

## **Lung Disorders - Bronchitis - Emphysema**

### **Hyperbaric treatment in the post-bronchitic emphysema.**

Pallotta R.

Following some introductory mention of the physiology of hyperbaric oxygen therapy and some notes on the physiology of postbronchitic emphysema and its cardiac, hepatic, renal and neurological sequelae, a personal method of hyperbaric treatment is described. The results in the first 50 emphysematous patients submitted to this therapy are reported along with those of the examinations carried out to evaluate respiratory function, and changes in haematosis, and cardiac, hepatic, neurological and renal function. It is concluded that hyperbaric treatment of postbronchitic emphysema should be considered of choice for quick, effective resolution of alterations in haematosis and the organic sequelae deriving from respiratory insufficiency. In association with other therapy (antibiotics, anti-inflammatory and balsamic drugs) it is also capable of stopping or usefully delaying the disease's development.

### **Arterial oxygen tension of patients with abnormal lungs treated with hyperbaric oxygen is greater than predicted.**

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The arterial oxygen ( $O_2$ ) tension ( $PaO_2$ ) of patients with normal gas exchange treated with hyperbaric oxygen (HBO<sub>2</sub>) can be predicted from their pre-HBO<sub>2</sub> arterial to alveolar  $O_2$  tension ratio ( $a/A$ ) which remains constant up to a  $PaO_2$  of 2,000 mm Hg. We observed that the  $a/A$  could not be used to predict the  $PaO_2$  of patients with impaired gas exchange (reduced pre-HBO<sub>2</sub>  $a/A$ s) treated with HBO<sub>2</sub>. Our study provides information about the  $PaO_2$  of patients with abnormal lungs treated with HBO<sub>2</sub>. For clinical reasons, we measured the  $PaO_2$  of 24 patients treated with HBO<sub>2</sub>. We obtained arterial blood gas values from patients with lung dysfunction ( $a/A < 0.75$ ) prior to, during, and after HBO<sub>2</sub>. The pre-HBO<sub>2</sub>  $a/A = 0.45 \pm 0.17$  (mean  $\pm 1$  SD). During HBO<sub>2</sub> the  $a/A$  ranged from 0.7 to 0.8 depending on chamber pressure and returned to the pre-HBO<sub>2</sub> baseline after HBO<sub>2</sub>. We conclude the following: (1) The hyperbaric  $PaO_2$ s of patients with  $a/A < 0.75$  is greater than expected. (2) However, the  $PaO_2$  is lower than in patients with normal lung function ( $a/A > 0.75$ ). Possible explanations include improvement in ventilation/perfusion matching, reduction of venous admixture, and/or extra-alveolar uptake of  $O_2$ . (3) Exposures to HBO<sub>2</sub> treatment pressures greater than recommended by existing protocols may be required in patients with impaired transfer of  $O_2$  across the lung to achieve  $PaO_2$ s similar to patients with normal lung function treated with HBO<sub>2</sub>.

### **Immunological indicators as the criteria of prognosis and treatment of infectious complications in patients operated on for chronic nonspecific diseases of the lungs and pleura**

Biriukov IuV, Tsygankova ST, Bronskaia LK, Namazbekov BK, Akimova NI.

A correlation of clinical specific features of the postoperative period and dynamics of immunological indices in patients operated upon for chronic nonspecific diseases of lungs and pleura was established. Pyo-inflammatory complications were three times more often in decreased amount of T-lymphocytes after operation. HBO-therapy has an immunostimulating effect in the form of increased total and active T rosette-forming lymphocytes, causes more rapid elimination of purulent intoxication, purification of the pleural cavity from the purulent discharge and makes the period of treatment at the hospital shorter.

### **Hyperbaric oxygenation in the treatment of patients with acute purulent-destructive lung and pleural diseases**

Lesnitskii LS, Buravtsov VI.

In experiments in rabbits the authors have elaborated safe (in relation to a barotrauma of the lungs) regimens of the pressure changes taking place while performing HBO. In the treatment of 127 patients with acute

suppurations of the lungs and pleura it was established that a short course of HBO (4-5 sessions) in the regimens used was safe and clinically effective. The method is recommended for the treatment of patients with spreaded injuries of the pulmonary tissue developing with a pronounced endogenous intoxication.

### **Value of the measurement of the alveolo-arterial PO<sub>2</sub> difference in moderate hyperoxia (FIO<sub>2</sub> = 0.40) in chronic respiratory insufficiency**

Weitzenblum E, Hirth C, Rasaholinjanahary J, Ehrhart M.

Alveolo-arterial difference in PO<sub>2</sub> (AaDO<sub>2</sub>) during moderate hyperoxia (FIO<sub>2</sub> = 0.40) and shunt-effect (Qs/Qt) were measured in 219 patients with chronic lung disease of various aetiologies. In particular, the series included 79 chronic bronchitis, 35 cases of "primary" emphysema, 40 cases of sarcoidosis and 36 cases of diffuse interstitial pulmonary fibrosis (DIPF). Alveolar PO<sub>2</sub> was calculated from the equation of alveolar air.

Ventilatory parameters were measured under stable conditions using a Fleisch metabograph. Shunt-effect (in moderate hyperoxia) was calculated from the classical equation. AaDO<sub>2</sub> in chronic bronchitis was on average 118.3 +/- 30.7 mmHg, significantly higher (p less than 0.005) than in the emphysema patients: 99.2 +/- 22.3 mmHg. The same difference between the two groups was found for shunt-effect (p less than 0.005). In sarcoidosis, AaDO<sub>2</sub> and Qs/Qt were only slightly raised on average: 83.6 +/- 22.0 mmHg and 7.2 +/- 3.7% respectively. By contrast, in DIPF, AaDO<sub>2</sub> was very high (124.9 +/- 35.7 mmHg) as was Qs/Qt (14.8 +/- 6.9%). The measurement (in moderate hyperoxia) of AaDO<sub>2</sub> and Qs/Qt, which are fairly representative of ventilation-perfusion inequalities, may thus make a contribution to the physiopathological differentiation between chronic bronchitis and emphysema. The frank increase in AaDO<sub>2</sub> and Qs/Qt in DIPF emphasises the importance of ventilation-perfusion inequalities in the development of hypoxaemia in such patients. For all the cases studied, there was a very satisfactory correlation between AaDO<sub>2</sub> in moderate hyperoxia and PaO<sub>2</sub> at rest in ordinary air ( $r = -0.64$ , p less than 0.001). Similarly, there was a satisfactory correlation between Qs/Qt in moderate hyperoxia and PaO<sub>2</sub> at rest in ordinary air ( $r = -0.53$ , p less than 0.01).

### **The use of hyperbaric oxygenation in the combined treatment of postresection tuberculous pleural empyema with bronchial fistulae**

Mukhin EP, Sarenko VN, Terlikbaev TA, Turkebaeva KA, Alenova AKh.

The results of treating 67 patients with postresection tuberculous empyema of the pleura and bronchial fistulas are presented. The complex treatment included courses of hyperbaric oxygenation. The treatment procedure is described. Closure of the bronchial fistula and decrease in the fistula diameter were observed in 23 (33.8 per cent) and 16 (24.5 per cent) patients, respectively. No closure of the bronchial fistula in 41.7 per cent of the patients was recorded. Increased erythropoiesis, decreased leukocytosis and higher leukocyte counts, retarded ESR, lower contents of transaminases, increased inhibition of leukocyte migration, lower levels of immunoglobulin E and fewer numbers of immune complexes circulating in blood were revealed.