

# Sleep-disordered breathing (SDB) and cardiovascular health: preventable complications - Part II

Obstructive sleep apnea (OSA) is the most common of the sleep breathing disorders and has important negative cardiovascular consequences as outlined in the last edition of this publication. Central sleep apnea (CSA), which is a centrally mediated sleep disorder, is particularly prevalent in the heart failure (HF) population. When CSA and OSA coexist, the sleep disorder is generally labelled as mixed or complex sleep apnea. This article will focus on CSA.

The most common form of CSA in HF is Cheyne-Stokes respiration, which is a centrally mediated periodic breathing pattern. The pathophysiology of Cheyne-Stokes respiration is generally believed to result from increased respiratory controller gain and circulatory delay, resulting in an unstable cyclical breathing pattern with a periodicity of ~60 sec<sup>1</sup>.

## CSA IN HEART FAILURE: PREVALENCE AND MORTALITY

SDB has a high prevalence in systolic<sup>2</sup> and diastolic<sup>3</sup> HF. SDB prevalence is reported to be ~76% in the HF population (n=700) with OSA at 36% and CSA at 40%<sup>2</sup>. The central apneas are predominately Cheyne-Stokes respiration. As HF becomes more severe, the prevalence of Cheyne-Stokes

respiration increases. HF patients with CSA/Cheyne-Stokes respiration have double the mortality compared with patients who have no SDB<sup>4</sup>.

## DIAGNOSING SDB IN HF

A screening questionnaire may not be adequate in HF patients because they may not have sleepiness symptoms or a high BMI. However there are simple flow-based screeners which test for SDB<sup>5</sup>.

CSA can be diagnosed overnight in a sleep clinic, hospital or in the comfort of a patient's home.

The use of respiratory effort bands help distinguish central from obstructive apneas.

## TREATMENT – REDUCING THE CARDIOVASCULAR RISKS

Continuous positive airway pressure therapy (CPAP) is used to treat OSA. Another positive airway pressure therapy, adaptive servo-ventilation (ASV), has been shown to treat CSA and periodic breathing effectively<sup>6</sup>, reducing central events by 90%.

In systolic dysfunction, treating Cheyne-Stokes respiration with ASV has been shown to increase left-ventricular ejection fraction

by ~20% and peak workload of the heart by 23%<sup>7</sup>.

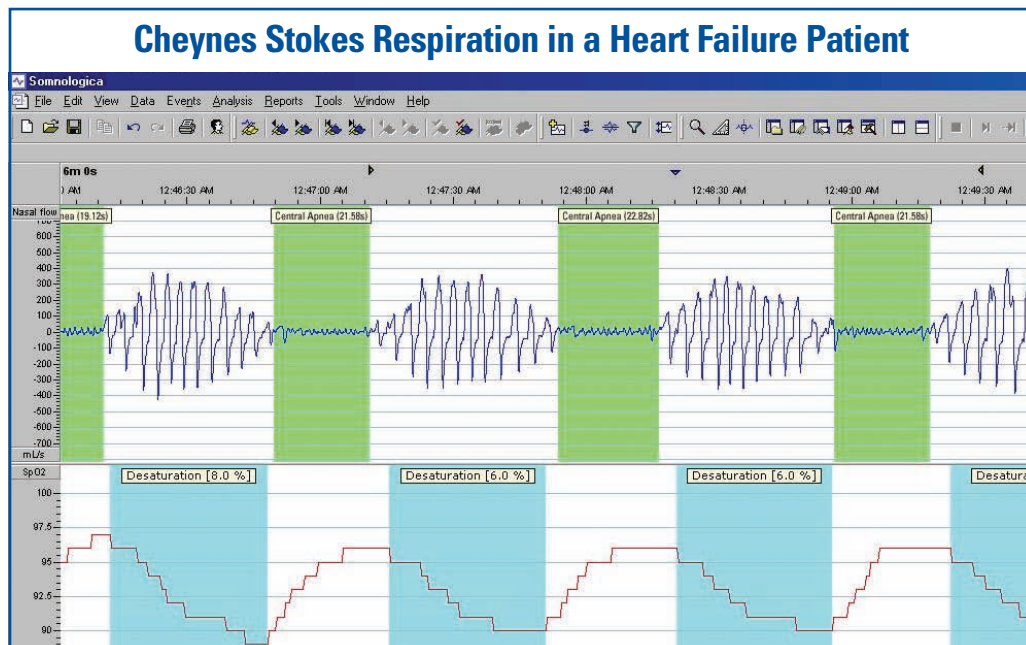
Furthermore, ASV greatly lowers the neurohormone levels which are elevated in patients with CSA and HF<sup>8</sup>.

## SUMMARY

There is a strong relationship between the presence of CSA and increased mortality in HF patients. The treatment of CSA in HF can positively influence cardiac output and exercise capacity and dramatically decrease neurohormone levels that may worsen hypertension and coronary disease.

## References

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