DISRUPTION OF SLEEP-WAKE CONTINUUM IN MYOTONIC DISTROPHY TYPE I

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Background

Sleep disruption is extremely common in myotonic distrophy type I (DM1), and excessive daytime sleepiness (EDS) and high daytime REM sleep pressure are well acknowledged. Fragmented nocturnal sleep, sleep-disordered breathing (SDB), and periodic limb movements (PLMS) have been implicated, but a central dysfunction of sleep-wake regulation is likely to play a pivotal role. Few studies evaluated sleep macrostructure in DM1, reporting peculiar alterations, but none investigated sleep microstructure through Cyclic Alternating Pattern (CAP).

Aims & Methods

We included 8 DM1 (6M; 37.5±13.3 years) and 16 healthy controls (12M; 27.8±5.7 years) that underwent in-lab polysomnographic nocturnal sleep and multiple sleep latency test (MSLT). Sleep stages and polygraphic events were scored according with standard criteria revised in 2007 by American Academy of Sleep Medicine (2007); sleep microstructure was analysed by means of CAP.

Results

Although not statistically significant, DM1 patients had decreased TST. DM1 patients showed increased percentage of REM sleep, with decreased N2, whereas absolute duration reached statistical significance only for N2 (Table 1 and Fig. 1). Two subjects had a sleep onset REM period and another one a first REM latency of 21 minutes. Although not statistically significant given high inter-individual variability, REM latency appeared shorter in DM patients (Table 1). MSLT showed reduced daytime sleep latency in DM1 patients (8.9±3.1 vs 14.4±2.9, p=0.004); 5 patients showed SOREM in at lest one test of MSLT. CAP analysis pointed out increased sleep instability (CAP rate) for DM1 (Table 1 and Fig. 2). There were no significant differences among two groups regarding apnea/hypopnea and periodic leg movements index.

Discussion & Conclusion

The peculiar macrostructural pattern confirms a narcoleptic-like phenotype in DM1 and points, from a pathophysiological point of view to a REM sleep dysregulation (sleep onset REM periods, fragmented REM sleep) that may account for excessive daytime sleepiness. Higher CAP rate suggests increased sleep instability in DM1 patients.

Our data further support a CNS involvement in DM1 pathophysiology and suggest a role for the mechanisms underlying central sleep regulation in the disruption of sleep-wake continuum, including sleep instability and EDS, in myotonic dystrophy type 1.

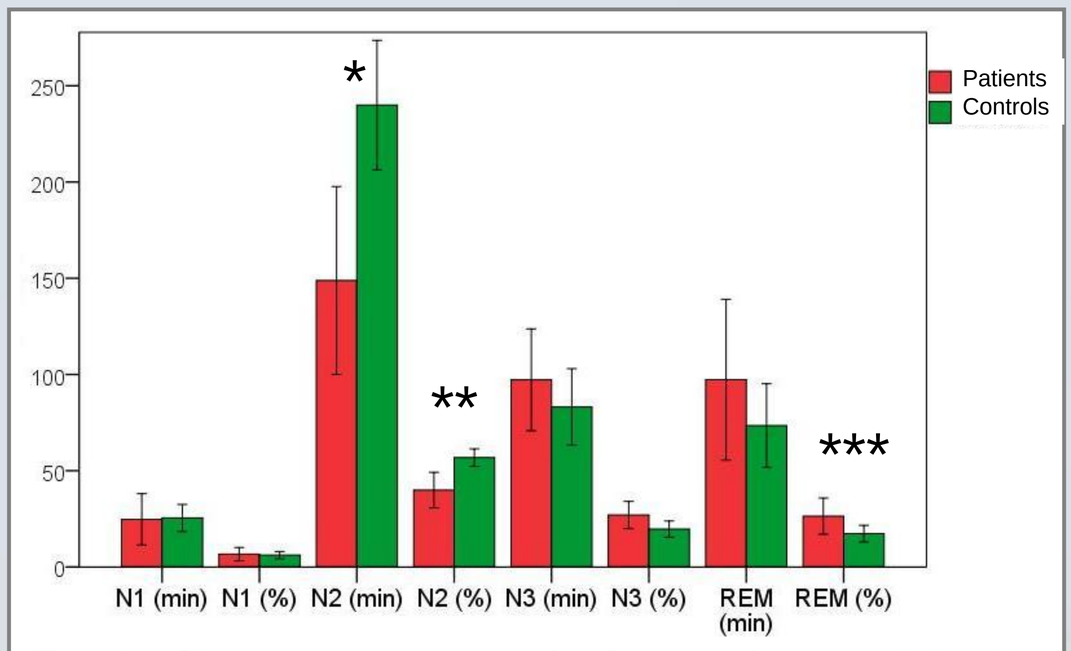

*Fig. 1: Sleep macrostructure in DM1 patients and healthy controls. *: p=0.001; **: p<0.001; ***: p=0.034.*

