Prevention of Hypoxemia in Chronic Obstructive Pulmonary Disease

Claudio F. Donner, M.D., F.C.C.P.;† and Dario Olivieri, M.D., F.C.C.P.;‡

LTOT = long-term oxygen therapy

Recent years have marked considerable progress in the field of pulmonary rehabilitation. Empiric approaches are being eroded with the growing recognition of the need for greater interdisciplinary communication between respiratory physiologists, clinical pulmonologists, psychologists, respiratory therapists, and other related health care professionals. This multidisciplinary approach lends increased support to the application of scientific principles in the management of chronic lung disease. Prevention strategies have had little impact on lung disease, and there is evidence that chronic respiratory diseases are becoming more prevalent throughout the world. Not surprisingly, therefore, rehabilitation is assuming an increasingly important role.

A first international conference on "Advances in Pulmonary Rehabilitation and Management of Chronic Respiratory Failure" was held Oct 15-17, 1987, at the Medical Center of Rehabilitation of Veruno, Italy. The conference was organized by the Clinica del Lavoro Foundation (Pavia), with the aim of presenting a comprehensive and up-to-date overview of the pathophysiological basis, fields of application, and different therapeutic approaches adopted in pulmonary rehabilitation. The introduction of the proceedings of that conference highlighted a number of unresolved controversial issues, in view of which a suggestion was made to plan periodic reviews of any new developments in the field.²

The 5 intervening years have marked a number of changes; however, many of those issues have yet to be solved, and moreover, new issues have emerged. The same institution organized a second international conference held Nov 4-7, 1992 (5 years after the first) in Venice, with the sponsorship, among others, of the European Respiratory Society (ERS), and the Italian Chapter of the American College of Chest Physicians.

The main, but by no means only focus of the conference was "Prevention of Hypoxemia in COPD." Hypoxemia is associated with varying degrees of functional limitation, but most importantly, it brings with it a prognosis of shorter survival. As a consequence, the prevention and treatment of hypoxemia forms the basis of rehabilitation programs for chronic respiratory patients.

The conference opened with a review of the "Natural History of COPD," touching on an array of topics from cellular and biochemical pathogenic background to epidemiologic data, in an attempt to provide an up-to-date, integrated framework of the clinical management of COPD. A reinterpretation of common pathologic findings was carried out in light of the new knowledge of the cytokine network regulating inflammatory processes. The precise identification of the molecular basis was stressed as a promise for new therapeutic opportunities. Presentations on epidemiology underlined the need to better standardize methodologies, rendering data collected from different areas comparable. Indeed, most studies focus on the correlation between risk factors and chronic symptoms rather than the assessment of prevalence and incidence of disease.

A further session on the "Natural History and Mechanisms of Hypoxemia" examined the different physiologic factors and conditions which lead to persistent hypoxemia or transient oxyhemoglobin desaturation during exercise and sleep. Anatomic and functional correlates were thoroughly discussed. The rationale and the impact different therapeutic approaches have on the evolution of hypoxemia were also reviewed. Interesting data were reported on possible pharmacologic manipulation of carotid body sensitivity, a central point in the control of breathing which has become a topic of renewed interest in recent years, particularly after the discovery of drugs able to...
contrast hypoventilation and dyspnea acting on carotid bodies.

The treatment of chronic hypoxemia relies heavily on long-term oxygen therapy (LTOT), which has been found to prolong survival. Alternative pharmacologic treatments are still under investigation. The last two decades have witnessed the widespread application of LTOT in Western countries. This has raised a number of crucial organizational problems as well as issues related to the quality of life, including compliance with long-term treatment in patients who are not necessarily bound to oxygen by severe dyspnea. Furthermore, the extension of prescription criteria (eg, transient desaturation during sleep and exercise, pulmonary fibrosis, hypoxemia of nonpulmonary origin), is under investigation along with the correct timing of institutions of ventilatory support in conditions which feature progressive hypercapnia. These last issues were the subject of a workshop sponsored by the International Oxygen Club. The Club also sponsored a roundtable discussion on the organization of respiratory home care, in cooperation with AIAR, the Italian Affiliate of AARC, the American Association for Respiratory Care, and the International Home Care Association. Besides LTOT, the discussion concentrated on the organization of home mechanical ventilation. In recent years, the use ICU techniques in the attempt to prolong survival of patients with severe chronic respiratory disease has met with broad approval. Serious drawbacks have promptly emerged, however, related to the difficulties involved in weaning, the selection of patients, organization, and management of home care services for ventilator-dependent subjects. In this context, the experiences of different countries were presented (since not all nations are at the same stage of evolution with regard to approaches designed to help the ventilator-assisted patient return home). Besides technical and clinical aspects, economic and quality standard evaluation was considered. The allocation of resources for home care is an important issue. Home respiratory care is of benefit to the patient and also reduces the economic burden imposed by long periods of hospitalization. These considerations make investments in home care services worthwhile. However, definite criteria and quality standards have yet to be firmly established. If we only consider LTOT, which is the backbone of home care at present, a comparison between different European and North American countries highlighted the great differences in prescription criteria, type of oxygen source preferentially selected, and per-unit amount of resources allocated. A particularly striking example of one such difference may be made by comparing the countries in which LTOT can be prescribed only by pulmonologists, where an average of 20 patients receiving LTOT every 10^6 inhabitants is found, and those countries where all physicians can prescribe oxygen, which present a number of subjects admitted by LTOT about four times greater.

