O2 therapy

Oxygen therapy

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Background

A chronic partial pressure of arterial oxygen below 55mmHg leads to pulmonary constriction, erythrocytosis and increased cardiac output. In the long run, these effects cause pulmonary hypertension, right ventricular failure and death. The concept of oxygen as a therapeutic agent was introduced in the 1820s. In severe chronic hypoxemia due to chronic obstructive pulmonary diseases (COPD) other than CF, long term home oxygen supplementation is able to improve survival, pulmonary hemodynamics, exercise and neuropsychological performance. Also in CF patients, when chronic pulmonary disease ultimately results in chronic hypoxemia, oxygen administration is largely used to relieve symptoms of dyspnea and to delay the development of cor pulmonale (Adde F V, 2013). Moreover, therapy with supplemental oxygen and/or Non Invasive Ventilation is considered to be effective to face sleep disturbances, at least in the short term (Katz ES, 2014

Since the indications for long-term home oxygen therapy in CF are not well established, the same criteria (PaO2 ?55mmHg or SpO2 ?88%) used to indicate oxygen therapy in COPD are suggested, especially in older CF patients.). In the past decade, heated humidified high-flow nasal oxygen therapy (HFNT) delivered through a nasal cannula has emerged as an alternative to non-invasive ventilation or oxygen delivered through a face mask. This form of delivery provides a high concentration of heated and humidified oxygen with flow rates from 40 to 60 liters per minute, that generate low levels of positive end-expiratory pressure (Matthay MA, 2015). In 2018, a review (Thille AW,2018) about HFNT for the management of CF patients with acute exacerbation affirmed that HFNT has beneficial effects on comfort and respiratory rate and could be a new oxygenation strategy for the management of these patients.

Issues

Short- and long-term beneficial effects of oxygen therapy, including changes in mortality, morbidity, quality of life, exercise tolerance, sleep parameters.

Short- and long-term oxygen therapy adverse effects: suppression of respiratory drive in hypercapnia, decreased motility, and psychological problems.

Best way for oxygen administration.

What is known

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One Cochrane review is available (Elphick Heather E, 2013). It considered 11 published studies on a total of 172 CF patients. Only one study showed data on long-term oxygen therapy (two years). A high degree of lung failure was present in patients enrolled in the studies, causing a possible bias in recognizing which kind of patients may really benefit from oxygen therapy.No significant improvement in survival, lungs or cardiac health has been demonstrated.There was an improvement in regular attendance at school or work in those receiving oxygen therapy at 6 and 12 months and oxygen administration was associated with improvement in exercise performance and sleep quality. Modest hypercapnia, probably of poor clinical significance, has been observed.

A study (Milross MA, 2019) in adult patients with CF and sleep desaturation that compared 12?months of NIV with or without oxygen, ?with low flow oxygen ?therapy, demonstrated no differences between the two groups.

In 2021 (Spoletini G,2021) a pilot open-label, randomized cross-over study demonstrated that HFNT during exercise in CF patients with advanced lung disease improves walking distance, control respiratory rate, hypercapnia, dyspnoea and comnfort.

Unresolved questions

Short- and long-term beneficial effects of oxygen therapy, including changes in mortality, morbidity, quality of life, exercise tolerance, sleep parameters.

Short- and long-term oxygen therapy adverse effects: suppression of respiratory drive in hypercapnia, decreased motility, and psychological problems.

Best way for oxygen administration.

No RCT is ongoing

Keywords

Respiratory Insufficiency;