Identifying and Correcting Sleep Disturbances Related To Nocturnal Glucose Regulation

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Abstract

Sleep disorders are said to affect approximately 20 percent of the US population[1] with problems ranging from insomnia, restless sleep, waking up at specific times, sleep apnea, and a host of others. There are many etiologies for each sleep disturbance such as hormonal imbalances and emotional problems. Often the reason an individual wakes up throughout the night is due to a spike in either cortisol or epinephrine as a result of a sudden drop in blood sugar levels or a drop below normal (hypoglycemia). Though it is well known that one of these two hormones is responsible for the disruption of sleep, it is often difficult to verify, as rarely can a patient be treated during the actual sleep cycle. However, using manual muscle testing (MMT) along with specific challenge procedures, one can often identify the reason for the sleep disruption and therefore the treatment can be tailored towards its improvement and, often, correction. This author has found a specific procedure to implement during the neurological examination process which will identify and treat such sleeping disorders.

Key Indexing Terms
Glucose, Glycogen, Cortisol, Epinephrine, Nocturnal, Sleep, Manual Muscle Testing (MMT), Glycogenolysis, Gluconeogenesis

Introduction

Blood sugar levels are monitored by cells in the pancreas called the Islets of Langerhans. When blood glucose levels fall too low, the body must increase this level via two main mechanisms. The body may convert stored glycogen into glucose (glycogenolysis), which occurs in the muscle and liver tissue, or it may generate glucose from some non-carbohydrate carbon substrate such as amino acids, glycerol or lactate. This process is called gluconeogenesis and occurs primarily in the liver.

Epinephrine and glucagon promote glycogenolysis which increases plasma glucose levels by breaking down liver glycogen.[2] Due to its origin in the adrenal medulla and its affect on the sympathetic nervous system, an increase of epinephrine will have a negative effect on restful sleep. Epinephrine excretion has been shown to have a positive correlation with percent of waking time during bed-rest in the daytime and at night.[3]

Cortisol, produced in the adrenal cortex, will increase protein catabolism which in turn frees amino acids to be used for gluconeogenesis. The excretion of cortisol is synonymous with a stress response, therefore, like epinephrine, it will also negatively affect sleep.

The liver is the main target organ involved in both the epinephrine effect of glycogenolysis and the cortisol effect of gluconeogensis. Therefore, the status of the liver must be observed when investigating sleep problems.

Discussion

There currently are various methods to help identify problems that may occur when a patient is sleeping, yet the examination is occurring at a different time; one such procedure is the Then & Now Technique.[4] Additionally, the patient may simulate REM sleep by rolling their eyes in a circle; muscle inhibition of a previously facilitated muscle often indicates a problem. Many times a challenge is needed during this REM sleep test to see a muscle change response and indicate a problem. The challenge is typically something that would over-stimulate the nervous system, such as cortisol, epinephrine, emotional or physical stress or a dietary stress such as sugar, caffeine or a food allergy/intolerance. However, often when something is expected to occur during the examination, based on the patient's history and symptoms, correlating such with a muscle test may not be evident. Additionally, as noted above, the liver plays an important role in sleep issues due to the influence of cortisol and epinephrine on the organ in blood sugar regulation. According to acupuncture meridian therapy, the liver's horary period is 1am-3am. This is when the organ is at its highest energy level. While many sleep disturbances do occur at this time due to certain stresses on the liver, some do not, so the liver must be challenged in a different way, in order to "smoke-out" a hidden sleep problem that may not be seen otherwise.

When there is a drop in the blood glucose level at night, the liver must work to bring the level back up. This is accomplished by either pulling glycogen from the liver and converting it into glucose (glycogenolysis), which is done via epinephrine, or by converting amino acids into glucose (gluconeogenesis), which results in an increase in cortisol output.

A doctor can test one of the liver related muscles, either the pectoralis major sternal or the rhomboid, while challenging the patient with either cortisol or epinephrine as the patient simulates REM sleep by closing the eyes and rolling them in a circle. This will verify if the patient is awakening at night due to a dysglycemic or a hypoglycemic state as a result of an increase in either cortisol or epinephrine. Furthermore, the reason for the spike in either hormone can be identified by challenging various stressors, such as dietary offenders, emotional issues, other hormonal imbalances or medication/supplemental intolerances. After the stressor is determined, challenging with various supplements to help regulate either epinephrine or cortisol, as well as nutrients, which will help support or overcome any other stressors and will prove to be very useful.

