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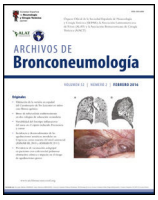

Editorial

Home High-Flow Oxygen Therapy Should Be Considered in Patients With COPD and Chronic Respiratory Failure

High-flow nasal oxygen therapy (HFNOT) dates back to the late 1960s.[1] Initially used to treat acute respiratory failure (RF) in paediatric patients,[2] it was first used for non-invasive respiratory support (NIRS) in severe acute RF in adult patients around 15 years ago, and is now the NIRS modality with the most evidence for efficacy in severe acute hypoxaemic RF.[3]

Several years ago, evidence of the beneficial physiological effects and excellent tolerability of HFNOT led some clinicians to speculate that the therapy could also be used instead of, or in combination with, conventional long-term home oxygen therapy.

HFNOT therapy could be particularly beneficial in patients with chronic RF secondary to COPD, because it delivers humidified gas at a constant fraction of inspired oxygen and improves the breathing rate by clearing anatomical dead space, reducing inspiratory effort, and achieving a moderate positive end-expiratory pressure (PEEP) effect.

With regard to constant FiO_2, Ritchie et al. showed that the accuracy of measured vs. prescribed FiO_2 depends directly on gas flow and the patient's breathing pattern, but was always greater in HFNOT compared to low-flow systems (mainly nasal cannulas). At an FiO_2 of 60%, HFNOT flow rates of less than 30 l/min were associated with a significant decrease in FiO_2.[4] However, it is important to bear in mind that high flow does not necessarily imply high FiO_2, since room air can also be delivered at high flow rates.

Chidekel et al., in an in vitro study, showed that delivering humidified vs. non-humidified gas improved the rheological properties of secretions.[5] Cell death occurred much later in cell lines that received humidified gas vs. those receiving gas at room temperature and humidity. In a study in patients with bronchiectasis, Hasani et al. used a radioaerosol measurement technique to show that lung secretion clearance significantly improved after the administration of humidified gas.[6]

Short-term physiological studies analysing the effect of HFNOT on breathing patterns have shown that this therapy reduces respiratory rates and increases tidal volume in stable COPD patients,[7–10] while reducing $PaCO_2$ values in both the short and medium term.[7–12] Other effects included a modest increase in PEEP – greater with the mouth closed – and an increase in end-expiratory volume.[13,14]

These beneficial effects, however, needed to be explored further in long-term clinical studies.

One of the first of these long-term studies was published by Rea et al.,[15] analysing a cohort of 108 patients with COPD or bronchiectasis randomised to receive HFNOT or conventional therapy. The authors observed that time to first exacerbation was significantly longer in patients on long-term HFNOT, and that a greater number of these patients presented no exacerbation compared with the group receiving conventional therapy. Differences in the number of exacerbations/year between groups study, however, reached only borderline significance, and treatment compliance with HFNOT was modest (mean 1.6 h/day).[16]

Another multicentre randomised study[17] in COPD patients with hypoxemic respiratory failure who received either conventional oxygen therapy alone or in combination with HFNOT showed that although the latter group showed a significantly lower rate of exacerbations, there was no direct evidence that HFNOT reduced the number of hospitalizations. Patients were followed up for 12 months, and therapeutic compliance was significantly higher than in Rea et al. (around 6 hours/day).

A cost-effectiveness study that included the same cohort demonstrated a probability between 83 and 92% of cost-effectiveness of the intervention with HFNOT.[17]

Nagata et al. published the results of a multicentre randomised study in 99 COPD patients with criteria for home oxygen therapy who received HFNOT + oxygen or oxygen alone.[18] The patients were instructed to comply with a minimum of 7 h/day, mainly at night, and recorded exacerbations in a daily diary. After 1 year of follow-up, the HFNOT group had recorded significantly fewer moderate-to-severe exacerbations (1 vs. 2.85 in the no-HFNOT group) in their diary; however, HFNOT did not improve quality of life, sleep, and dyspnoea questionnaire scores at 1-year follow-up.

Several conclusions can be drawn from the foregoing studies. First, HFNOT has a beneficial effect on the pathophysiological mechanisms associated with COPD (improved secretion clearance, stable prescribed FiO_2, reduced air trapping, and reduced inspiratory effort), and is safe in both the short and long term, even in patients with hypercapnia. Second, even with suboptimal therapeutic compliance, it reduces the incidence of COPD exacerbations, a factor that considerably affects survival in these patients.[19] And third, it is cost-effective.

Despite this, HFNOT therapy cannot be indicated in all COPD patients that are candidates for home oxygen therapy, but should be reserved for patients with a phenotype that would respond pos-

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itively to the proven benefits of HFNOT, for example, exacerbators or patients with predictors of exacerbation that can a priori be modified with HFNOT.[20,21] Ongoing studies[22,23] will help define the indications for home HFNOT, but it seems that HFNOT is here to stay, and both clinicians and healthcare authorities should include it in existing home oxygen therapy programmes for patients with COPD.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.arbres.2022.10.009.

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