CONDITION

Central sleep apnea

Learn how central sleep apnea affects breathing during sleep, what can cause it, how it is diagnosed, and which treatments may help.

WHAT IT IS
Sleep-related breathing disorder with absent brain breathing signals

BODY SYSTEM
Breathing and sleep

MAIN SYMPTOMS
Breathing pauses, restless sleep, morning headaches, daytime sleepiness

WHAT CAUSES IT
Unstable breathing control or reduced brain signals

HOW IT IS DIAGNOSED
Overnight polysomnography

MAIN TREATMENT
Breathing support and underlying-condition treatment

CAN IT BE CURED?
Sometimes - altitude-related apnea may improve

IS IT AN EMERGENCY?
Sometimes - severe breathing difficulty while awake

LONG-TERM OUTLOOK
Poorer outcomes with serious heart or neurologic disease

Overview

Central sleep apnea is a sleep-related breathing disorder in which the brain briefly stops sending the usual signals that tell the breathing muscles to work. Breathing effort and airflow stop together, then restart.

This differs from obstructive sleep apnea, in which the brain continues to signal breathing but the upper airway becomes blocked. Some people have both central and obstructive events.

Central sleep apnea can lower oxygen levels and repeatedly disturb sleep. These interruptions may affect alertness, concentration, mood, and quality of life. The condition may also be related to heart failure, stroke, medication effects, or high altitude.

In central sleep apnea with Cheyne-Stokes breathing, breathing gradually becomes deeper

and then shallower before a pause. This pattern is often associated with heart failure or stroke. Treatment-emergent central sleep apnea can develop after positive airway pressure treatment begins for obstructive sleep apnea.

An occasional central breathing pause does not establish a disorder. Diagnosis depends on the number and pattern of events, symptoms, medical history, and sleep-study results.

Symptoms

Many people do not notice their own breathing pauses. A bed partner may observe them first.

Possible symptoms include:

Snoring may be less prominent than in obstructive sleep apnea. Some symptoms may come from an underlying condition. For example, shortness of breath, ankle swelling, or reduced exercise tolerance may be related to heart failure.

Arrange a medical appointment for repeated breathing pauses, persistent poor sleep, morning headaches, or daytime sleepiness. Do not drive or operate dangerous equipment when too sleepy to do so safely.

Seek emergency care for severe breathing difficulty while awake, chest pain, fainting, blue or gray lips, new confusion, or stroke signs such as facial drooping, arm weakness, or difficulty speaking. These require immediate assessment.

- Witnessed pauses in breathing during sleep
- Repeated awakenings or restless sleep
- Waking with shortness of breath
- Difficulty falling or staying asleep
- Morning headaches
- Daytime sleepiness or fatigue
- Problems with attention, memory, or mood
- Reduced ability to exercise
- Snoring, especially when obstructive sleep apnea is also present

Causes and risk factors

Central sleep apnea develops when breathing control becomes unstable or signals from the

brain to the breathing muscles are reduced.

Heart failure is an important cause. Changes in circulation and sensitivity to carbon dioxide can produce unstable breathing, including Cheyne-Stokes breathing. Atrial fibrillation and other cardiovascular conditions may also occur with central sleep apnea.

Stroke, brain injury, a brain tumor, or another condition affecting the brainstem may interfere with automatic breathing control.

Opioids and some other medicines that slow the nervous system can suppress breathing signals. Risk may increase with long-term use, higher exposure, or combinations of sedating substances. Do not stop a prescribed opioid like oxycodone or morphine suddenly without medical guidance.

High altitude may trigger periodic breathing because low oxygen levels change the body's breathing response. It may improve after returning to a lower altitude.

Treatment-emergent central sleep apnea can appear when positive airway pressure opens an obstructed airway but central events develop or remain. These events sometimes decrease as the body adjusts, but persistent events require reassessment.

Other associated conditions include advanced kidney disease and certain neurologic or neuromuscular disorders. When no cause is found, the condition may be called primary or idiopathic central sleep apnea.

Factors associated with a higher likelihood include:

Risk factors alone do not establish a diagnosis.

- Older age
- Male sex
- Heart failure or atrial fibrillation
- Previous stroke
- Long-term opioid use
- Advanced kidney disease
- Sleeping at high altitude
- Recent treatment for obstructive sleep apnea

Diagnosis

Evaluation begins with a medical and sleep history. A clinician may ask about sleep quality,

witnessed pauses, daytime alertness, heart or neurologic symptoms, altitude exposure, and use of medicines, alcohol, or other substances. A bed partner's observations can help.

