

SLEEP APNEA

Vikram Shah M.D.

Sleep apnea refers to the periodic cessation of air moving in and out of the lungs during sleep. Airflow must stop for an interval that is longer than the normal pause between breaths in order to be called apnea. This interval is usually defined as 10 seconds or more for adults.

There are three basic types of sleep apnea: 1) Central apnea: No air moves in and out of the lungs because the person makes no effort to breathe for a certain period of time. 2) Obstructive apnea: The person tries to breathe, but cannot take in air because a portion of the throat is blocked. 3) Mixed apnea is an event when initially there is no effort to breathe, then, when the person resumes efforts to breathe, the airway is obstructed and no air moves into the lungs.

This review will focus on obstructive sleep apnea (OSA) or obstructive sleep apnea - hypopnea (OSAH). OSA and OSAH are caused by abnormal closure of the airway during sleep. The throat is surrounded by muscles that open or close the airway during speech or swallowing. These muscles are also important in allowing air to flow normally into and out of the lungs during breathing. If these throat muscles relax inappropriately during sleep, or if the throat is abnormally small, the airway may partially close. This results in snoring and a decrease in the flow of air into and out of the lungs. An episode of partial airway closure is called a sleep apnea. Complete closure of the airway results in cessation of all air movement, and is called an obstructive apnea. A person may have both apneas and hypopneas during sleep.

Changes in blood oxygen and carbon dioxide levels occur when breathing is abnormal during sleep. Even if these levels change only slightly, it may be recognized by the brain and there is some interruption in normal breathing. It is also possible that the brain recognizes when more work is being done in an effort to get air into the lungs, as may occur when the throat is completely or partially blocked. This causes partial awakening (arousal) from sleep. Once a person begins to wake up, the throat muscles contract, the airway is reopened, and normal breathing resumes. This is often, but not always associated with a loud snore or snort. The person often falls back to sleep quickly, usually without being aware of having awakened. Alternatively, some patients with OSA may awaken suddenly and completely with a sensation of gasping, smothering or choking.

Once sleep resumes, the throat muscles relax, the airway closes and the pattern repeats itself. The period of apnea or hypopnea may last a minute or more, and this cycle can occur hundreds of times in a single night. In this way, OSA and OSAH cause numerous interruptions in sleep, and may result in significant sleep disruption and deprivation. This is true even if the person is not aware of these frequent interruptions. In addition to poor sleep quality, OSA and OSAH may be associated with increased risk for, or worsening of common heart problems.

It is likely that OSA and OSAH occur because of structural or functional abnormalities in the throat. The condition is more common in men than women, and is often associated with obesity. OSA is a common disorder. It is estimated that more than 3 million men and 1.5 million women in the United States may have signs of sleep apnea. OSA is a

chronic condition, but many treatments are available. Treatment helps patients sleep without interruption and feel more rested. Treatment may also decrease the risk of certain types of heart disease.

The main symptoms of OSA and OSAH are loud snoring and severe sleepiness. A person can have these conditions and not be aware of either of these symptoms. For example, if the person does not have a bed partner, he or she may not be aware of the snoring. Sleepiness can also come on gradually and build up over time to the point where the person accepts it as normal. Other symptoms include: 1) restless sleep, 2) awakening with choking, gasping or smothering, 3) awakening with chest pain or discomfort, 4) morning dry mouth or sore throat, 5) morning confusion, 6) morning headaches, 7) personality change, 8) memory impairment or difficulty concentrating, 9) impotence, 10) frequent awakenings to urinate. In addition, patients with high blood pressure have an increased risk of having OSA, particularly if they are overweight.

A doctor may suspect these conditions based on a patient's symptoms. The patient's neck circumference may be measured, as a large neck is associated with increased risk of sleep apnea. If a bed partner gives a history of observing the patient having episodes of choking or gasping during the night, this raises the suspicion that these conditions are present. The diagnosis can be established with certainty only by testing the patient during sleep.

Patients with OSA are usually referred to a sleep laboratory for a full sleep study using a polysomnogram. It measures: 1) blood oxygen level, 2) heart rate and electrocardiogram (ECG), 3) breathing effort and airflow, 4) duration of the various stages of sleep, 5) body position, 6) limb movement.

Aside from feeling tired, complications attributed to OSA and OSAH include poor concentration. Studies have shown that people with severe OSA/OSAH are more than twice as likely to be involved in a motor vehicle accident than people without these conditions. In addition, there is some evidence that untreated OSA/OSAH is associated with an increased risk for cardiovascular problems such as high blood pressure, heart attack, abnormal heart rhythms, or stroke. This increased risk may be due to the wide fluctuations in heart rate and blood pressure observed in patients with OSA/OSAH during sleep. However, further research is needed to clearly document whether sleep apnea contributes to any of these problems.

Treatment can be generally divided into non-surgical and surgical approaches. A number of non-surgical therapies can be recommended. Changes in lifestyle and habits may reduce the severity of OSA/OSAH. Weight reduction may be helpful in overweight patients with OSA/OSAH, however, the degree of weight reduction required to reduce or eliminate these conditions, varies. Some patients benefit from restriction of body position by sleeping exclusively on their side or with the head of the bed elevated. Since alcohol may promote throat closure during sleep, it should be avoided. In addition, OSA/OSAH may be worsened by certain prescription medications, irrigation of the upper airway, and high altitude. People with OSA/OSAH should always be certain that their healthcare provider is aware of their condition in order to avoid medications which may make throat closure more likely, or at least so the potential risks and benefits can be weighed. It is important to realize that while often helpful, changing habits and

exposures cannot be assumed to have a curative effect. Additional treatment is often necessary.

The main non-surgical treatment for OSA/OSAH is the use of a mechanical device to keep the upper airway open during sleep. A Continuous Positive Airway Pressure (CPAP) machine supplies air under relatively low pressure through a mask that fits on the nose or over the nose and mouth. Devices that fit comfortably into the nasal opening, rather than over the nose, are also available. Patients should use CPAP whenever they sleep. The CPAP device may be used for the first time in the sleep laboratory, where technicians can adjust the pressure needed to keep the airway from closing. Most patients are able to tolerate CPAP, especially if attention is given to finding a mask that fits comfortably. Other mechanical devices may be useful in some patients. These devices are typically oral appliances and function by holding the lower jaw or tongue forward during sleep.

Once effective treatment is initiated, the improvement in alertness and other benefits are often rapid.

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