Basic Program

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The basic program will point out some theses which can be guidelines for the discussion and lectures in the planned workshop.

The first workshop of the Liquid Oxygen (LOX) Group has two major aims.

Defining and clarifying open questions in long-term oxygen therapy (LTOT): indications; therapeutic effects, and differential indications for different oxygen delivery systems. All these questions should be discussed with respect to problems of exercise-induced hypoxia in chronic obstructive pulmonary disease (COPD) patients.

Discussion and critical analysis of the study plan: effects of LTOT due to portable LOX tanks in disabled exercise-limited and 'malnourished' COPD patients with so-called borderline hypoxemia ($\text{paO}_2 < 70 \text{ mm Hg}$) at rest.

First Thesis

Prognosis in COPD depends on many factors. The body weight loss (muscular wasting?) is an independent risk factor of prognosis [1,2]. The O_2 consumption of ventilation in 'malnourished' COPD patients is significantly elevated by reduced ventilatory muscle efficiency [3]. Body weight loss may be assumed as a result of elevated O_2 consumption of ventilation. In acute respiratory failure (ARF) the worse prognosis may be explained by the reduced ventilatory muscle efficiency combined with the increased cost of breathing.

Second Thesis

COPD patients with predominant emphysema have a poor prognosis in ARF [4]. Besides mechanical alterations (obstruction, hyperinflation), the key for respiratory insufficiency may be respiratory muscular failure resulting from: (1) reduced total body muscle mass; (2) altered composition of muscle fibers (e.g. relation of slow and fast fibers); (3) altered energetic muscle status, and (4) altered oxygen supply to tissue.

Third Thesis

The energetic status of skeletal muscle generally depends on: (1) energy substrate delivery and demand; (2) oxygen supply, and (3) oxygen extraction (depending on diffusion and demand, i.e. the number of mitochondria working).

The muscle lactate content in acute or chronic hypoxemia depends not only on oxygen supply but also on the number of mitochondria (ATP status) [5,6]. So the aim of research in impaired muscle metabolism in COPD should not only be the lactate metabolism but the combined measurement of the lactate concentration (blood/muscle) and the ATP content of muscle at rest

and exercise. Yet the absolute lactate levels (blood/muscle) correspond purely to the degree of muscle hypoxidosis.

Fourth Thesis

Hypoxidosis is not adequately characterized by blood or tissue lactate levels or $\bar{P}_{\text{vO}_2}$ [7]. The existing oxygen debt

(hypoxidosis) at exercise due to the increased demand of should be able: (1) to ameliorate the oxygen debt by

oxygen should be demonstrated by an increased oxygen consumption in the case of higher oxygen supply [8].

Fifth Thesis

If treated by LTOT with portable systems (LOX), patients with severe COPD and low tissue oxygenation

increasing oxygen delivery and consumption; (2) to increase ATP content of muscle fibers, and (3) to decrease serum lactate levels and anaerobic metabolism.

The benefit should be: (1) improvement of exercise capacity; (2) improvement of muscle force; (3) improved maximal voluntary ventilation compared with control, and (4) reduced episodes per year of acute respiratory failure.

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