The main test is overnight polysomnography. Sensors measure airflow, chest and abdominal movement, oxygen level, heart rhythm, sleep stages, and brain activity. During central apnea, airflow stops with little or no breathing effort. During obstructive apnea, effort continues against a blocked airway.

An in-laboratory study is often preferred when central sleep apnea is suspected. Home tests are mainly intended for uncomplicated suspected obstructive sleep apnea and may not reliably distinguish central from obstructive events.

The sleep study reports the apnea-hypopnea index, or AHI, which is the average number of complete pauses and partial reductions in breathing per hour of sleep. It also identifies central events and oxygen changes. Results must be interpreted with symptoms and medical history.

Additional testing may include:

Identifying the type and cause of sleep apnea is important because treatments differ.

- An echocardiogram to assess heart structure and pumping function
- An electrocardiogram or heart rhythm monitoring
- Blood tests for kidney, thyroid, or metabolic problems
- Oxygen and carbon dioxide measurements
- Brain imaging when a neurologic cause is suspected
- Review of opioid and other sedating medication use

Treatment and management

Treatment depends on the cause, severity, symptoms, oxygen changes, and other medical conditions. Goals include stabilizing breathing, improving sleep, and managing underlying illness.

Treating heart failure, neurologic or metabolic disorders, or altitude exposure may reduce central events. Medication changes must involve the prescribing clinician. If opioids contribute, supervised dose reduction or another pain strategy may be considered; abrupt withdrawal can be harmful.

Positive airway pressure options include:

A bilevel device without a backup rate may worsen central apnea in some situations. Device selection and settings should follow sleep-study findings and specialist review.

ASV is not appropriate for everyone. A major trial found increased cardiovascular death with a particular ASV approach in people with symptomatic chronic heart failure, predominantly central sleep apnea, and a left ventricular ejection fraction of 45% or less. Heart function and current device-specific safety guidance must be reviewed before considering ASV.

Supplemental oxygen during sleep may help selected people, including some with heart failure or altitude-related apnea. It is not interchangeable with positive airway pressure and should be used only after clinical evaluation.

Acetazolamide may be considered for altitude-related or other selected forms. It can stimulate breathing by changing the body's acid balance, but may cause side effects and electrolyte changes, so medical supervision is required.

Transvenous phrenic nerve stimulation is an implanted-device option for selected adults with moderate to severe central sleep apnea. It stimulates the nerve controlling the diaphragm. Implantation has procedural risks and requires follow-up programming.

Regular sleep hours, avoiding excess alcohol and non-prescribed sedatives, and consistent equipment use may support treatment. Report mask discomfort, leaks, dry mouth, or pressure intolerance because fitting or setting changes may help.

- Continuous positive airway pressure, or CPAP, which provides steady pressure and may help when central and obstructive events occur together.
- Bilevel positive airway pressure with a backup rate, which uses different inhaling and exhaling pressures and can deliver timed breaths.
- Adaptive servo-ventilation, or ASV, which adjusts support from breath to breath.

Complications

Untreated central sleep apnea can cause fragmented sleep, fatigue, impaired concentration, reduced quality of life, and greater driving or workplace accident risk.

Breathing pauses may alter oxygen and carbon dioxide levels and activate the body's stress response. Central sleep apnea often accompanies serious heart or neurologic disease and is associated with poorer outcomes, although treating breathing events does not necessarily reverse the underlying condition or improve survival.

Treatment can also cause problems. Masks may cause skin irritation or leaks, while pressurized air may cause dryness, congestion, or bloating. Implanted devices carry risks such as infection, lead problems, and procedural complications. Follow-up helps balance risks and benefits.

Follow up

Follow-up is needed after treatment starts or changes. A sleep clinician may review symptoms, equipment data, oxygen levels, mask fit, and remaining events. A repeat sleep study or overnight adjustment study may be needed to confirm that treatment is effective and safe.

Treatment-emergent central apnea may improve over time, but persistent events require review. Do not change pressure settings, oxygen flow, or prescription medicines on your own.

Continue routine care for heart failure, neurologic disease, kidney disease, or long-term opioid use. Seek earlier follow-up if symptoms worsen, equipment is difficult to use, or daytime sleepiness continues despite regular treatment.

New shortness of breath while awake, swelling, fainting, chest discomfort, or neurologic changes should be assessed promptly. Severe breathing difficulty, chest pain, blue or gray lips, or stroke signs require emergency care.

Sources

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