

Sleep disorders

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Abstract. – Sleep disorders occupy an important position among the pathologies which may precede the appearance of headache. Some authors consider sleep disorders an expression of a functional, biochemical and/or neurotransmission alteration at central nervous system level. Sleep disorders may be distinguished, according to the Association Sleep Disorders classification in: alteration of the sleep-awake cycle, hypersomnia, parasomnia, insomnia. We observed 1876 normal children ranging from 3 to 14 years of age, 1073 (60,4%) of whom presented sleep disorders. Few studies have been carried out on the incidence of sleep disorders on casistics of healthy children. Data reported in literature state that sleep disorders do not exceed 25% of cases that is not more than one child out of four presents sleep disorders. This percentage is much lower than the 60,4% rate observed by us in children suffering from primary headache. Our results stress the importance of sleep disorders as a cephalalgic risk factor.

Key Words:

Primary headache, Sleep disturbance, Migraine.

of evolutive age are parasomnia and insomnia. The first category includes an eterogeneous group of disorders characterized by the activation during sleep of neurovegetative and/or neuromuscular centres related to sleep structures. They include somnambulism, somniloquism, bruxism, nocturnal terrors and nightmares, jactatio capitis, and nocturnal enuresis³. The second category is defined as the difficulty to get to sleep, the possible awakening during the night and the early awakening in the morning⁴. Usually in pediatric patients parasomnias and insomnias are benign manifestations: they are transient so that they do not require any treatment, disappear spontaneously and do not leave any consequences. Thus, differently from adults in which the persistence or reappearance of such symptoms is frequently associated to psychiatric disorders⁵, in children parasomnias and insomnias neither are symptoms nor do they point to important underlying disorders.

Introduction

Sleep disorders have a certain relevance among the many disorders that may precede or accompany the appearance of migraine. The American Sleep Disorders Association¹ classifies sleep disorders as follows:

- alteration of the sleep-awake cycle;
- hypersomnia, parasomnia, insomnia.

Although alteration of the sleep awake cycle and hypersomnia may regard children, they are not very frequent: in evolutive age they do not exceed, on the whole, 1% of sleep disorders². The typical sleep disorders

Materials and Methods

A retrospective study was performed on 1876 children (1005 males and 871 females; age range 2-12 years; mean age 8.2 years) referred to our Department between 1992-1997 for migraine. In all the patients, the mean age at the onset of migraine was 6.6 years. The patients did not follow any particular diet and did not suffer from gastrointestinal, neurological or psychiatric disorders. Eighty five percent (85%) of the children presented a family trait for migraine. Among the patients, 1073 (60.4%) referred sleep disorders, such as alteration of the sleep-awake cycle, hypersomnia, parasomnia, insomnia. These symptoms

were more frequent between 2 and 5 years; they were an isolated phenomenon (9%) or associated with typical (23%) or atypical (68%) symptoms of Periodic Syndrome⁶. In order to rule out other causes of migraine laboratory investigations (complete blood count, erythrocytation rate, anti-streptolysin titre, C-reactive protein, total IgE serum levels, urine analysis, nasal and paranasal sinus x-rays, EEG) were performed and resulted all within normal ranges. Clinical examination also resulted negative. On the basis of these results and according to the Headache Classification Committee of the International Headache Society⁷, primary headache was diagnosed in all the patients.

Discussion

Sleep and wakefulness depend on the activity of the whole brain and not on the activity of a topographically selected region. It seems appropriate to individuate as responsible of sleep and wakefulness different neurotransmitter systems. On the basis of these neurotransmitters four systems have been indicated: serotonergic, catecholaminergic, cholinergic, and gabaergic. The system that has been more extensively studied and is at the moment best known is the serotonergic system. The role of the serotonergic system in the sleep-awake cycle has been defined by many experiences. These include pharmacological experiments (for example, the injection in circulation parachlorophenylalanine, an inhibitor of the 5-HT synthesis), microsurgery with the ablation of selective areas of the CNS (as the nuclei of the raphe, where histofluorescence techniques have shown that there are more than 50% of the serotonergic neurons), electrostimulation by microelectrodes, or microinjection in delimited areas (as in the central nuclei of the thalamus or in the preoptical area). More in detail, this system has proved to be responsible for the slow-wave sleep, or not-REM or synchronized sleep, and also of the preparation and triggering of the rapid-eye movement sleep or REM or paroxysmal sleep. Even though the role of serotonergic system within the sleep-awake cycle is well defined⁸, its mode of action is yet unknown and depends from many factors: ex-