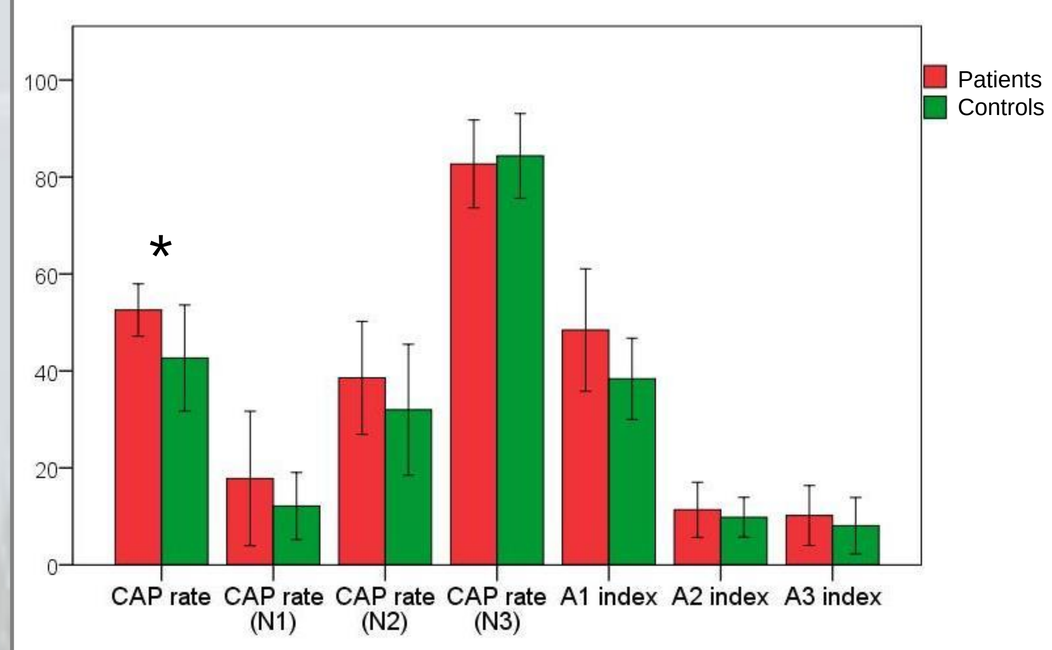

*Fig. 2: Cyclic Alternating Pattern parameters in DM1 patients and healthy controls. *: p=0.043.*

	Patients	Controls	
	Mean ± DS	Mean ± DS	p
TST (min)	368.1 ± 71.9	422.1 ± 49.3	0.122
FRL (min)	70.9 ± 68.6	112.9 ± 42.9	0.173
WASO (min)	51.2 ± 40.1	51.3 ± 34.3	1.000
N1 (min)	24.8 ± 13.3	25.5 ± 7.0	0.897
N1 (%)	6.6 ± 3.5	6.1 ± 1.9	0.573
N2 (min)	148.8 ± 48.8	240.0 ± 33.7	**0.001**
N2 (%)	39.9 ± 9.2	56.9 ± 4.5	**<0.001**
N3 (min)	97.3 ± 26.4	83.2 ± 19.9	0.360
N3 (%)	27.0 ± 7.0	19.7 ± 4.2	0.068
REM (min)	97.3 ± 41.8	73.5 ± 21.8	0.237
REM (%)	26.4 ± 9.4	17.3 ± 4.4	**0.034**
CAP time (min)	143.8 ± 38.2	149.1 ± 43.7	0.829
CAP rate (%)	52.6 ± 5.4	42.7 ± 10.9	**0.043**

Table 1: Sleep macrostructure and Cyclic Alternating Pattern in DM1 patients and Healthy Controls. WASO=Wake after sleep onset.

References

•*Dauvilliers YA, Laberge L. Myotonic dystrophy type 1, daytime sleepiness and REM sleep dysregulation. Sleep Med Rev 2012;16:539-45.*
•*Gibbs JW, Ciafaloni E, Radtke RA. Excessive daytime somnolence and increased rapid eye movement pressure in myotonic dystrophy. Sleep 2002;25:662-5.*
•*Laberge L, Bégin P, Dauvilliers Y, Beaudry M, Laforte M, Jean S, Mathieu J. A polysomnographic study of daytime sleepiness in myotonic dystrophy type 1. J Neurol Neurosurg Psychiatry 2009;80:642-6.*
•*Romigi A, Izzi F, Pisani V, Placidi F, Pisani LR, Marciani MG, Corte F, Panico MB, Torelli F, Uasone E, Vitrani G, Albanese M, Massa R. Sleep disorders in adult-onset myotonic dystrophy type 1: a controlled polysomnographic study. Eur J Neurol 2011;18:1139-45.*
•*Romigi A, Albanese M, Liguori C, Placidi F, Marciani MG, Massa R. Sleep-Wake Cycle and Daytime Sleepiness in the Myotonic Dystrophies. J Neurodegener Dis 2013;2013:692026.*
•*Terzano MG, Parrino L, Sherieri A, et al. Atlas, rules, and recording techniques for the scoring of cyclic alternating pattern (CAP) in human sleep. Sleep medicine 2001; 2(6): 537-53.*

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