



Brief International Cognitive Assessment for MS (BICAMS) and NEDA maintenance in MS patients: a 2-years follow-up longitudinal study



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Background and aims

Multiple Sclerosis (MS) is a chronic autoimmune disease affecting the CNS, often causing cognitive impairments in processing speed, memory, and executive function. While NEDA-3 monitors disease stability, cognitive decline may still occur in patients who maintain NEDA-3 status. The Brief International Cognitive Assessment for Multiple Sclerosis (BICAMS) is widely used to assess cognition, though its long-term use and relationship with disease activity are under-researched. Recent normative data help interpret cognitive changes in MS, and early high-efficacy therapy may prevent cognitive decline or even lead to cognitive improvements in some patients.

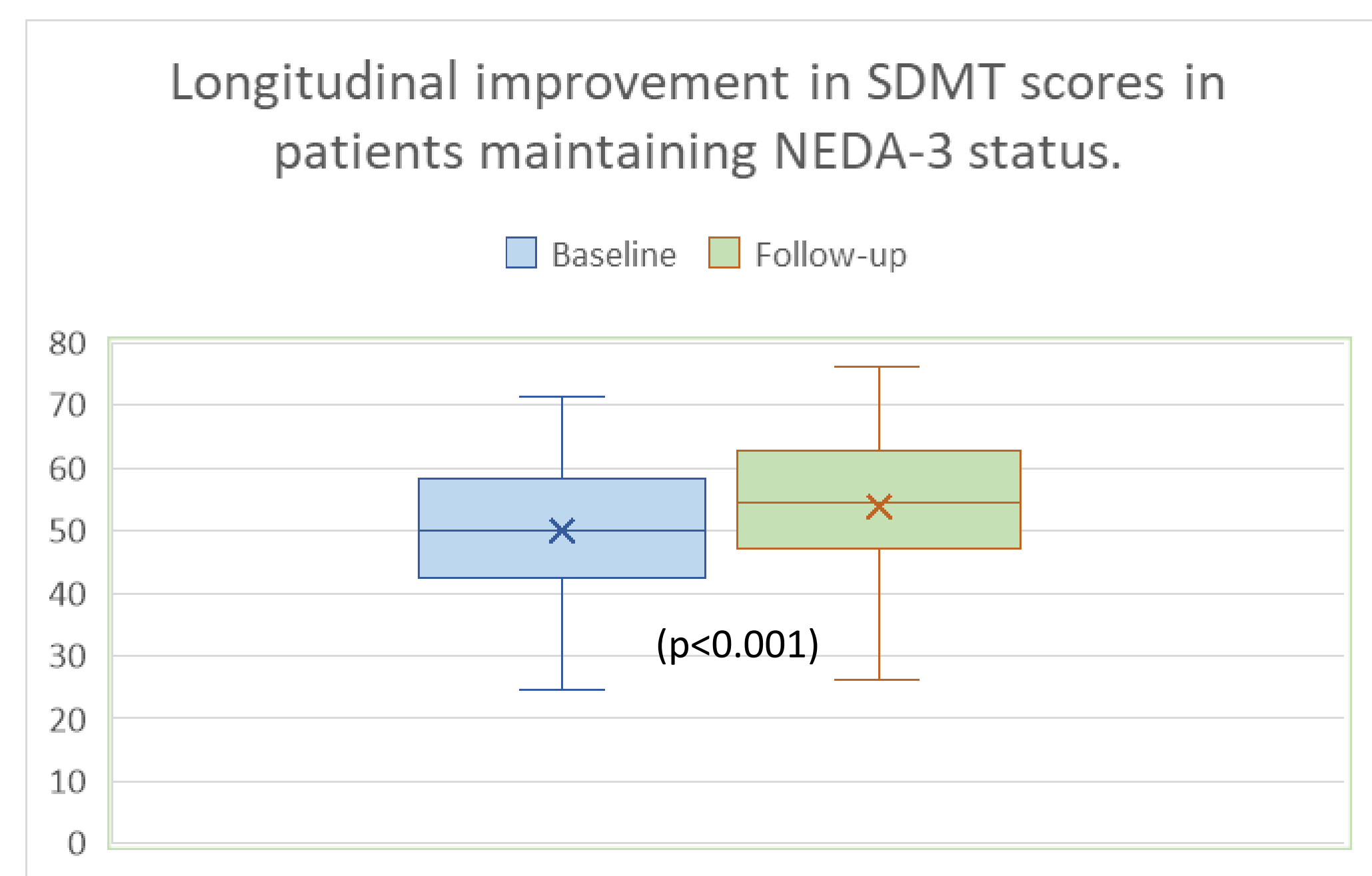
The general aim of our study was to **examine cognitive impairment trajectories based on NEDA-3 maintenance and to identify baseline clinical parameters that could predict cognitive deterioration or improvement over a 24-month follow-up in MS patients initiating highly-effective disease-modifying treatments (DMTs).**