A symposium on "Advances in Respiratory Failure" addressed acute respiratory failure, with special regard to patients with a history of chronic failure. Exacerbations are the most common cause of death or further disability in COPD patients. The most recent investigations were presented on topics such as respiratory mechanics, acute and chronic respiratory muscle fatigue, gas exchange, and mechanical ventilation techniques.

A session on nutrition was also held (Nutritional Approach to Chronic Respiratory Failure) in recognition of the need to establish guidelines based on the growing body of information concerning the relationships between chronic respiratory failure and malnutrition. It has been demonstrated that nutritional support can be of benefit to malnourished COPD patients in terms of body composition and muscle strength, but important problems were underlined, such as the standardization and improvement of correct nutritional assessment in a clinical setting, the definition of individually tailored nutritional intervention programs, the correlation between improvements in patients' nutritional state and their respiratory function, and finally, the objective impact on morbidity, mortality, and quality of life.

The quality of life must be the major focus of any rehabilitation program designed for COPD patients; yet, how does one go about defining it? It is clearly necessary to arrive at some objective system of measurement whereby the impact of treatments and the best techniques of administration may be evaluated. A session concluded the conference accordingly, stating that there is no ideal method of measuring quality of life and that each approach has its strengths and weaknesses. Notwithstanding, using questionnaires of appropriate responsiveness and validity, important information can be acquired for the planning of rehabilitation programs for patients with chronic respiratory disease, with the partial exception of severe conditions, in which more reliable tests are needed and are at present under investigation.

The conference also included a special symposium on "Smoking Cessation." Smoking is the greatest risk factor for COPD, and smoking cessation holds the key to the prevention and care of COPD patients. One of the fundamental prerequisites for admittance to any rehabilitation program should be to have already given up the habit. Cessation programs include re-education and counseling, as well as a variety of other techniques, which have not always proven effective. A thorough discussion of the different aspects of smoking (pharmacology, psychology, clinics) provided a review of the most advanced programs and techniques currently
available to help “would-be nonsmokers.” The session relied mainly on the US experience, one of the most advanced at present. In Italy, but also in most European countries, antismoking interventions are still in the preliminary phase; things have started to change with regard to the Italian legislation (e.g., prohibition of cigarette advertising and restriction of public areas where smoking is allowed), and some initiatives, mainly educational, have been taken by individual groups; however, there is still the need to do much more. Besides promoting the conference, the Clinica del Lavoro Foundation presented a project for a smoking cessation campaign to be launched in 1993 which will include well-known items, such as education of doctors, education of subjects at risk of adopting deleterious habits, and medical and psychological support to smokers willing to quit.

The overall aim of the conference was to bring together a wide cross-section of experts working at the forefront of contemporary research to present and discuss their experience. Judging by the size of the audience, over 1,000 participants, by the lively discussions held in every session, and by the post-Congress comments, most participants experienced a profitable exchange of views.

Invited and selected oral presentations are being collected in a proceeding book to be published and widely circulated. The aim is not only to provide an integrated framework of the current developments in chronic respiratory failure and pulmonary rehabilitation, but also to highlight key areas for further development. Every effort is being made to ensure rapid publication of the proceedings.

REFERENCES


2 Donner CF, Berglund E. Advances in pulmonary rehabilitation and management of chronic respiratory failure. Eur Respir J 1999; 2(suppl 7):S775-S81s