

Influence of spasticity on patients with disorders of consciousness

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1. Objectives

The aim of this study was to measure spasticity of patients in a vegetative state/unresponsive wakefulness syndrome (VS/UWS), in a minimally conscious state (MCS) and in patients who emerged from MCS (EMCS) by performing comparison between spasticity and (i) etiology, (ii) antispastic medication and (iii) diagnosis. We also performed a correlation between spasticity and the Coma Recovery Scale-Revised (CRS-R) [1], and its motor subscale.

2. Methods

We studied spasticity of biceps for the upper limb (UL) and triceps surae for the lower limb (LL) using the Modified Ashworth Scale [2] in 44 patients :

-10 **VS/UWS** (8 men, 4 traumatic, mean age: 44 ± 19 y)

- 26 **MCS** (18 men, 18 traumatic, mean age: 34 ± 13 y)

- 8 **EMCS** (18 men, 18 traumatic, mean age: 34 ± 13 y)

The assessment of consciousness was performed using the CRS-R after spasticity assessment.

Data were analysed with SPSS 16.0 (IBM Corp.) using non-parametric statistics (Mann-Whitney test, Kruskal-Wallis test and Kendall's Tau). Bonferroni correction was applied for multiple comparisons.

4. Conclusion

Both traumatic and non-traumatic patients with disorders of consciousness suffered from spasticity but patients with medication were more spastic than those without medication. This suggests that while less spastic patients are not treated pharmacologically, medication administered in patients presenting spasticity does not seem to be sufficiently effective to treat all spastic symptoms. MCS patients also seemed more spastic than VS/UWS patients which suggest that a partial recovery of consciousness could be related to the recovery of muscle activation. This is also in line with previous study showing that persistent flaccidity is often associated with a poorer outcome [3]. However, CRS-R and its motor subscale did not correlated with spasticity, but this could be explained by the nature of the motor subscale where MCS patients can have some difficulties to reach higher items than simple flexion withdrawal and highlight the problem of motor interface requested by the CRS-R. These results show for the first time the difference between VS/UWS and MCS patients in terms of spasticity. However, future studies are needed to better understand the mechanisms underlying this disorder in severely brain damaged patients.

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3. Results

Spasticity was not different according to the etiology ($p=.65$) for both UL ($p=.65$) and LL ($p=.35$). Patients with antispastic medication showed higher spasticity than patients without such a medication ($p<.001$). UL spasticity was different depending on diagnosis ($p=.008$), unlike LL spasticity ($p=.17$). For UL, there was indeed a significant difference between spasticity of VS/UWS and MCS patients ($p=.008$) but no difference between EMCS and MCS patients ($p=.22$). There was no correlation between spasticity and CRS-R ($p=.35$) and its motor subscale ($p=.42$).

