

European Respiratory Society Annual Congress 2012

Abstract Number: 7121

Publication Number: P2064

Abstract Group: 2.2. Noninvasive Ventilatory Support

Keyword 1: Mechanical ventilation **Keyword 2:** COPD - management **Keyword 3:** Sleep studies

Title: Impact of intelligent volume assured pressure support on sleep quality, compliance and gas exchange in patients with stable hypercapnic COPD

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Body: Introduction: Noninvasive positive pressure ventilation (NPPV) using the technique of high-intensity-NPPV (HI-NPPV) has been shown to treat hypoventilation in stable hypercapnic COPD patients with an overall good sleep quality (SQ). iVAPS (intelligent volume assured pressure support) using target alveolar ventilation is a hybrid mode of NPPV. Its impact on SQ still needs to be addressed. The aim of the study was to compare SQ and gas exchange using iVAPS and HI-NPPV in hospital and at home. Methods: In a randomized crossover design patients used iVAPS and HI-NPPV. Objective and subjective SQ as well as comfort with NPPV were assessed by polysomnography and questionnaires. Blood gas measurements were performed in hospital and at home. (Figure 1)

Results: 14 patients were included. Beside applied pressure being rated more disturbing with iVAPS, there was no further difference with regard to SQ in hospital. At home, patients reported more restful sleep using iVAPS. There was no difference in daily usage (6.2 ± 1.6 vs. 6.5 ± 1.3 h, $p=0.27$). PaCO₂ in hospital was lower during iVAPS (41 ± 8 mmHg vs. 44 ± 7 mmHg; $p=0.04$), whereas no difference was found at home (43 ± 7 vs. 44 ± 10 mmHg; $p=0.37$). Conclusion: NPPV using iVAPS and HI-NPPV revealed no differences in SQ in hospital. At home, patients reported more restful sleep during iVAPS without differences in comfort with NPPV and daily usage.