Obstructive Sleep Apnea (OSA), Overview and Treatment Options: A Review Article

Abstract

There are different forms of sleep apnea, each with different causes. Fortunately, they are all treatable. 1] Obstructive sleep apnea (OSA) occurs when the muscles and soft tissues in the upper airways relax and become blocked during sleep. It is often accompanied by loud snoring or snorting. OSA is the most common form of sleep apnea, 2] Central sleep apnea (CSA) occurs when the brain stops sending signals to the respiratory muscles while sleeping. Although the airways remain open, breathing stops. CSA is less common than OSA, 3] Mixed sleep apnea is a combination of central and obstructive sleep apnea, and 4] Cheyne-Stokes breathing (CSA) is a pathological form of breathing that can occur during sleep. It is generally characterized by alternating shallow and deep breaths with central respiratory arrests in between. Common to all of these disorders is the occurrence of apneas and hypopneas. Apnea is when the muscles and soft tissues in the upper airways slacken and they collapse to the point that they are completely blocked for 10 seconds or more. Hypopnea is a partial blockage of the airways that results in a decrease in airflow of more than 50% for 10 seconds or more.

Keywords

Obstructive Sleep Apnea, OSA, CPAP, Nighttime Snoring, Daytime Sleepiness

Introduction

Obstructive Sleep Apnea Syndrome (OSAS) is a serious sleep-related breathing disorder in which breathing is repeatedly reduced or completely stopped during sleep due to narrowing of the throat. These breathing pauses can occur several hundred times per night and last up to minutes. The collapse in the area of the upper respiratory tract leads to a drop in the oxygen concentration in the blood and an insufficient supply of the organs. In this case, the brain is the first to be affected and sounds the alarm (1). This so-called alarm manifests itself in recurring wake-up reactions, which fragment sleep and lead to non-restful sleep. The stages of sleep are thereby disturbed (2).

The symptoms of obstructive sleep apnea syndrome are very variable in their form and intensity. The most common symptoms are irregular loud snoring, unrefreshing sleep, constant daytime sleepiness with an increased tendency to fall asleep during the day.

Symptoms of Obstructive Sleep Apnea (OSA)

Many people snore while they sleep. Almost half of people over 60 years of age snore. The vibration of the moving parts of the pharynx leads to very loud snoring noises, especially when inhaling. On the one hand, this can be very annoying for the bed partner, but as a symptom of obstructive sleep apnea, it can have serious health consequences. Patients with obstructive sleep apnea report nocturnal breathing pauses observed by their bed partner. These lead to a drop in oxygen in the blood with the following wake-up reaction and are, on the one hand, frightening for the bed partner and, on the other hand, clearly disruptive for the sleep profile of the person concerned, since restful deep and dream sleep is prevented here (3).

In the context of obstructive sleep apnea, many patients report pronounced daytime sleepiness. Sometimes reports of sleep attacks that are difficult to control and that occur particularly in monotonous situations (reading the newspaper, watching TV, in the theater, etc.) are reported. The microsleep that occurs when driving a car can be particularly dangerous for those affected and their environment and lead to restrictions in private and professional life. According to an investigation by insurance companies into fatal accidents on motorways, falling asleep at the wheel is the most common cause of accidents at 24 percent (4).

Due to the disturbed night sleep, the functions and recovery processes that are important for the body and mind can only take place to a limited extent. Many patients report reduced mental and physical performance, poor concentration and sometimes nervousness and irritability (5). These changes are particularly noticeable in the person's environment and significantly reduce the quality of life.

Consequences of Obstructive Sleep Apnea (OSA)

The consequences of untreated obstructive sleep apnea can be serious. They not only worsen the quality of life, but they also shorten the lifespan.

Studies have shown that untreated patients with obstructive sleep apnea syndrome have a significantly shorter life expectancy than healthy people of the same age due to the cardiovascular complications. Sleep apnea can also make it difficult to control blood pressure and lead to cardiac arrhythmias. For sleep apnea sufferers, the risk of a heart attack and stroke is threefold (6).

The nightly pauses in breathing lead to repeated drops in oxygen in the blood, which result in brief wake-up reactions. These wake-up reactions disrupt the normal sleep profile and can lead to morning headaches, exhaustion, sexual dysfunction and even

impotence in men. The sleep apnea patient sometimes reports that he is no longer able to meet the demands of everyday life (7). This psychological burden should not be underestimated and in some cases, it can lead to depression.

However, some of the patients do not feel that they have any restrictions in everyday life. However, they also have an increased risk of cardiovascular consequences.