Procedure

1. Test a liver related muscle, (rhomboid or pectoralis major sternal division). The pec sternal is easier to use and should be strong with normal autogenic inhibition - (shortening of the spindle cell weakens the muscle).
    a. Have the patient close the eyes and slowly roll them in either direction, (REM sleep). If this produces a change (weakening) in the muscle being tested, the doctor must correct according to other procedures which will not be addressed in this paper.
    b. With the patient's eyes open, challenge the patient with cortisol by using either oral nutrient testing of homeopathic 6X cortisol or vigorously rubbing the adrenal Chapman's Reflexes (CR) for 2-3 seconds. If this produces a change (weakening) in the muscle being tested, the doctor must correct according to other procedures which will not be addressed in this paper.
        i. If this produces no change, then perform the muscle test again, challenging cortisol <u>simultaneously</u> with the REM sleep eye movement. If this results in a weakening of the pec sternal, go to 2. This is a positive test indicating that the patient is experiencing nocturnal gluconeogenesis.
    c. Challenge the patient with epinephrine by using either oral nutrient testing of homeopathic 6X epinephrine or asking the patient to squeeze the hands into a fist as hard as possible for 2-3 seconds. If this produces a change (weakening) in the muscle being tested, the doctor must correct according to other procedures which will not be addressed in this paper.
        i. If this produces no change, then perform the muscle test again, challenging epinephrine <u>simultaneously</u> with the REM sleep eye movement. If this results in a weakening of the pec sternal, go to 2. This is a positive test indicating that the patient is experiencing nocturnal glycogenolysis.

2. The treatment is to provide more parasympathetic activity to the liver, which is accomplished by rubbing the CR of the liver while either cortisol or epinephrine stimulation is introduced. However, before this is corrected, the doctor may wish to find an offender/stressor that may be driving the increased epinephrine or cortisol output, as well as investigate any possible supplements which may help the patient deal with the hormonal stress output or offender/stressor.
    a. To investigate common offenders, the oral homeopathic solution, if used, should be removed from the tongue. Next the doctor should check for various offenders that may be suspected to weaken the pec sternal during the REM sleep challenge. Common offenders are the following: caffeine, sugar, food allergies/intolerances, medications, other hormones (such as estrogen, testosterone, thyroxine), and emotional stress (patient should therapy localize to the stomach neurovascular points). This procedure is done by challenging with the offender/stressor while the patient is rolling their closed eyes and the doctor is testing the pec sternal.

b. Next, the doctor should check to see if any supplementation may help the patient recover from the sleep disorder faster.
    i. If cortisol showed weakening during the testing, the doctor, while performing the REM challenge test (patient's eyes are closed and rolling and the doctor vigorously rubs the adrenal gland CRs so oral testing of the nutrient may be performed), should check the following nutrients: B1, B2, B3, B5, Phosphatidylserine, choline, vitamin E, vitamin C, and magnesium. Supplement as indicated.
        2 Additionally, protein intake should be assessed as levels may be low or inadequate
    ii. If epinephrine weakened during the testing, the doctor, while performing the challenge test (patient's eyes are closed and rolling and they are asked to squeeze their hands into a fist as hard as possible for 2-3 seconds), should check the following substances: B2, B5, B12, selenium, zinc, glucuronic acid, cysteine, glutathione, and copper. Supplement as indicated.
        2 Additionally, carbohydrate intake should be assessed as liver glycogen levels may be low

Conclusion

Nocturnal hypoglycemia is a common problem that results in a disrupted sleep cycle. The resultant hormonal spikes of either cortisol due to gluconeogenesis from amino acids converting to glucose or epinephrine due to glycogenolysis will awaken the individual. Testing the various substances and/or hormones via the liver related muscles during a simultaneous REM sleep and hormonal challenge is the key to a proper diagnosis and treatment. Adjusting the patient's diet, either throughout the day by providing adequate and healthy levels of carbohydrate or protein or by identifying and correcting common offenders, often proves to be useful in dealing with this problem. Supplementation of various nutrients described when indicated to help break down epinephrine and cortisol will also benefit the patient.

References

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