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Title: Efficacy of auto-trilevel positive airway ventilation on patients with both obesity hypoventilation and obstructive sleep apnea syndromes

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Body: Objectives To observe the efficacy of auto-trilevel positive airway pressure (Auto-trilevel PAP) ventilation on patients with both obesity hypoventilation syndrome (OHS) and obstructive sleep apnea syndromes (OSAS). Methods 17 patients were recruited. Three different positive airway pressure (PAP) modes were issued by the ventilators (SOMNOvent auto-S, Weinmann Inc, Germany). The inspiratory positive airway pressures (IPAP) were titrated by PaCO₂ in all three models. The EPAP was titrated as the minimal level for removal of snoring in mode 1, but kept 3cmH₂O higher in mode 2, and used in mode 3 with autotrilevel PAP in which the end of EPAP (EEPAP) was automatically adjusted to elevate based on ventilation volume. Results All three modes could significantly improve AHI, minimal SpO₂ (miniSpO₂), arousal index, daytime sleepiness and morning PaCO₂(all P<0.01). Comparison among three modes showed that with the same IPAP, the mode 3 could result in the lowest arousal index, daytime sleepiness and the highest sleep efficiency. Comparison between mode 1 and 2 revealed there was a statistically lower AHI but higher miniSpO₂ and morning PaCO₂ in mode 2 (all P<0.05). Compared with mode 1, in mode 3 there was a lower AHI, higher miniSpO₂ (all P<0.01), but no significant difference in PaCO₂ (P>0.05). Compared with mode 2, in mode 3 there was a significant lower PaCO₂ (P<0.01), but no significant difference in AHI and miniSpO₂ (all P>0.05). Conclusions Auto-trilevel PAP ventilation can achieve a higher efficacy in simultaneous removal of residual AHI and correction of hypercapnia as well as in achieving a higher sleep quality and lower daytime sleepiness.