Methods

101 MS patients were prospectively enrolled, all of whom initiated high-efficacy therapy within 3 months of the study onset.

- Patients underwent the Brief International Cognitive Assessment for Multiple Sclerosis (BICAMS) at baseline and during follow-up.
- Symptoms of anxiety and depression were assessed at baseline using the Hospital Anxiety and Depression Scale (HADS)
- Information regarding EDSS scores, occurrence of clinical relapses, radiological activity, and disability progression over 2 years was collected.

Cognitive changes from baseline to follow-up were interpreted using the latest normative data for both the reliable change index (RCI) and regression-based change index (RB-CI) for SDMT, CVLT-II, and BVM-T-R. Significant changes in each subtest were determined using 80% ($z=1.25$) and 90% ($z=1.65$) confidence intervals. Binary logistic multivariable regression models explored associations between baseline demographic and disease-related factors with BICAMS subtest worsening or improvement over follow-up, applying an RB-CI with a 90% confidence level.



At repeated-measures ANCOVA, subjects with preserved NEDA-3 status ($n=78$) showed higher increase in SDMT scores (+2.63 vs -1.04 respectively), interaction time*NEDA-3 status ($p=0.05$)

Table 1: Binary Logistic multivariable regression analysis exploring the association between demographic and clinical characteristics and SDMT improvements (RB-CI 90%)

| | B | 95% CI | | SE | Z | p |
|--------------------|---------|---------|---------|--------|--------|--------------|
| | | Lower | Upper | | | |
| Disease Duration | -0,0424 | -0,1322 | 0,0473 | 0,0458 | -0,927 | 0,354 |
| EDSS at baseline | -0,7308 | -1,3769 | -0,0847 | 0,3296 | -2,217 | 0,027 |
| HADS-total | 0,0728 | -0,0207 | 0,1663 | 0,0477 | 1,526 | 0,127 |
| MRI activity | 0,2063 | -1,2245 | 1,6371 | 0,7300 | 0,283 | 0,777 |
| Previous Treatment | 1,0014 | -0,4370 | 2,4397 | 0,7339 | 1,365 | 0,172 |

Statistically significant p-values ($p < 0.05$) are reported in bold.

EDSS = Expanded Disability Status Scale; HADS = Hospital Anxiety and Depression Scale

Results

SDMT-T scores significantly improved at follow up for the entire group ($p=0.003$) and in patients maintaining NEDA-3 ($p<0.001$).

The model assessing the SDMT improvement ($n= 12$; $z = 1,65$), was significant and explained 21% of the variance ($p = 0,038$; Nagelkerke $R^2 = 0,212$). Lower EDSS proved to be an independent predictor of SDMT reliable improvement ($p = 0,027$) in our sample.

Conclusions

Our analysis showed that lower EDSS independently predicts SDMT improvement at follow up, highlighting that an early intervention, when disability is still low, could positively influence not only physical but also cognitive performance.

Bibliography

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