Efficacy of ASV in comp SAS and CSA

Complex sleep apnoea syndrome (CompSAS) is characterised by the concurrence of mixed or obstructive events with central apnoeas, the latter predominating on exposure to continuous positive airway pressure (CPAP) ventilation. Treatment of CompSAS or central sleep apnoea (CSA) syndrome with adaptive servoventilation (ASV) is now an option but no large series exist describing the application and effectiveness of ASV.

Materials and methods
This was a retrospective chart review of the first 100 patients who underwent polysomnography using ASV at the Mayo Clinic Sleep Center (Rochester, MN, USA).

Results
ASV titration was performed for CompSAS (63%), CSA (22%) or CSA/Cheyne-Stokes breathing patterns (15%). Median diagnostic sleep apnoea–hypopnea index (AHI) was 48 events per h (range 24–62). With CPAP, obstructive apnoeas decreased but the appearance of central apnoeas maintained AHI at 31 events per h (range 17–47; p=0.02). With bilevel positive airway pressure (BiPAP) in spontaneous mode, AHI tended to worsen versus baseline, with a median 75 events per h (range 46–111; p=0.055). BiPAP with a backup rate improved AHI to 15 events per h (range 11–31; p=0.002). ASV dramatically improved the AHI versus baseline and CPAP to a mean 5 events per h (range 1–11; p<0.0001). ASV also resulted in an increase in rapid eye movement sleep versus baseline and CPAP (18% versus 12% and 10%, respectively; p<0.0001). Overall, 64 patients responded to ASV with mean AHI <10 events per h. Of the 44 successful follow-up patients contacted, 32 reported some improvement in sleep quality.

Conclusion
ASV appears to be an effective treatment of both CompSAS and CSA syndromes that are resistant to CPAP.

Editorial comment
This retrospective, observational and descriptive study in 100 consecutive patients with CompSAS and central apnoea syndromes clearly illustrates the superiority of ASV versus CPAP or BiPAP and is the most comprehensive presently available. Although the exact algorithms are still protected, ASV uses an automatic, minute ventilation-targeted (adaptive) device that performs breath-to-breath analysis (servo) and adjusts its settings accordingly. Since the machine limits its target volume to 90% of the mean ventilation of the previous 3 min, it prevents overventilation and induction of central apnoeas and intuitively explains the trend toward worsening seen with CPAP or BiPAP. Although the effectiveness of ASV has been shown before in Cheyne–Stokes respiration (CSR), this is one of the first papers dealing with CompSAS as well as CSR in a real-life clinical setting. Since CompSAS has a high prevalence (up to 15% in CPAP trials for obstructive sleep apnoea), treatment is a real challenge. Recent studies have expressed enthusiasm about the effectiveness of ASV in CSR but long-term follow-up data on left ventricle ejection fraction, compliance and survival are scarce. For CompSAS, studies with ASV are just starting; therefore, this study meets a serious need. The enthusiasm has, however, to be tempered, when looking to the number of patients achieving success (defined as a total AHI <10 events per h and completing ≥60 min of an ASV trial), which was only 70% overall and 78% in the CompSAS group. Moreover, a quarter refused to start the treatment at home. After 5 months of therapy, 84% of the patients were still using ASV, with only 50% reporting ‘much improvement’ in sleep quality and 36% reporting ‘much improvement’ in daytime sleepiness, based on a subjective survey by telephone contact. Unfortunately, objective compliance data were absent. Based on the study of Paivinen et al. [1] in CSR, objective compliance can be estimated around 4.3±3.1 h per night, which is not impressive compared with CPAP or BiPAP. It is also a missed chance that most data on compliance, success rate and subjective survey were pooled and not reported separately for each patient category. In addition, opioid users (13%) and patients with atrial fibrillation (25%) were included in the CompSAS group, which can interfere with the outcome, since these patients have the potential to behave differently from the pure central apnoea/CompSAS patients. Therefore, we can question whether CompSAS and its treatment is hype or reality. New, extensive and prospective short- and long-term randomised controlled trials in well-described patients (resistant to CPAP) are welcome, given the high prevalence and public health consequences of this clinical problem. Hopefully the present paper may trigger these studies and lead to a new area in sleep medicine.

References

Message
Adaptive servoventilation is not only indicated for Cheyne–Stokes breathing, but also in complex sleep apnoea. This opens new perspectives for difficult-to-treat sleep apnoea patients who do not respond to CPAP and BiPAP therapy.

Original article