REVIEW ARTICLE

Sleep and Sugar: Diabetes and associated sleep problems

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Sleep disturbances are common in diabetics. Diabetics report higher rates of insomnia, excessive daytime sleepiness, and unpleasant sensations in the legs that disturb sleep.[1,2] Hence up to 71% of this population complain of poor sleep quality[3] and high rates of hypnotic use.[1]

Many factors contribute to insomnia in diabetics. In type 1 diabetes, rapid changes in glucose levels during sleep can cause awakenings.[4] In individuals with type 2 diabetes, sleep disturbances may be related to obesity or sleep apnea. Sleep-disordered breathing correlates highly with obesity in the diabetic population.[5] A strong association also exists between obesity, impaired glucose tolerance, insulin resistance and sleep-disordered breathing.[5-7] The severity of sleep-disordered breathing, as measured by the apnea-hypopnea index, correlates with the severity of glucose intolerance, insulin resistance and diabetes.[7,8] Obstructive sleep apnea is the commonest type of sleep-disordered breathing. Patients with autonomic diabetic neuropathy may have central-type apneas and periodic breathing.[5]

Discomfort or pain can disturb sleep in patients with peripheral neuropathy.[9] Sleep-onset and maintenance of insomnia can be caused by restless legs syndrome and periodic limb movements in diabetics with peripheral neuropathy.[10] Hyperglycemia or hypoglycemia during the night and night sweats can contribute to disturbed sleep.[4,11]

There is evidence that demonstrates that individuals with diabetes are at risk for poor sleep quality and that poor sleep is associated with insomnia, sleep-disordered breathing, restless legs syndrome besides chronic pain may exacerbate diabetes. Therefore, evaluation and management of patients with diabetes should include an assessment of sleep quality and sleep disorders.

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Key questions to be asked

Recognition that the etiology of sleep disruption in diabetes is often multifactorial, is essential:

1. Do you have difficulty falling or staying asleep?
2. Are you excessively sleepy during the day or fall asleep when you do not want to?
3. Do you snore or have you been told that you snore loudly?
4. Do you gasp for air or have you been told that you stop breathing during sleep?
5. Do you experience uncomfortable sensations in the legs in the evening that are relieved by movement?
6. Are you a restless sleeper or have you been told that you kick during sleep?

After considering and ruling out medical and psychiatric causes of insomnia, a diagnosis of primary insomnia may be made. Keeping a sleep diary during a two-week period can provide a detailed assessment of sleep and wake patterns. The diagnosis of restless legs syndrome is usually made by the history and physical examination. However, when a diagnosis of sleep apnea is suspected, an overnight polysomnogram is usually required for diagnosis.

Management of sleep disorders

Successful management of sleep disorders often requires a multifaceted approach that not only provides relief of symptoms, but also treatment of the common comorbid conditions.

Obstructive Sleep Apnea

Diabetics who have obstructive sleep apnea, medical management includes weight loss, identification and

treatment of anatomic and functional upper airway obstruction and nasal continuous positive airway pressure. In addition to improving sleep quality and nocturnal hypoxemia, continuous positive airway pressure use improves insulin sensitivity in patients with sleep apnea.[12] Much less information is available about effective treatments for periodic breathing and central-type apneas in patients with autonomic neuropathy. Regular, moderate-intensity physical activity has shown to have a protective effect on both snoring and diabetes in overweight people.[13] Effective treatment of sleep apnea can improve glucose regulation, insulin sensitivity as well as the daytime function and quality of life of diabetics.

Hypoglycemia

In type 1 diabetics, autonomic responses to hypoglycemia are reduced during sleep. Patients with hypoglycemia during sleep showed improved sleep efficiency and increased slow wave sleep.[4] It is probable that reduced sympatho-adrenal responses inhibit sympathetic and arousal responses to hypoglycemia in these patients. This reduction results in patients becoming substantially less likely to be awakened by hypoglycemia during the night.[14] Rapid changes in glucose, rather than absolute glucose levels, may be the catalyst for awakening from sleep.[4] As a result, nocturnal glucose levels should be closely monitored in type 1 diabetics, to prevent hypoglycemia during sleep.

Peripheral neuropathies

When parasthesias and pain are secondary to peripheral neuropathies, treatment should be focused on pain control. Treatment of pain symptoms for those with diabetic neuropathy may include analgesics, antidepressants (such as tricyclics and selective serotonin reuptake inhibitors (SSRIs]) or gamma-amino butyric acid (GABA) ergic agents (such as gabapentin or tiagabine)[15]

Restless Legs Syndrome

Diabetic patients with restless legs syndrome often also have periodic limb movements during sleep. After evaluation for possible causes, such as iron deficiency or thyroid disease, dopamine agonist medications, benzodiazepines, and gabapentin are recommended. In severe cases, opiates may be used for relief of symptoms. In patients with low levels of ferritin, evaluation for sources of iron loss and iron replacement therapy is useful.

Pharmacologic approaches

A significant number of patients with insomnia benefit from pharmacologic therapy. Currently available hypnotic medications are benzodiazepine receptor agonists. These consist of benzodiazepines (temazepam, flurazepam, estazolam, and triazolam) and the newer agents (zolpidem and zaleplon). Other categories of medications used for alleviating insomnia are the sedating antidepressants and certain anticonvulsants. Trazodone is the most widely prescribed sedating antidepressant for insomnia. For patients with diabetic neuropathy, insomnia, and restless legs syndrome, anticonvulsants (such as gabapentin) may be useful.

Behavioral management

Behavioral approaches are important in the management of insomnia in diabetics. Adherence to good sleep hygiene, sleep restriction, cognitive behavioral therapy, and relaxation therapies are effective and basic to the treatment of insomnia. Behavioral interventions aim to correct or remove factors that perpetuate or worsen insomnia [16]

Behavioral therapy alone or combined with pharmacologic treatments has been shown to be effective for primary as well as secondary insomnia.[17,18] Traditional behavioral therapy requires multiple sessions for a period of 6-8 weeks. An abbreviated cognitive behavioral therapy of only two 25-minute sessions has been shown to be effective.[19] Therefore, behavioral strategies should be an integral part of the management of insomnia.

Conclusion

Sleep disturbances are common and can be detrimental to the health, mood and quality of life of people with diabetes. Sleep-disordered breathing, pain, restless legs syndrome, primary insomnia and lifestyle factors all contribute to a high rate of sleep complaints in this population. Because the etiologies of poor sleep quality is multifactorial, careful evaluation for insomnia, sleep-disordered breathing and restless legs syndrome should be done.

There is evidence that treatment of sleep disorders such as sleep apnea, can improve glucose control and insulin sensitivity. Advances in behavioral therapy for insomnia, as well as improved safety and tolerability of the newer

hypnotic agents and better control of neuropathic symptoms have resulted in improvement in the management of sleep disruption in diabetics.

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