Somnometabolic Syndrome Revisited

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Abstract

The term somnometabolic syndrome has been used to describe a condition where obstructive sleep apnoea coexists with one or more components of metabolic syndrome. We propose a wider definition, stating that somnometabolic syndrome refers to the multifaceted, bidirectional relationship between sleep and metabolic health, including vascular health. This also includes the association of sleep with psychological and neurocognitive function.

Keywords: Adreno-somnic axis, autonomic hygiene, cardiovascular disease, diabetes, insomnia, obesity, obstructive sleep apnoea, sleep disorders

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Introduction

Sleep is an integral part of human physiology. Sleep has a restorative function, and is known to be cardioprotective and neuroprotective.[1] There is ample evidence to demonstrate the health benefit of seven hours of sleep a day. Unfortunately, this is not adequately highlighted in modern discourse on metabolic health. The primordial, primary, secondary, and tertiary preventative effects of sleep are not harnessed properly in metabolic medical care. We therefore expand the definition of somnometabolic syndrome, to promote understanding and utilization of the importance of sleep, in the prevention and management of metabolic syndrome.[2]

Definition

Somnometabolic syndrome can be defined as the multifaceted, bidirectional relationship between sleep and metabolic health, as well as sleep disorders and metabolic ill-health. The syndrome also refers to vascular and psycho-cognitive aspects of health that are associated with sleep and metabolism. The table lists clinically significant facets of somnometabolic syndrome that healthcare provider must be aware of.

Table: Somnometabolic Syndrome.

Sleep and disease
● Inadequate sleep is associated with higher insulin resistance and inflammatory marker concentrations
● Inadequate sleep is associated with higher risk of prediabetes, hypertension, obesity and cardiovascular events
● Inadequate sleep is associated with higher cardiovascular mortality and all–cause mortality
● Obstructive sleep apnoea is associated with metabolic syndrome
Metabolic syndrome and sleep
● Obese persons are at greater risk of sleep disorders
● Persons with diabetes may have disturbed sleep due to painful neuropathy, or other painful inflammatory conditions
Metabolic syndrome treatment and sleep
● Person with diabetes may have bad dreams, night mares or disturbed sleep due to nocturnal hypoglycaemia
● Persons who indulge in excessive night time physical activity are more prone to cardiovascular morbidity and mortality
Sleep management and metabolic health
● Management of sleep apnoea improves metabolic health and outcomes
● Use of certain psychotropic drugs is associated with increased insulin resistance, dysglycaemia and obesity
● Hypnotic drugs may impair hypoglycaemia awareness and lead to undesirable consequences
● Dual orexin receptor antagonists (DORAs) may help improve insulin sensitivity.

Adreno-Somnic Axis

Sleep is closely linked with the autonomic nervous system. Sustained or extreme sympathetic stimulation, caused by exposure to caffeine, audiovisual stimuli, exercise or stress, disturbs both sleep and metabolic homoeostasis.[3]

The term 'adreno-somnic axis' refers to bidirectional link between adrenal function, both cortical and medullary, and sleep. Disturbed sleep is associated with raised cortisol as well as catecholamine levels, and these are further associated with dysregulation of glycaemic and vascular parameters. The adreno-somnic axis therefore becomes an important contributor to our understanding of the somnometabolic syndrome.

The concept of autonomic hygiene provides a counterfoil to keep this axis in health.[4] Balance between sympathetic and parasympathetic tone promotes healthy sleep.

Prevention

Sleep hygiene should be introduced at all levels of health

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promotion and disease prevention.[5] At all stages of life one should be encouraged to practice healthy sleep habits (primordial prevention). This is especially true for persons with metabolic syndrome (primary prevention). Regular screening, diagnosis and management of sleep disorders, including insomnia and obstructive sleep apnoea, is necessary as well (secondary prevention).[6] Poor sleep is associated with diabetes, hypertension, obesity and adverse cardiovascular outcomes.[7-10] Sleep management strategies are required to handle challenging situations such as high fasting glucose and high blood pressure (tertiary prevention).

From the metabolic window, a healthy lifestyle should be offered to all persons (primordial prevention), especially those with sleep disorders (primary prevention). Regular screening should be done to ensure timely detection and addressal of metabolic dysfunction. In fact, insomnia or sleep disorders should be listed in high-risk conditions for diabetes (secondary prevention). Comprehensive care of somnometabolic syndrome helps reduce complications and avoid comorbidities, such as cardiovascular events (tertiary prevention).

Action

Physicians managing sleep disorders and metabolic syndrome, therefore, should be aware of advances in both disciplines. They must be empowered to screen for somnometabolic syndrome, and ensure timely cross-disciplinary referral, if needed.

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