JOURNAL CLUB SUMMARIES

What's hot that the other lot got

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DOMICILIARY NASAL HIGH-FLOW THERAPY IN STABLE HYPOXIC COPD PATIENTS

Nasal high-flow (NHF) therapy has been shown to be a beneficial therapy for patients with acute respiratory failure in hospital and might be beneficial in patients with chronic hypoxemic respiratory failure if delivered at home. Storgaard *et al*. (*Int J Chron Obstruct Pulmon Dis 2018;13:1195*) performed a randomised controlled trial comparing NHF added to long-term oxygen therapy (LTOT+NHF) to LTOT alone in 200 moderately severe COPD patients. Compared with the previous year, patient-reported exacerbations increased from 2.90 to 4.95/patient/year in the LTOT alone group compared with a slight decrease from 3.23 to 3.12/patient/year in the LTOT+NHF group, resulting in a lower exacerbation frequency in the NHF group compared with the LTOT group ($p<0.001$). However, hospital admission and all-cause mortality were not different between the groups after 1 year. Exploratory analyses suggested that there was a dose response effect with a reduction in admissions in patients with high device usage. Furthermore, dyspnoea symptoms, health-related quality of life, arterial carbon dioxide pressure ($PaCO_2$), and the 6 min walking distance improved in the NHF group compared with the LTOT group (all $p<0.001$). The study demonstrates that NHF is a potentially viable therapy in the home setting and may have physiological and clinical impact in patients with COPD on LTOT. Future studies should focus on high risk patients to assess the potential clinical impact on admission reduction.

CO_2 CLEARANCE WITH NASAL HIGH-FLOW THERAPY IN HYPERCAPNIC COPD PATIENTS IS FLOW AND LEAK DEPENDENT

Studies have shown that nasal high-flow (NHF) therapy might reduce arterial $PaCO_2$ in stable hypercapnic COPD patients. Possible mechanisms include an increase in airway pressure or a washout of the upper airways. Bräunlich *et al*. (*BMC Pulm Med 2018;18.1:14*) conducted a study to evaluate these mechanisms. Hypercapnia was evaluated in 36 COPD patients by capillary blood gas sampling before and 1 hour after NHF therapy under four conditions with different effective flow rates and degrees of leakage achieved by varying nasal prong position (A=20 L/min with low leakage; B=40 L/min with low leakage; C=20 L/min with high leakage; D=40 L/min with high leakage). In 10 COPD patients, mean airway pressure was measured in the nasopharynx under identical conditions. NHF reduced capillary PCO_2 in all patients, without significant differences between the four conditions (~5% reduction). In patients with a baseline capillary PCO_2 >55 mmHg (n=26), capillary PCO_2 decrease was dependent on leak and flow levels (percentage of baseline capillary PCO_2±SD: A=94.2%±8.2%; B=93.5%±4.4%; C=90.5±7.2%; D=86.8%±3.8%). The highest mean airway pressure was achieved under condition B (2.3±1.6 mbar), while the lowest PCO_2 was observed in condition D, indicating that change in airway pressure was not related to change in capillary PCO_2 but rather that washout of the dead space area is the principal working mechanism of NHF in this patient group. These data will help support the design of future trials and clinical practice by ensuring better understanding of optimal device settings.

NON-INVASIVE VENTILATION DURING EXERCISE TRAINING

Non-invasive ventilation (NIV) added to exercise training (ET) improves the intensity at which patients with COPD can exercise. However, there are no data showing NIV added to ET improves health-related quality of life (HRQoL) or clinical parameters in patients with chronic respiratory failure (CRF) secondary to either obstructive or restrictive lung disease. Vitacca *et al*. (*Respirology 2018;23.2:182–189*) investigated whether adding NIV during ET could increase the 6 min walking distance (6MWD) compared with ET alone in patients with CRF already treated with home NIV. The trial was powered based on a doubling of the effect of ET on 6MWD with additional NIV. Fifty patients with COPD or a restrictive lung disease were randomly assigned to ET with NIV (delivered at their home NIV settings) or ET alone. All patients underwent 20 sessions of cycle training over a 3 week period. The 6MWD improved above the minimum clinically important difference (MCID=25 m) in both groups (ET+NIV: 299 to 344 m ($p=0.004$); ET alone: 315 to 359 m ($p=0.0002$)), without a between group difference. Improvement in cycle endurance time was significantly greater in the NIV group (754±974 s vs 51±407 s (MCID=200 s), $p=0.0271$), although with significant heterogeneity. Of note HRQoL improved only in the control group. Only one patient dropped-out because of NIV intolerance during training. Unfortunately, the study lasted only 3 weeks and it is unknown whether the used NIV pressures during ET were sufficient to unload the respiratory muscles. Despite demonstrating the feasibility and physiological benefits of adding NIV to exercise training in patients with chronic respiratory failure there was no evidence of improvement in clinically meaningful endpoints such as HRQoL or 6MWD. Whether this relates to failure to optimise the intervention by delivering targeted NIV settings or due to under powering of the trial is unclear.

NON-INVASIVE VENTILATION IN PATIENTS WITH BULBAR AMYOTROPHIC LATERAL SCLEROSIS

The efficacy of non-invasive ventilation in Amyotrophic Lateral Sclerosis (ALS) patients with bulbar dysfunction is not clear. Sancho *et al*. (*ERJ Open Res 2018;4.2:00 159–2017* investigated the effect of NIV on survival of ALS patients in relation to the degree of bulbar dysfunction and determined prognostic factors associated with NIV failure. The study utilised a prospective non-randomised design with all ALS patients attending a specialist centre in whom NIV was indicated being enrolled. Patients were divided into groups; those who agreed to NIV treatment and were NIV

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tolerant (n=120) and a control group of patients who refused NIV without any attempt at acclimatisation (n=20). Patients who tried and failed NIV were excluded. The NIV group survived longer compared with the control group (18 months vs 3 months, p<0.001). The survival advantage conferred by NIV persisted in patients with severe bulbar dysfunction (13 months vs 3 months, p<0.001). Nevertheless, having severe bulbar dysfunction at NIV initiation was prognostically unfavourable. Survival in the non-bulbar patients on NIV was 20 months vs 13 months in patients with bulbar dysfunction (HR 0.5, p=0.001). The control of sleep disordered breathing as measured by %sleep time SpO_2<90% while using NIV was also found to be prognostic factor (HR 1.12, p=0.02). The study will provide further information for clinicians caring for patients with ALS supporting the individualising of management decisions, in particular suggesting that severe bulbar dysfunction in ALS should not be a barrier to delivery of NIV and that titration of NIV may be important to maximise efficacy.

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