Editorial

Sleep and sleep medicine. From exotic research to a public health problem

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Abbreviations: EEG, electroencephalography; REM, rapid eye movement; NREM, non-rapid eye movement; OSAS, obstructive sleep apnea syndrome

Editorial

For many years sleep research and sleep medicine have been restricted to a small number of scientists mainly active in the field of Neurology, Neurophysiology, and Psychiatry. Following the description of the electroencephalography (EEG) by Berger,[1] the knowledge of sleep and sleep disturbances increased exponentially in the last six decades. The beginning of modern sleep medicine was developing the discovery of the typical EEG sleep pattern of both normal sleep or non REM sleep (NREM) and paradoxical sleep or REM sleep.[2–5] Sleep disorders appear early in human written history. Insomnia, for example, was described in the oldest human story "Gilgamesh" the king of Uruk.[6] There are a huge amount of nowadays celebrities who have declared problems of insomnia including George Clooney or Michael Jackson. Although insomnia clearly reduces the quality of life it has taken a long time until both healths professional and the general population accepted insomnia as a disease. Sleeplessness is a frequent disorder with about 10% of the population refering chronic insomnia.

A short-term or intermitted insomnia reaches values up to 35% of the population.[7] It is now considered a fact, that insomnia and also sleep deprivation or sleep restriction may lead to a reduction in the physical capability and is an important risk factor for car accidents.[8,9] Besides insomnia sleep related breathing disorders have been intensively investigated in the last decades. The most frequent one is the obstructive sleep apnea syndrome (OSAS). Also, here celebrities are not excluded with famous examples including Quincy Jones or Shaquille O´Neal. The most frequently cited prevalence of OSAS is 4% in men and 2% in women.[10] However, due to the increased obesity in the industrialized countries the actual prevalence is possibly much higher. Recent studies indicate higher numbers with 15% of the US population and 30% of a São Paulo cohort fulfilling the criterias of sleep apnea.[11,12]

Considering these numbers, it is highly probable that physicians not directly related to sleep medicine will encounter patients with relevant sleep disorders. Patients are frequently not aware that common health problems are influenced or even have their origin in the presence of sleep disorders. The relationship between OSA and cardiovascular diseases has been established for a long time with first descriptions in the 1980th just after the invention of positive pressure therapy.[13,14] In several epidemiological studies, OSA was found to increase the risk of hypertension, especially nocturnal hypertension and coronary heart disease.[15–17] Patients benefit of an adequate therapy of OSAS by a decrease of the cardiovascular diseases and the mortality. There exists a sufficient body of evidence that intermittent hypoxia is the key mechanism for the higher prevalence of cardiovascular diseases in OSAS.[18–20] Nevertheless, other non-hypoxic sleep diseases like insomnia and restless legs syndrome are also found to be related to hypertension and non-dipping blood pressure.[21–25]

The interaction of sleep disorders with metabolic alterations is less clear but there is now ample evidence that sleep disturbances are associated with the metabolic syndrome.[26–30] Recent cross sectional and longitudinal studies have found more and more confirmation that Type 2 diabetes is associated with the presence of OSAS.[31–33] Positive pressure therapy abbreviates some of the altered parametres. OSAS is therefore in the interesting position that it helps to understand the pathogenesis leading to Type 2 diabetes but also, from the clinical point of view, that it is relevant for disease control.[34–38] Similary to the above stated association between OSAS and cardiovascular diseases, the intermittent hypoxia is considered one of the major risk factors to develop metabolic alterations.[39–41] Both insulin resistance and lipid metabolism are connected to the liver function. In fact, the repitetive hypoxemia in OSAS patients has been recently linked to the development of non-alcoholic steatohepatitis and OSAS has been found associated with the prevalence of non-alcoholic fatty liver disease.[42–44] This closes the circle of interacting metabolic diseases including obesity, OSAS, hypoxemia, liver dysfunction and altered glucose and insulin metabolism.[45]

But once again, although well designed studies brought evidence that intermittent hypoxemia leads to metabolic alteration, it is yet in the discussion if sleep fragmentation, restriction, and insomnia are also important risk factors. Both quality and quantity of sleep predict the risk of type 2 diabetes.[46] Female shift workers with a rapid forward shift rotation are more prone to reach criteria of the metabolic syndrome when compared to colleagues working on a regular basis during the day.[35] In an animal model, alteration of the circadian rhythm may cause hyperlipidaemia via clock gene regulations.[47] The effect of sleepiness, fatigue and non-restoring sleep on cardiovascular and metabolic disorders is still unclear. At present it remains in the discussion if sleep apneas without sleepiness are in fact at an increased risk of cardiovascular diseases or metabolic disorders.[48–53]

Conclusion

We know that sleep effects various functions of the homeostasis. To address correctly the health problems of their patients any physician should be aware of this relationship. Although the impact of

OSAS on cardiovascular and metabolic disorders is well established, there is still some uncertainty if sleep quality, sleep duration, and sleep fragmentation are not of relevance as well. To elucidate this complicated relationship between sleep, mental and physical health the publication of case reports will be of considerable importance.

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Conflict of interest

The author declares no conflict of interest.

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