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AUTONOMIC REGULATION IN AUTISM SPECTRUM DISORDERS

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ABSTRACT

Introduction*: The sinactive developmental model provides suggests a different way for the brain study by observing the children behavior. In all neurodevelopmental disorders, we can observe autonomic alteration comprising sleep disorders, meal behaviour alteration and self-regulatory impairment. These alterations/impairment are very frequent in autism spectrum disorders (ASD) (1-12). Aim of the present preliminary study is the assessment of metabolic rate in children affected by ASD.*

Material s and methods*. 5 males affected by ASD aged 7-10 years (mean age 6.73±3:39), were recruited. The average score at the ADOS scale was 12.24 (SD± 3.29). The control group consisted of 5 males typically developing children (TDC) aged 7 to 11 years (mean age 7.92 ± 3.23).*

Autonomic/Metabolic evaluation*: Free-living daily physical activity was measured using either the SenseWear Armband in order to calculate the total energy expenditure (TEE), baseline (REE) and the metabolic physical activity for prolonged periods of time. In general, the SenseWear Armband allows objective monitoring of the lifestyle including duration and sleep efficiency.*

Results*: ASD subjects show values of total energy expenditure (p = 0.0047) and active energy expenditure (p = 0.044) significantly higher compared to control subjects (Table 1). In addition, ASD children have a metabolic intermediate significantly higher than healthy subjects (p=0.015). (Table 1). Finally, the ASD children show a significant reduction of sleep time (p = 0.027) (Table 1).*

Conclusion: ASD can represents a very significant risk factor for developing sleep disorders and to high energy expenditure, although further studies are needed in this respect.

Keywords*: autonomic regulation, autism spectrum disorders, SenseWear Armband.*

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Introduction

The sinactive developmental model provides ways of access to the brain study by observing the children behavior, the first way of communicating for the newborn[1-8].

According to this theory, the development process is an interactive and hierarchical process including five subsystems: the autonomic nervous system, motor system, the behavioural system, the attention-interaction system and the self-regulation system. be a hint of aging, but the facilities are needed[9-11].

In all neurodevelopmental disorders, we can observe autonomic alteration comprising sleep disorders, meal behaviour alteration and self-regulatory impairment. These alterations/impairment are very frequent in autism spectrum disorders (ASD)[1-12].

Therefore, aim of the present preliminary study is the assessment of metabolic rate in children affected by ASD.

Materials and methods

Population

5 males affected by ASD aged 7-10 years (mean age 6.73 ± 3:39), were recruited.

The average score at the ADOS scale was 12.24 (SD ± 3.29).

Exclusion criteria were the following: overweight (z-BMI> 85 pc) and obesity (z-BMI > 95 pc), cognitive disability (IQ <70), neurological disorders (ie headaches, epilepsy), chromosomal syndromes (eg. Down, Prader-Willi, Crouzon, Pierre-Robin, trisomy 18), psychiatric illness (ie. mood disorders, anxiety disorders, psychosis) and specific neuropsychological disorders [13-38].

The control group consisted of 5 males typically developing children (TDC) aged 7 to 11 years (mean age 7.92 ± 3.23). The subjects of both groups are all Caucasians, recruited in the same urban area and similar socio-economic status.

Autonomic/Metabolic evaluation

Free-living daily physical activity was measured using either the SenseWear Armband. Participants were requested to wear the SWA on their upper arm 24 h a day, with the exception of swimming or showering/bathing. Moreover, the specific characteristics of the instrument makes it suitable pediatric age. In fact, the tool is handy, small, light is worn on the upper part of his right arm, the triceps area of the posterior. It has a low weight (80 g) allows the data storage of up to 2 weeks of continuous monitoring of all the physiological signals. Allows the calculation of "objectively" the total energy expenditure (TEE), baseline (REE) and the metabolic physical activity for long periods of time. It allows objective monitoring of the "lifestyle" including duration and sleep efficiency.

Statistics

t-Test for comparison between the two populations. p values ≤ 0.05 were considered significant.

Results

The two groups were similar for age (p = 0.585). The ASD subjects show values of total energy expenditure (p = 0.0047) and active energy expenditure (p = 0.044) significantly higher compared to control subjects (Table 1). In addition, the ASD children have a metabolic intermediate in the 24 hours significantly higher than in healthy subjects (p = 0.015). (Table 1). Finally, the ASD children show a significant reduction of sleep time (p = 0.027) (Table 1).

	ASD N=5	TDC N=5	p
Age	6.73 ± 3.39	7.92 ± 3.23	0.585
Total exprenditure (Joule)	7048.58±1126.36	5398.18±1094.25	0.047
Active expenditure (Joule)	3506.75±714.91	2189.63±1003.49	0.044
Mean Metabolic rate (METs)	5.396±0.141	3.971±1.026	0.015
Total sleep time (min)	346.48±75.16	453.25±45.72	0.027

Table 1: shows comparison between means and standard deviation among children affected by autism spectrum disorders (ASD) and typical developing children (TDC) for ArmBand evaluation. t-Test was applied; p values <0.05 were considered as statistical significant.

Discussion

The results of the autism spectrum disorders represent a complex disease and articulated in several respects. Besides the core symptoms, in fact, there are many other complications that the clinician, therapist and parents are forced to face. The neurodegenerative disorders are, among these, the key for feeding difficulties notes, to pain and sensory perception. The sleep of people with ASD is impaired and disturbed at any age and independently of the severity of impaired social and communicative sphere, but not the level of development. In our study, we excluded cases of mental retardation.

What emerges from the results of our survey shows that ASD is a very significant risk factor for developing sleep disorders, although the report could also be interpreted in the opposite manner or that have a disturbed sleep can be an aggravating factor in the nuclear symptoms ASD subjects, although further studies are needed in this respect[39-50].

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