

Home - NIV: Brings Solidity in COPD Rehabilitation

Anand Agrawal*

Professor and Head, Department of Respiratory Medicine, BPSGMC(W) KK, Sonapat, Haryana, India

***Corresponding Author:** Anand Agrawal, Professor and Head, Department of Respiratory Medicine, BPSGMC(W) KK, Sonapat, Haryana, India.

Received: May 07, 2019; **Published:** June 26, 2019

Pulmonary rehabilitation of chronic stable patient is an essential component of COPD management aiming to stabilize or reverse the pathophysiological as well as psychopathological manifestations of the disease to bring the patient at highest possible functional capacity. According to large scale epidemiological studies, there were 384 million patients with COPD worldwide in 2010, with a global prevalence of 11.7% and become third leading cause of death by 2020, resulting in an exponential increase of economic and social burden. Global data reveal that approximately 20% of patients hospitalized for COPD, present with hypercapnic respiratory failure (CHRF), which is an indicator of an increased risk of death as well as impaired health-related quality of life (HRQoL) [1].

Factually pulmonary rehabilitation is a recommended holistic approach for improving exercise capacity to gain quality of life by reducing frequent hospital admissions. However recent evidences reveal that , Non-invasive ventilation can improve exercise tolerance, with less desaturation in patients admitted to hospital with an exacerbation of chronic respiratory disease as well as at home [2,3]. In well recognized, UPLIFT Trial [4] the mean improvement in FEV1 with Tiotropium was 87 - 103 ml over 4 years as well as In the TORCH Study [5] the mean increase in FEV1 over 3 years with the combination of Salmeterol and Fluticasone was 92 ml, similarly researcher reported comparable increases in FEV1 after domiciliary use of NIV [6]. It potentiate the phenomenon that NIV has an impact on the airways themselves; possible mechanisms include a reduction in airway oedema or even stretching open of chronically fibrosed airways [7]. Though the use of long-term nocturnal non-invasive ventilation (NIV) to treat CHRF in COPD has long been subject of debate therefore should be carefully considered, as knowledge gaps exist with regard to patient selection, the optimal setting to initiate NIV [8]. Randomized control trial conducted by Mc Evoy, *et al.* promulgate that use of NIV in patients with CHRF reduce the sleep-related increase in transcutaneous carbon dioxide tension (TcCO₂) compared with the group receiving LTOT alone (12.6 vs 18.8 mm Hg). Mortality also get reduced among NIV group over the course of the study [9].

According to Windisch, *et al.* NIV can be used either by low or Hi intensity settings “ In the low-intensity NPPV method, IPAP is initially set to 10 cmH₂O and is continuously adjusted by increments and decrements of 1 - 2 cmH₂O (up to 20 cmH₂O), though in High-intensity NPPV, stepwise titration of IPAP up to 30 cmH₂O” [10]. Perhaps there are growing body of evidence that HI-NPPV can improve blood gas, lung function, health-related quality of life and now survival on domiciliary use [11-15]. Though few studies have not been able to achieve these results. Concerns raise that the high inspiratory pressures of HI-NPPV will not be tolerated and could possibly induce worsening hyperinflation in severe COPD patients. In a larger Randomized control trial of Italy, 90 stable patients on oxygen for more than 6 months were randomly assigned to continuing oxygen alone or oxygen with bilevel NIV. There was no change in survival, lung function, exercise tolerance or sleep quality score in either group. However, the arterial carbon dioxide tension (PaCO₂) measured on usual oxygen and resting dyspnoea scores improved [16]. Contrary to this a multicentre randomized controlled trial from China comparing patients receiving LTOT with domiciliary NIV + LTOT reported significant reduction in daytime PaCO₂ and increase in 6MWD with domiciliary NIV + LTOT, however there was no mortality benefit, improvement in lung function or QoL [17]. Moreover, the RESCUE trial, a multicentre cohort from

the Netherlands, compared initiation of domiciliary NIV with standard treatment after an admission with hypercapnic respiratory failure found no mortality benefit as well as reduction in admissions or COPD exacerbations in the year after discharge [16]. In spite of that there is growing evidence that restoration of central chemosensitivity and a reduction in load are important, and the ventilator needs to be set to have an effect upon these parameters [18,19]. In negative studies, if important physiological parameters are not affected, it cannot be concluded that NIV really had no effect [20].

