



Who and when: selecting patients for home NIV



Patients recovering from acute respiratory failure associated with an exacerbation of COPD should be evaluated at 2–4 weeks after resolution of respiratory acidosis, and those with persistent hypercapnia should be given home NIV.¹

Stable COPD patients with chronic hypercapnic respiratory failure also benefit from home NIV.²

Differences in the timing of home NIV initiation might explain different outcomes between studies.^{1,3}

There is now a significant body of evidence to support home non-invasive ventilation (NIV) as an effective strategy for the management of patients with advanced severe chronic obstructive pulmonary disease (COPD) and chronic hypercapnic respiratory failure, including those who remain persistently hypercapnic after recovering from an acute exacerbation episode.^{1,2}

When considering the results of recent clinical trials, it is important to carefully evaluate the patient phenotype, and the timing and delivery of NIV to ensure that home NIV is provided to patients most likely to benefit from therapy.⁴

The HOT-HMV trial enrolled patients who had persistent hypercapnia at least 2 weeks after an acute exacerbation of COPD and showed a significant improvement in time to death or first readmission after 1 year of home NIV + home oxygen therapy (HOT) compared with HOT alone.¹

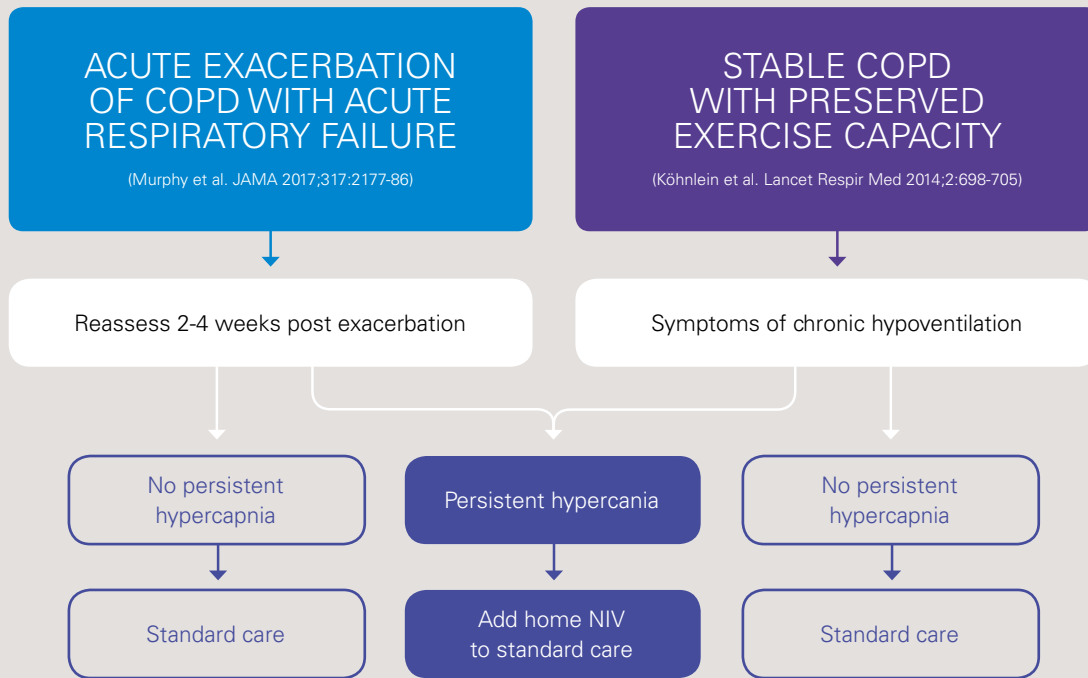
In contrast, when home NIV was initiated early after an acute exacerbation, improvements in PaCO₂ were similar in the NIV and control groups.³ This indicated general resolution of hypercapnia during early recovery after an acute exacerbation. It is therefore likely that the reason these patients did not benefit from home NIV is because they did not actually have chronic hypercapnia or respiratory failure.⁵

A notable difference between the two post-exacerbation studies was the timing of home NIV initiation, and this is the likely explanation for the contrasting findings.⁵

Otherwise, patients in both studies were similar, having comparable levels of hypercapnia and type II respiratory failure at baseline.^{1,3,5}

In terms of patient management in clinical practice, clinicians need to be aware that almost 50% of the patients screened for the HOT-HMV trial had spontaneous resolution of hypercapnia within 2–4 weeks after resolution of respiratory acidosis.⁴

Flow diagram showing patient selection for home NIV based on clinical trial data.^{1,2}



The HOmeVent registry

For patients with chronic hypercapnic COPD, current registry data suggest that a relevant proportion of those in GOLD stage 3 or 4 exhibit chronic hypercapnia and might therefore be candidates for home NIV treatment. The HOmeVent registry⁶ was set up to determine the prevalence of chronic hypercapnia in COPD outpatients. 231 COPD patients were enrolled in the registry from 10 clinics in Germany, of which 58% were GOLD stage 3 and 42% were GOLD stage 4. A quarter of the patients had PaCO₂ ≥45mmHg and of these 9% had PaCO₂ ≥ 50mmHg.⁶

Current usage and guidelines

Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines

state that home NIV may improve hospitalisation-free survival in selected patients after recent hospitalisation, particularly those with pronounced daytime persistent hypercapnia (PaCO₂ ≥52 mmHg, Level of Evidence = B).⁷

European Respiratory Society (ERS) guidelines.

A multidisciplinary ERS Task Force committee has published evidence-based recommendations that conditionally support the application of LTH-NIV to improve health outcomes by using fixed pressure settings and targeting a reduction in carbon dioxide in COPD patients with persistent hypercapnic respiratory failure.⁸

In many European countries, home NIV is also used for COPD patients after prolonged weaning from mechanical ventilation if required to control symptoms of hypoventilation and hypercapnia, as recommended in German guidelines.⁹ Further clinical evidence is required to support this indication.

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2 Köhnlein T, et al., Non-invasive positive pressure ventilation for the treatment of severe stable chronic obstructive pulmonary disease: a prospective, multicentre, randomised, controlled clinical trial. Lancet Respir Med 2014;2:698-705.

3 Struik FM, et al. Nocturnal non-invasive ventilation in COPD patients with prolonged hypercapnia after ventilatory support for acute respiratory failure: a randomised, controlled, parallel-group study. Thorax 2014;69:826-34.

4 Murphy PB, Hart N. Home non-invasive ventilation for COPD: how, who and when? Arch Bronconeumol 2018;54:149-54.

5 Storres JH, et al. Home noninvasive ventilatory support for patients with chronic obstructive pulmonary disease: patient selection and perspectives. Int J COPD 2018;13:753-60.

6 Dreher M, Neuzeret PC, Windisch W, et al. Prevalence Of Chronic Hypercapnia In Severe Chronic Obstructive Pulmonary Disease: Data From The HOmeVent Registry. Int J Chron Obstruct Pulmon Dis. 2019;14:2377-2384. Published 2019 Oct 18. doi:10.2147/COPD.S2228037

7 Vogelmeier CF, et al. Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Lung Disease 2017 Report. GOLD Executive Summary. Am J Respir Crit Care Med. 2017;195(5):557-82.

8 Ergan B, Oczkowski S, Rochweg B, et al. European Respiratory Society Guideline on Long-term Home Non-Invasive Ventilation for Management of Chronic Obstructive Pulmonary Disease. Eur Respir J 2019; in press (https://doi.org/10.1183/13993003.01003-2019).

9 Schönhofer B, et al. S2k-Guideline "Prolonged Weaning". Pneumologie 2015;69:595-607.