Diagnosis of Obstructive Sleep Apnea (OSA)

For the diagnosis of "sleep apnea" it is important to ask the patient about the typical symptoms as part of the anamnesis and to include the sleep partner in the sleep anamnesis typical symptoms of obstructive sleep apnea were queried and a sleep diary was kept.

If the suspicion of a sleep-related breathing disorder is confirmed during the patient consultation, we arrange for an outpatient polygraph or an inpatient polysomnography ("sleep laboratory examination") (8).

Ambulatory polygraphy is a small portable device that you can take home and record your breathing, body position, heart rate, and oxygen saturation throughout the night. The next day, this device can be handed in to your attending physician and evaluated (9). A relatively accurate diagnosis of sleep apnea syndrome can be made in this examination.

The assessment of night sleep is carried out in sleep laboratory using polysomnography. During the night of measurement, important parameters such as blood pressure, heart rate, nocturnal oxygen saturation, breathing pauses and the stages of sleep are recorded by means of EEG and the findings are then evaluated for the presence of a sleep-related breathing disorder and the findings and further therapy planning discussed with you during our sleep consultation (10).

Management Options for Obstructive Sleep Apnea (OSA)

Obstructive Sleep Apnea (OSA) therapy is very important for the health of those affected: The sleep-related breathing disorder increased by daytime fatigue and the risk of accidents is related to the development of cardiovascular disease and other diseases.

First of all, one can try to alleviate the symptoms by making changes in lifestyle and sleeping habits. However, this cannot necessarily reduce the breathing pauses itself. There are several general "sleep hygiene" measures that can improve sleep: 1] Avoid stimulants such as coffee and tea and heavy meals in the evening four to six hours before going to bed, as they can impair sleep, 2] Do not smoke or drink alcohol in the evening, because the consumption of alcohol and nicotine in the evening can also disturb sleep, 3] Alcohol makes the respiratory muscles even more slack, which can worsen sleep apnea symptoms, and 4] Ensure a quiet, dark and above all comfortable place to sleep with a pleasant temperature (11).

Certain sleeping pills and sedatives have and can have many side effects in the long run Sleep apnea strengthen. These include above all funds from the group of Benzodiazepines. Hence, it is better to go on Benzodiazepines to avoid it or to take it in the lowest possible dose for a few days (12). Other sleep-promoting agents (called non-benzodiazepines) (13) are unlikely to cause more frequent pauses in breathing.

People who are overweight are more likely to have one Sleep apnea- probably because too much belly fat makes breathing difficult. Fat deposits in the throat and pharynx also narrow the airways. If you are very overweight (obese), losing weight can generally have positive effects on your health. Also, the Sleep apnea improves,

but rarely disappears just by losing weight (14). A combination of a reduced calorie diet and more exercise can help you lose weight.

Those who sleep on their back are more likely to have snoring and breathing disorders, as the tongue falls back more strongly into the throat. If the Sleep apnea occurs only in the supine position, one can try to lie on the side at night (15). For example, some people sew a tennis ball into the back of their pajamas, put a pillow in their back or use a backpack-like positioning belt that is strapped around their chest. To make breathing easier when lying on your back, it sometimes helps to position your head higher.

A change in sleeping position alone can accommodate most people Sleep apnea not helping enough (16). It can reduce the frequency of pauses in breathing. In previous studies, however, changing positions did not help participants feel more awake during the day (17). CPAP therapy, in which a special breathing mask is worn during sleep, is more effective overall.

There is also a wide range of aids and products such as nasal plasters, sprays and gargle solutions that are supposed to improve sleep and reduce snoring. It is unclear whether they bring any relief, as there is a lack of meaningful scientific studies on such remedies.

Continuous Positive Airway Pressure (CPAP)

CPAP therapy is very often used to treat an obstructive disease Sleep apnea used - it is considered the standard therapy (18). CPAP stands for "continuous positive airway pressure". This treatment involves wearing a mask while sleeping. Depending on the model, it encloses the mouth and nose or just the nose. There are also so-called nasal

pillows, in which two end pieces made of soft plastic are inserted directly into the nostrils.

With respiratory therapy, ambient air is pumped into the airways with a slight excess pressure during sleep. A small pump, which is connected to the mask via a hose, provides the overpressure. The incoming air keeps the upper airways open. This significantly reduces the number of pauses in breathing, increases the oxygen content in the blood and improves the quality of sleep (19). Most of the time, snoring also stops.

