Nasal high-flow versus noninvasive ventilation in patients with chronic hypercapnic COPD.

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Abstract

Background: Despite the encouraging results of noninvasive ventilation (NIV) in chronic hypercapnic COPD patients, it is also evident that some patients do not tolerate NIV or do not benefit from it. We conducted a study in which COPD patients with stable, chronic hypercapnia were treated with NIV and nasal high-flow (NHF) to compare effectiveness.

Methods: In a multi-centered, randomized, controlled, cross-over design, patients received 6 weeks of NHF ventilation followed by 6 weeks of NIV ventilation or vice-versa (TIBICO) between 2011 and 2016. COPD patients with stable daytime hypercapnia (pCO_2≥50 mmHg) were recruited from 13 German centers. The primary endpoint was pCO_2 changes from baseline blood gas, lung function, quality of life (QoL), the 6 min walking test, and duration of device use were secondary endpoints.

Results: A total of 102 patients (mean±SD) age 65.3±9.3 years, 61% females, body mass index 23.1±4.8 kg/m^2, 90% GOLD D, pCO_2 56.5±5.4 mmHg were randomized. PCO_2 levels decreased by 4.7% (n=94; full analysis set; 95% CI 1.8-7.5, *P*=0.002) using NHF and 7.1% (95% CI 4.1-10.1, *P*<0.001) from baseline using NIV (indistinguishable to intention-to-treat analysis). The difference of pCO_2 changes between the two devices was -1.4 mmHg (95% CI -3.1-0.4, *P*=0.12). Both devices had positive impact on blood gases and respiratory scores (St. George's Respiratory Questionnaire, Severe Respiratory Insufficiency Questionnaire).

Conclusions: NHF may constitute an alternative to NIV in COPD patients with stable chronic hypercapnia, eg, those not tolerating or rejecting NIV with respect to pCO_2 reduction and improvement in QoL.