ternal (such as the light-darkness cycle, which stimulates the retinal receptors), internal (as the hormonal variations), nervous (as conditioned stimuli), genetic and especially in man, psychological, environmental, and sociocultural factors. The individual role of these different factors on specific sleep disorders is unknown, but undoubtedly they all act on the serotonergic system. There seem to be three points in common between sleep disorders and primary headache in childhood:

- 1) the involvement of serotonergic system: experimental and clinical data indicate an alteration in the serotonergic system as the primary pathogenetic factor⁹;
- 2) familial trait: a predisposition, a terrain favourable to sleep disorders has been put forward by many Authors. In the same way, the familial trait percentage is very high also in the case of primary headache¹⁰;
- 3) psychological factors: undoubtedly, sleep disorders are more intense and frequent when emotionally significant events occur during the day. Psychological factors seem to have the same relevance in many cases of migraine, both at the onset and during its clinical course¹¹.

Data emerging from our study are that in children, sleep disorders represent an important cephalalgic risk factor. In samples of healthy children, it has been described that the incidence of sleep disorders does not exceed 25%³. This value is much lower than the 60.4% that we have observed on our patients suffering from primary headache. Such difference may depend on the difficulty to quantify exactly the prevalence of the disorder, in relation to the subjectivity of the observation. In conclusion, our data suggest that sleep disorders may be considered as migraine equivalents or as cephalalgic risk factors, which tend to precede by some years the appearance of headache. The likelihood of this evolution increases the number of periodic syndrome phenomena associated to sleep disorders¹². Moreover, it appears evident that, if at the basis of many cases of primary headache and sleep disorders there is an alteration of the serotonergic system, this is probably hereditary. This factor by itself is not always

sufficient to trigger this type of disorders but can become effective when associated to psychic conditions requiring special methods of processing and response.

References

- 1) AMERICAN SLEEP DISORDERS ASSOCIATION. International classification of Sleep Disorders, Diagnostic and coding manual. Rochester, Minn, 1990.
- 2) SHELDON SH, SPIRE JP, LEVY HB. Introduzione al sonno e ai suoi disturbi: disturbi del sonno in età pediatrica. Momento medico 1-15, 1993.
- 3) ARRUDA MA, SPECIALI JG, CIACIARELLI MC, BORDINI CA. Risk factors and associated disorders of childhood migraine. Cephalalgia.
- 4) HAURI OLMSTEAD E. Childhood onset insomnia. SLEEP 1980; 3: 59-65.
- 5) PUCA FM, SAVARESE M, GENCO SE, PRUDENZANO AMP. Relazione tra insonnia e cefalee primarie. Psichiatria e medicina 1992; 1: 33-36.
- 6) CORDELLI F. La sindrome periodica. Pediatria oggi vol. VI n° 1, 13-31 Gennaio-Febrero 1986.
- 7) INTERNATIONAL HEADACHE SOCIETY. Classification and diagnostic criteria for headache disorders, cranial neurologias and facial pain. Cephalalgia, VIII (Suppl 7), 1988.
- 8) MANCIA M, SMIRNE S. Fattori morali e neurochimici del sonno. Il sonno e i suoi disturbi, Raffaele Cortina Editore 1985 pg. 55.
- 9) SICUTERI F. Hypothesis: migraine, a central biochemical dysnociception. Headache 1976; 16: 145-159.
- 10) DEL BENE E, POGGIONI M. Headache Risk in Children. Proceedings of the IV Meeting of the Italian Headache Society. Fidia Research Laboratories Pavia 231, 1979.
- 11) KOWAL A, PRITCHARD D. Psychological characteristics of children who suffer from headache: a research note. J Child Psychol Psychiat 1990; 31: 637-649.
- 12) CULLEN KJ, MAC DONALD WB. The Periodic Syndrome: its nature and prevalence. Med Journal Aust 1973; 2: 167-173.