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Adaptive servoventilation to treat sleep-disordered breathing in cardiac patients

Dear Editor,

Adaptive servoventilation (ASV) therapy was designed to treat central sleep apnea (CSA) and Cheyne-Stokes respiration (CSR) in particular [12]. Using ASV, central respiratory events can be suppressed most effectively, as compared to oxygen, continuous positive airway pressure or bilevel positive pressure therapy [17].

With respect to cardiac patients, CSA-CSR was identified to be highly prevalent in heart failure patients with a reduced left ventricular ejection fraction [HF-REF] [1, 14, 15]. Moreover, several studies revealed an independent prognostic impact of CSA-CSR in HF-REF patients [9]. Thus, the first randomized controlled outcome trial was initiated (SERVE-HF). The outcome was highly unexpected with an increased risk in all-cause mortality and cardiovascular mortality in particular [4]. Further analyses of the SERVE-HF study revealed a more pronounced mortality risk in those patients with a more impaired left ventricular ejection fraction [4, 6]. These findings raised severe safety concerns for the use of ASV to treat CSA in HF-REF patients and triggered recent guidelines to announce a contraindication in these patients [16]. However, these guidelines and position statements [13] stress the fact that ASV is only contraindicated in HF-REF patients presenting with moderate to severe CSA in an initial diagnostic setting.

Alternative indications for ASV

Within the shade of SERVE-HF, another study investigating the outcome of ASV-treated patients [7] with acutely decompensated heart failure (ADHF) and with preserved (HF-PEF) or reduced (HF-REF) LV-EF had to be terminated early. However, the first analyses of this study point towards improved outcomes of ASV-treated ADHF patients with preserved LV-EF [11], which supports a call for an appropriately designed and powered outcome study in HF-PEF patients.

Besides heart failure with preserved or reduced LV-EF [1, 2, 15], the prevalence of CSA was documented to be high in other cardiovascular diseases, including atrial fibrillation, valvular heart disease, coronary artery disease, pulmonary hypertension and/or stroke [3, 5, 8, 10]. Thus, we retrospectively explored the use of ASV for cardiac patients admitted to our institution, after ASV became contraindicated for the treatment of CSA in HF-REF.

From May 2015 to August 2016, ASV was prescribed in 34 patients (28 male; 70 ± 12 years). Polysomnographic indication for ASV was CSA in 29%, complex sleep apnea in 56%, mixed sleep apnea in 12% and obstructive sleep apnea in 3% of cases (**Fig. 1**). Regarding underlying cardiac disease, 58% of patients presented with heart failure and preserved left ventricular ejection frac-

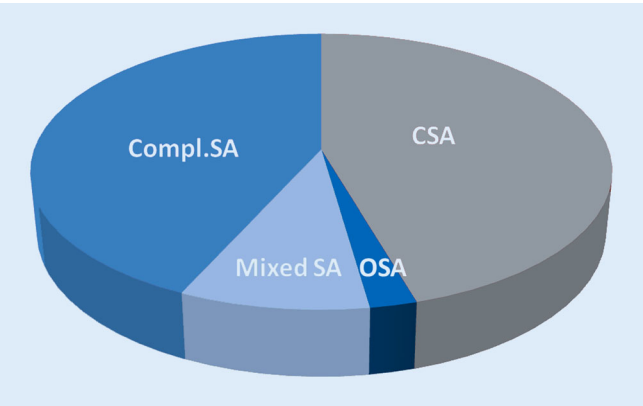

Fig. 1 ▲ Indications for Adaptive Servoventilation treatment after SERVE-HF

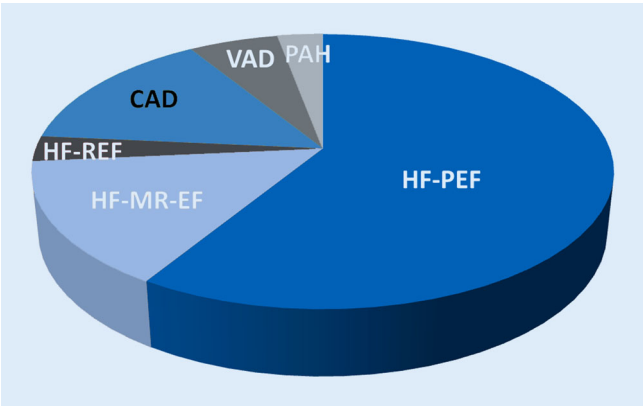

Fig. 2 ▲ Underlying cardiac disease in patients treated with Adaptive Servoventilation after SERVE-HF

tion (HF-PEF), 14% with mid-range ejection fraction, 3% were diagnosed to have coronary artery disease without heart failure, 14% valvular heart disease and 3% pulmonary hypertension (**Fig. 2**). Complex (treatment imposed) sleep apnea was documented in 12 out of 19 patients with HF-PEF.

This first analysis of ASV indications in cardiac patients indicate the use of ASV in a variety of underlying cardiac diseases and sleep disorders. Especially in HF-PEF patients, complex sleep apnea was observed quite often and treated by ASV. Prospective studies have to verify these findings, followed by mortality studies.

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Conflict of interest. O. Oldenburg , H. Fox, T. Bitter and D. Horstkotte declare that they have no competing interests.

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