RELIEF OF DYSPNEA WITH MOUTHPIECE VENTILATION (MPV) IN PATIENTS WITH COPD EXACERBATION

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Background: Severe dyspnea is very common and burdensome symptom in patients with chronic obstructive pulmonary disease (COPD). Especially in patients with advanced disease and during an acute COPD exacerbation (AECOPD) the response to the usual dyspnea treatment is diminished. The use of noninvasive ventilation (NIV) with facial mask in acute hypercapnic respiratory failure in AECOPD is a standard care. The efficacy of NIV to reduce dyspnea is shown in patients with neuromuscular diseases (NMD) and with end-stage cancer. It is also possible to use NIV through mouthpiece as mouthpiece ventilation (MPV). It has reported that MPV improves the quality of life in patients with NMD not only by reducing dyspnea but also by improving the ability to cough, speech and eat when compared to mask NIV. Preliminary data also shows that MPV-NIV helps to normalize hypoventilation in AECOPD, but its efficacy on subjective dyspnea in patients with AECOPD remains unknown.

Aim: Aim of the study is to assess the effectiveness of mouthpiece ventilation (MPV) in relieving dyspnea in patients with AECOPD.

Methods: This is a pilot study with case-reports. Patients were recruited in the wards of Tampere University Hospital and Tampere City Hospital at the time of AECOPD. Inclusion criterions were a hospitalization due to AECOPD with at least moderate dyspnea (NRS = Numeric Rating Scale ≥ 4) without significant hypoventilation (blood pH ≥ 7.35 and $pCO_2 \leq 6.0$ kPa). Trilogy 100® (Philips Respironics) with mouthpiece was used as a study ventilator. Study periods were 15 minutes and next 24 hours. The primary end-point was to assess relief of dyspnea by NRS after 15 minutes on treatment. Secondary end-points include patient's willingness to use MPV and relief of dyspnea after 24 hours on treatment. Also pain and anxiety were assessed by NRS and VAS. Gas exchange parameters, respiratory rate, pulse and blood pressure were measured. Possible benefits and side effects were asked both from patients and caregivers. This study was approved by the ethics committee of Tampere University Hospital.

Results: 10 patients (five males) were recruited. Study results have yet not been analyzed but patient characteristics are presented. Mean age was 75.1 years (range 62-83). Patients have been smoking 45 pack years (range 30-60). The mean forced expiratory volume in one second (FEV_1) was 0.92 l (range 0.4-1.3) and FEV_1 % pred. was 36 % (range 21-53%). Most of the patients had severe obstruction (GOLD 3), while two had very severe obstruction (GOLD 4) and one had only moderate (GOLD 2) obstruction. They all had emphysema with mean diffusion capacity 45%. One patient used long term oxygen therapy at home. All patients had inhalation medication for COPD. Only one the patients had morphine as a rescue medication for dyspnea. Despite of the advanced COPD, only two patients had DNR-decision made at the time of the study intervention. Nine patients lived at home (two needed home care) and one in a nursing home. Until 31st of March in 2019, three of the recruited patients had died in 7, 15 and 20 months after the intervention, respectively. Thus, no fatal complications occurred with MPV in our patients.

Discussion: MPV-NIV is known to be efficacious in relieving dyspnea, decrease the work of breathing and improve the quality of life in patients with NMD. In the setting of palliative care, NIV should only be used if it provides symptomatic relief, is well tolerated, doesn´t prevent patient's communication ability and doesn´t prolong the normal dying process. Thus, it is reasonable to investigate if MPV-NIV is also useful in treating of dyspnea in advanced COPD.

Conclusion: Our hypothesis is that MPV might be a rational treatment option for dyspnea relief during end-of-life care of patients suffering from COPD.