oxygen therapy have recently been published. Subsequent information may equip physicians with improved insight as to when low-flow oxygen therapy should be instituted earlier in the course of treatment and which patients may benefit most. The economic aspects of continuous low flow oxygen therapy demand careful investigation before further recommendations are made.

Philip G. Boysen, M.D., F.C.C.P.
Gainesville, Florida

Associate Professor of Anesthesiology and Internal Medicine, University of Florida.
Reprint requests: Dr. Boysen, Department of Anesthesiology, Box J-354, JMH/MC, Gainesville, Florida 32610

REFERENCES
3 Douglas NJ, Calverley PMA, Leggett RJE, Brahm HM, Flennery DC, Brezinova V. Transient hypoxaemia during sleep in chronic bronchitis and emphysema. Lancet 1979; 1:1-4
10 Flenley DC. Clinical hypoxia: causes, consequences and correction. Lancet 1978; 1:542-46
11 Coccagna G, Mantovani M, Brignani F, Parchi C, Lugaresi E. Continuous recording of the pulmonary and systemic arterial pressure during sleep in syndromes of hypoxemia with periodic breathing. Bull Physiopathol Resp 1972; 8:1159-72

Hormone Receptors in Lymphangioleiomyomatosis

Corticosteroids are the primary treatment modality for most interstitial lung diseases. That some interstitial processes may be responsive to other hormonal agents is generally not appreciated. One component of the lung repair process is proliferation of bronchiolar and alveolar smooth muscle. In one rare and poorly understood disease, lymphangioleiomyomatosis (LAM), the predominant pathologic lesion is proliferation of smooth muscle throughout the lung, giving rise to emphysema with airway obstruction, interstitial disease, chylous effusions, and recurrent pneumothoraces. Smooth muscle proliferation is not confined to the chest, but may involve the abdomen and may result in lymphogenous cysts and chylous ascites. There is increasing evidence that the muscular hyperplasia of LAM is regulated by sex hormones; LAM occurs solely in women and usually during the child-bearing years. Following the appearance of radiographic abnormalities, the disease progresses rapidly, resulting in death within a few years. Following menopause, the pace of the disease is slowed and long-term survival is possible.

Attempts to treat the disease by oophorectomy have been few and have met with limited success. Such efforts have resulted in slowing of the progress of the disease, but not in reversal of functional abnormalities. The failure to achieve functional improvement may have been due to the presence of lung destruction rather than to a lack of hormonal responsiveness of the muscular element.

There is appreciable evidence that muscle of all types is under estrogenic regulation. Uterine muscle is clearly under estrogen control. Metastatic tumors of uterine muscle ("benign metastasizing leiomyoma") contain estrogen receptors and have been cured apparently by oophorectomy. Estrogen receptors have also been identified in skeletal muscle and vascular smooth muscle. Cattle fed diethylstilbestrol develop increased skeletal muscle mass, as well as increased fat content and diethylstilbestrol has been found to localize within the muscle. A pertinent clinical observation is that women tend to tolerate certain myopathies better than men. Diethylstilbestrol has been administered to patients with muscular dystrophy in an effort to decrease enzyme leakage and to retard progressive loss of muscle strength.

In this issue of Chest (see page 96) Brentani et al have identified both estrogen and progesterone receptors within the lungs of a patient with LAM. The concentrations of both classes of receptors were low, but these diminished levels may have been due to prior treatment with progesterone. This study confirms the findings of McCarty et al who not only demonstrated progesterone receptors in a patient with LAM, but found that progesterone administration resulted in some improvement in lung function. The apparent usefulness of progesterone in this disorder may be related to its antiestrogen effects. It has been shown...
that administration of progesterone results in a diminution of estrogen receptor concentrations.\(^8\)

The efficacy of a variety of hormonal manipulations in this disease, especially the manner in which efficacy relates to hormonal receptors, needs to be evaluated. Since LAM is an unusual disease, it is rarely considered in the differential diagnosis of pneumothorax or obstructive lung disease. When tissue is obtained from such patients, it is important that a portion of the specimen be frozen in liquid nitrogen so that receptor assays may be performed when the histology is suggestive of LAM. Techniques for detection of hormonal receptors in tissue sections are currently being developed and should facilitate these investigations. If techniques become available that will allow the use of paraffin-embedded tissue, then retrospective studies will become feasible. Ultimately, cooperative studies will be required to substantiate the value of hormonal treatments in this rare but tragic disease.

Arthur S. Banner, M.D., F.C.C.P.
Chicago

Reprint requests: Dr. Banner, 990 East 59th Street, Chicago 60637

REFERENCES


5 Horwitz KB, Horwitz LD. Canine vascular tissues are targets for androgens, estrogens, progestins and glucocorticoids. J Clin Invest 1981; 69:750-58


7 Cohen L, Morgan J. Diethylstilbestrol effects on serum enzymes isozymes in muscular dystrophy. Arch Neurol 1976; 33:450-54


Appropriate Lung Distention for Gas Exchange in ARDS

Positive end-expiratory pressure (PEEP) is widely used for the treatment of hypoxemia in the adult respiratory distress syndrome (ARDS). The goal of this therapy is to improve arterial oxygen tension without causing detrimental effects on the lung tissue or other systems and organs. A number of experimental and clinical studies have reported the beneficial effect of progressive lung distension by PEEP on gas exchange and pulmonary mechanics, but also its negative influence on cardiac function.

At this moment, several clinical approaches to this dilemma exist: 1) titration of PEEP up to a level where cardiac output is not depressed yet;\(^13\) this level depends overall on the underlying pulmonary disease, lung elasticity and circulating blood volume; 2) precise assessment of cardiac function during ARDS and positive pressure ventilation\(^14\) and correction of cardiovascular side effects by intravascular volume expansion and/or dopamine infusion;\(^7\) 3) differential ventilation in the lateral position, with independent regulation of tidal volume or PEEP applied to each lung by a double lumen endotracheal tube.\(^2,13\)

The report of Murray et al in this issue of Chest (see page 100) presents an elegant method to titrate PEEP for an appropriate recruitment of functional alveolar ventilation, namely: the arterial minus end-tidal carbon dioxide gradient. Its advantages over previously reported techniques are both simplicity and a sound physiologic background.

The model of ARDS investigated, oleic acid-induced nonhydrostatic pulmonary edema, resembles early stages of human ARDS when pulmonary hypertension, increased capillary permeability and massive interstitial and intraalveolar edema prevail. The experience with the method presented should now be extended to human forms of acute pulmonary failure, particularly to later stages of ARDS showing different morphologic alterations of lung structure.\(^3\) Progressive vascular obstruction, parenchymal consolidation, and beginning fibrosis make the therapy difficult in this situation. A repeated assessment of the available gas exchange surface area could be a valuable tool to adjust the ventilator treatment and the cardiovascular management, as well as to estimate the course of pulmonary parenchymal destruction or repair. The arterial – end-tidal carbon dioxide gradient could provide a helpful physiologic measurement in these patients because it can be obtained easily at the bedside in every intensive care unit.

Peter M. Suter, M.D.
Geneva, Switzerland

References


Division de Soins Intensifs de Chirurgie, Cantonal Universitaire.
Reprint requests: Dr. Suter, Division des Soins Intensifs, Hôpital Cantonal Universitaire, Geneva, Switzerland