Information for PNEUMOLOGISTS

Combined treatment of Cheyne-Stokes Respiration and Obstructive Sleep Apnea

Risk factor in heart failure: Sleep-Disordered Breathing
Cheyne-Stokes Respiration with heart failure

Sources
Dear Pneumologists and Somnologists,

Sleep is a period of rest and recuperation and an essential factor in mental and physical health. During the course of normal sleep, muscles relax and blood pressure and heart rate decrease. Regeneration during sleep is particularly important for patients with compromised cardiovascular systems.

It has been shown that Sleep-Disordered Breathing (SDB) of central and obstructive origin is a threat to the cardiovascular system and an additional load on the heart. The increased cardiovascular risk caused by SDB is summarized in the EU Cost Action B26 AG.

Patients with underlying cardiovascular disease show a distinctly higher prevalence of SDB. Patients with symptomatic heart failure in particular are at high risk of suffering from accompanying Sleep-Disordered Breathing. Seventy-one percent of patients with heart failure in NYHA Stages II + III are affected by SDB of obstructive or central origin.

In this brochure we would like to highlight the connection between SDB and increased cardiovascular risk while focusing on effective therapy of SDB for heart failure patients. The goal is optimum somnological care that contributes to a high rate of compliance, which in turn ensures effective treatment of this patient group.

Cardiovascular Diseases
The prevalence of heart failure is about 1 to 2% of the general population. Etiologic connections have been made between a number of cardiovascular diseases and heart failure:
- Coronary Heart Disease (35 - 75 %, study results vary), often combined with arterial hypertension
- Hypertrophy of the heart
- Cardiomyopathy
- Cardiac valve diseases and congenital heart defects
- Arrhythmia
- High-output heart failure
- Primary right-heart failure
Heart failure is divided into four development stages according to the degree of severity. The four stages are known as the New York Heart Association (NYHA) classification.

Sleep-Disordered Breathing and Heart Failure
The prevalence of Sleep-Disordered Breathing is significantly higher in cases of cardiovascular diseases. Despite the best possible drug treatment of heart failure, the latest studies show more than 70% of these patients are in need of treatment of SDB. Of the total patient population 43% are affected by Obstructive Sleep Apnea (OSA) and 28% by Cheyne-Stokes (CS) Respiration. In the course of the disease mixed forms of apnea may also occur.

The following are affected by Obstructive Sleep Apnea:
- 50 % of patients with high blood pressure
- 50 % of patients with acute apoplexia
- 33 % of patients with idiopathic atrial fibrillation
- 50 % of patients with atrial fibrillation with cardioversion
- 33 % of patients with Coronary Heart Disease
- 35 % of patients with heart failure with systolic dysfunction

Frequent types of Sleep-Disordered Breathing (SDB) with cardiac disease:
Obstructive Sleep Apnea (OSA):
caused by the collapse of the upper airways during sleep; no air flow at mouth and nose for > 10 seconds with sustained respiratory effort
Central Sleep Apneas:
caused by a lack of respiratory drive during sleep: no air flow at mouth and nose for > 10 seconds with no respiratory effort
Cheyne-Stokes Respiration (CSR):
special type of central sleep apnea: alternating episodes of hyperventilation and apnea or hypopnea (air flow reduction of about 50 %)
Mixed Apnea:
Cessation of breathing initially due to lack of respiratory drive, followed by a collapse of the upper airways when respiratory effort resumes

See back page for sources

71% Risk factor: Sleep-Disordered Breathing (SDB) with heart failure

Heart Failure Patients
(NYHA Classes II–IV, EF < 40 %)

71 % SDB in heart failure patients

43 % Obstructive Sleep Apnea

28 % Cheyne-Stokes Respiration
Obstructive Sleep Apnea and Cheyne-Stokes Respiration over the course of cardiac disease

While OSA is considered a cardiovascular risk factor and a separate risk for hypertension, Cheyne-Stokes Respiration is a marker for the severity of heart failure.

In the progress of underlying cardiac disease, each form can occur on its own and both can appear in combination (mixed form), resulting in a disruptive effect on the neurohumoral system, among other things. The consequences of untreated SDB include:

- activation of the sympathetic nervous system
- recurring phases of hypoxemia
- increased left ventricular afterload
- endothelial dysfunction

Possible causes of Cheyne-Stokes Respiration resulting from heart failure

The exact causes of Cheyne-Stokes Respiration are not completely understood. It is suspected that they are combined in a vicious circle of:

- cardiac pulmonary edema with consecutive stimulation of vagal lung receptors
- increased central and peripheral chemosensitivity to CO₂
- arousals from sleep and sympathetic nervous system activation

SDB largely unknown

It is estimated that more than 90% (!) of heart failure patients do not know that they also suffer from SDB.

Because SDB poses an additional cardiovascular risk, patients with chronic heart failure in NYHA stages II to IV and patients with noticeable daytime symptoms should be routinely examined for SDB in the sleep lab.
SOMNOvent CR – the sleep medicine therapy solution for heart failure patients

SOMNOvent CR is a therapy device which automatically regulates positive pressure ventilation for patients with Cheyne-Stokes Respiration and obstructive or mixed sleep apnea. This type of therapy is based on Anticyclic Modulated Ventilation (ACMV), which adapts at all times to the patient’s current needs.

With our initiative “Sound sleep – clearly a matter of the heart”, we are doing our part to focus attention on the connection between Sleep-Disordered Breathing (SDB) and an increased cardiovascular risk.

For further information please go to weinmann.de

SOMNOvent CR by Weinmann