Special forms of CPAP: 1] APAP - auto-CPAP: In contrast to the CPAP no constant pressure generated. The pressure of the breathed air is re-determined by the device with each breath and adapted to the breathing. The APAP can be an alternative for people who cannot cope with the continuous pressure of the CPAP machine or a Sleep apnea that only occurs in certain sleeping positions, and 2] BiPAP - bi-level PAP: BiPAP devices reduce the pressure with every exhalation. They are mainly used when there are problems breathing out against the CPAP pressure. These devices are also more suitable for people with obstructive pulmonary disease (20), (21).

Studies show that CPAP therapy is an effective treatment option for Sleep apnea. Being less tired during the day can lift your mood and significantly improve your quality of life. The various CPAP machines are equally effective. Breathing therapy can be an option for obstructive sleep apnea however, it does not cure it, only relieve its symptoms. When treatment is stopped, the symptoms usually reappear immediately. Treatment can also help reduce high blood pressure. It is unclear whether CPAP therapy also reduces the risk of heart disease or stroke (22).

Handling the CPAP machine

Wearing a mask to sleep takes some getting used to. Some people find CPAP therapy uncomfortable and restrictive. Some get a stuffy nose or a dry throat. You can try to change the ventilation pressure. A humidifier can also be attached to modern CPAP devices. (23)

Modern CPAP devices are very quiet and hardly disturbing. However, some people feel so uncomfortable with the breathing mask that they take the therapy abort. Others only put the mask on for a few hours at night and then hardly feel the benefits of the treatment. It is recommended that you use CPAP machines at night for at least five hours.

The CPAP is the most effective treatment for a Sleep apnea (24). It is therefore worthwhile to look for ways and means that make it easier to use the breathing apparatus. Studies show that it is more likely to use the devices longer at night and the therapy if you have permanent contact persons with whom treatment problems can be discussed. These can be doctors, nursing staff or other people affected. Intensive support in the first few weeks of using the breathing apparatus is particularly important. Sometimes psychological support can be useful.

It also makes sense to seek professional support if you have practical problems using the CPAP machine or if you cannot get used to breathing therapy. It may be helpful to try a different type of mask. If the airways are dry, the humidifier on the device can be the solution.

Bite Splints

Bite splints for the upper and lower jaw help some people with sleep apnea. There are basically three types of bite splints: 1] Tongue retainer (keeps the tongue from falling back into the throat), 2] Tongue extensors (move the tongue forward and down) and

3] Mandibular protrusion splints: They keep the airway open by slightly shifting the mandible and tongue forward. The splint system is individually manufactured in the dental laboratory and adapted to the upper and lower jaw (25). It is supposed to improve breathing, but cannot do anything against the breathing disorder itself. In addition, bite splints are not successful for every sleep apnea patient. They are most likely to be helpful for mild breathing disorders. They are particularly suitable for people whose sleep apnea depends on their sleeping position (usually on their back) and who are young, female, not overweight and have a small neck size (26).

Surgery

There are several operations possible to improve breathing in one Sleep apneato facilitate permanently. Most procedures tighten or remove tissue to clear the airways.

- An operation called UPPP (uvulopalatopharyngoplasty) tightens the uvula and surgically removes soft tissue on the palate. These tissue parts constrict in one Sleep apnea the airways. In addition, the tonsils can be removed or reduced in size during the procedure (27).
- With the help of the so-called Radiofrequency therapy (RFT) is used to remove tissue from the roof of the mouth, turbinate or tonsils with a small probe. This creates scars that are supposed to pull together and tighten the tissue (28).
- The palate tissue can also be tightened with a laser. Laser uvulopalatopharyngoplasty (LAUP) is rarely used today, partly because it is painful (29).
- In some people, the lower jaw is shifted so far back that it hinders their breathing. The lower jaw can be surgically moved forward.

Whether a particular procedure can help depends primarily on the type of airway narrowing. How useful the individual interventions are and for whom they are best suited cannot, however, be assessed well overall. There are very few and very small studies on this.

Each of the procedures mentioned also carries risks such as bleeding, pain or difficulty swallowing. The risk of side effects depends on the surgical method. Before an operation, doctors must provide detailed information about the undesirable consequences that can occur.

Medications

There are various drugs that are supposed to make breathing easier at night - for example, by influencing the respiratory muscles or increasing the respiratory drive. Since no agent is known so far, this can be proven in one Sleep apnea can help, drugs currently play no role in treatment .(30)

However, medication can play a role in the treatment of certain diseases, including a Sleep apnea can favor or strengthen. These include, for example, hay fever or a house dust allergy (31).

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