Although existing evidences for long term use of NIV in chronic patients at home are limited and dice hence need more comprehensive randomized trials to reinforce the concept to use NIV at home “Hi versus Low” for improving the quality of life among chronic stable COPD patients in near future and to recognize it useful device in COPD rehabilitation.

Bibliography

1. Adeloje D., *et al.* “Global and regional estimates of COPD prevalence: Systematic review and meta-analysis”. *Journal of Global Health* 5.2 (2015): 020415.
2. Dyer F., *et al.* “Non-invasive ventilation (NIV) as an aid to rehabilitation in acute respiratory disease”. *BMC Pulmonary Medicine* 11 (2011): 58.
3. Vogiatzis I., *et al.* “Intermittent Use of Portable NIV Increases Exercise Tolerance in COPD: A Randomised, Cross-Over Trial”. *Journal of Clinical Medicine* 8.1 (2019): 94.
4. Tashkin DP., *et al.* “A 4-year trial of tiotropium in chronic obstructive pulmonary disease”. *New England Journal of Medicine* 359.15 (2008): 1543-1554.
5. Calverley PM., *et al.* “Salmeterol and fluticasone propionate and survival in chronic obstructive pulmonary disease”. *New England Journal of Medicine* 356 (2007): 775-789.
6. Diaz O., *et al.* “Effects of noninvasive ventilation on lung hyperinflation in stable hypercapnic COPD”. *European Respiratory Journal* 20.6 (2002): 1490-1498.
7. 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* 69.9 (2014): 826-834.
8. Rochweg B., *et al.* “Official ERS/ATS clinical practice guidelines: noninvasive ventilation for acute respiratory failure”. *European Respiratory Journal* 50.2 (2017): 1602426.
9. McEvoy RD., *et al.* “Nocturnal non-invasive nasal ventilation in stable hypercapnic COPD: a randomised controlled trial”. *Thorax* 64.7 (2009): 561-566.
10. Windisch W., *et al.* “Normocapnia during nIPPV in chronic hypercapnic COPD reduces subsequent spontaneous PaCO₂”. *Respiratory Medicine* 96.8 (2002): 572-579.
11. Duiverman ML. “Noninvasive ventilation in stable hypercapnic COPD: what is the evidence?” *ERJ Open Research* 4.2 (2018): 00012-2018.
12. Weir M., *et al.* “High Intensity Non-Invasive Positive Pressure Ventilation (HINPPV) for Stable Hypercapnic Chronic Obstructive Pulmonary Disease (COPD) Patients”. *Chronic Obstructive Pulmonary Disease* 2.4 (2015): 313-320.
13. Plant PK., *et al.* “Non-invasive ventilation in acute exacerbations of chronic obstructive pulmonary disease: long term survival and predictors of in-hospital outcome”. *Thorax* 56.9 (2001): 708-712.

14. Luo Z., *et al.* "High-intensity versus low-intensity noninvasive positive pressure ventilation in patients with acute exacerbation of chronic obstructive pulmonary disease (HAPPEN): study protocol for a multicenter randomized controlled trial". *Trials* 19.1 (2018): 645.
15. Zhou L., *et al.* "High-pressure versus low-pressure home non-invasive positive pressure ventilation with built-in software in patients with stable hypercapnic COPD: a pilot study". *Scientific Reports* 7.1 (2018): 16728.
16. Clini E., *et al.* "The Italian multicentre study on noninvasive ventilation in chronic obstructive pulmonary disease patients". *European Respiratory Journal* 20.3 (2002): 529-538.
17. Zhou L., *et al.* "Home noninvasive positive pressure ventilation with built-in software in stable hypercapnic COPD: a short-term prospective, multicenter, randomized, controlled trial". *International Journal of Chronic Obstructive Pulmonary Disease* 12 (2017): 1279-1286.
18. Shah NM., *et al.* "Update: non-invasive ventilation in chronic obstructive pulmonary disease". *Journal of Thoracic Disease* 10.1 (2018): S71-S79.
19. Storre JH., *et al.* "Home noninvasive ventilatory support for patients with chronic obstructive pulmonary disease: patient selection and perspectives". *International Journal of Chronic Obstructive Pulmonary Disease* 13 (2018): 753-760.
20. Elliott MW. "Domiciliary non-invasive ventilation in stable COPD?" *Thorax* 64.7 (2009): 553-556.

Volume 8 Issue 7 July 2019

©All rights reserved by Anand Agrawal.