associated costs to MS have been poorly studied, despite that in 2006 one study done by Colombian Health Ministry showed MS as the most expensive pathology between 2003 and 2005 in our country. After this investigation, there has been few economical studies other than this pathology in Colombia. A total of 14 articles and posters were found, from

these 4 were selected, which comply with the inclusion and exclusion criteria. The transversal variable is the cost of the drugs which represents between 86% and 90% of the treatment cost of MS, of which for Colombia with prices of 2014 is US$15,389.33. The reported cases between 2011 and 2014 are consistent versus the costs and percentages of the costs of drugs.

Conclusion: Integral cost studies about MS are needed in Colombia to quantify the real impact of this disease given that the real costs of productivity loss and disability, among others, are not established. Better and deeper studies about MS pathology are required in order to obtain more information on the real economic impact in Colombian population.