FEV_1 800 (32%) and FEV_1/FVC 32. Chest radiography presented signs of chronic bronchopathy without any other findings of interest, and the stomach was visualized in its anatomically correct location. The patient reported continuous cough over the course of the last year, with little expectoration. The cough had increased, even interfering with sleep and making it impossible to speak normally. The existence of gastro-esophageal reflux had been ruled out by esophageal pH. The patient had come to the hospital's Emergency Department reporting suffocating cough and dyspnea and was therefore hospitalized with the diagnosis of COPD exacerbation. Arterial gasometry showed: pH 7.40, PO_2 64 mmHg with O_2 at 2 l/min through nasal cannulae, PCO_2 44 mmHg. The complementary studies done (chest radiograph, ECG, blood analysis) did not show relevant alterations or changes compared with previous studies. Given the intensity of the cough and its accentuation with oxygen therapy, we decided to administer O_2 to the patient with AIRVO® equipment (Fisher & Paykel, Auckland, New Zealand). The air flow from the device is regulated at 35 l/min and the O_2 flow of the flow meter at 3 l/min, in order to achieve an estimated FiO_2 of 28%. The clinical response was spectacular, with the complete disappearance of the cough 5 min after initiating the therapy. The patient continued with the treatment for one week and was later discharged with conventional HOT. One month afterwards, the patient was seen in the outpatient consultation. The cough had reappeared, but was much milder and tolerable.

Discussion

We present a COPD patient with HOT and chronic cough related with the administration of O_2 after having ruled out other causes of chronic cough at both the pulmonary and digestive levels. The administration of O_2 at body temperature and 100% relative humidity made the cough disappear almost instantaneously, a situation which was maintained for a prolonged period. It is well known that the medical O_2 that patients receive is a cold, dry gas. Its temperature is 15 °C, and the absolute humidity is 0.3 mg/l. The effect of adding a cold bubbler improves the absolute humidity of the gas, reaching values of 15 mg/l, although this is far from the 44 mg/l necessary to reach a relative humidity of 100%.[3] The thermal humidity provided by AIRVO® imitates the natural balance of temperature and humidity produced in healthy lungs (37 °C, 44 mg/l), achieving a greater well-being of the patient and a greater tolerance to treatment while restoring the defense mechanisms of the respiratory apparatus, especially the mucociliary function.[4,5] The patient returned to a conventional HOT system after being discharged from the hospital.[6] The reappearance of the cough, although milder and tolerable, one month after discharge leads us to believe that the patient would still be under the beneficial effects of the thermal humidification on the mucosa, although sooner or later the cough would probably become more intense. Is this patient a candidate for receiving HOT through a system of thermal humidification, either continuous or discontinuous? We believe so. This opens new areas of research in the field of HOT, while identifying the need to individualize the prescription of oxygen therapy.

References

1. Sánchez Agudo L, Cornudella R, Estopá R, Molinos L, Servera E. Indicación y empleo de la oxigenoterapia continuada domiciliaria. Arch Bronconeumol. 1998;34:87–94.
2. Plaza V, Miguel E, Bellido-Casado J, Lozano MP, Ríos L, Bolíbar I. Eficacia de la normativa SEPAR en la identificación de las causas de tos crónica. Arch Bronconeumol. 2006;42:68–73.
3. Dysart K, Miller T, Wolfson MR, Shaffer TH. Research in high flow therapy: mechanisms of action. Respir Med. 2009;103:1400–5.
4. Roca O, Riera J, Torres F, Masclans JR. High-flow oxygen therapy in acute respiratory failure. Respir Care. 2010;55:408–13.
5. Kilgour E, Rankin N, Ryan S, Pack R. Mucociliary function deteriorates in the clinical range of inspired air temperature and humidity. Intensive Care Med. 2004;30:1491–4.
6. Alfageme I. Terapias respiratorias domiciliarias. Arch Bronconeumol. 2009;45 Suppl. 2:2–28.

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Should We Reconsider the Criteria for Home Oxygen Therapy Depending on Altitude?☆

¿Deberíamos reconsiderar los criterios de oxigenoterapia crónica domiciliaria en función de la altitud?

Dear Editor:

The criteria for home oxygen therapy (HOT), proposed more than 20 years ago, establish that patients with COPD who are non-smokers, correctly follow treatment and present respiratory failure in a context of clinical stability should receive HOT. Specifically, those patients with PaO_2 <55 mmHg or those with PaO_2 between 55 and 60 mmHg in whom there are signs of repercussions in the organs from hypoxemia, such as pulmonary hypertension, chronic cor pulmonale, congestive heart failure, heart rate disorders or polycythemia (hematocrit >55%), or those with lower intellect, would be ideal candidates. In this group of patients, HOT has demonstrated its benefits in terms of survival and improvement of the clinical parameters.[1]

These universally-accepted criteria are valid at sea level. However, many of our patients do not live at sea level, and one must contemplate whether these criteria are equally applicable at other altitudes. Studies have been done to estimate the degree of hypoxemia that a patient can reach when moved to a certain altitude, basically aimed at evaluating the need for the administration of oxygen (O_2) during airplane travel.[2,3] However, the prediction equations of a certain level of PaO_2 that are based on a baseline PaO_2 value obtained at sea level cannot be applied inversely. We cannot estimate the PaO_2 that a patient would have at sea level by using his/her PaO_2 determined at a certain altitude.

Our group has worked with patients residing in Madrid at an altitude of 723 m with criteria for respiratory failure whose arterial saturation has ostensibly improved at sea level. That is to say that patients with criteria for HOT in Madrid may no longer meet said criteria when the altitude effect is cancelled out (Table 1). Many of these patients would not receive HOT if they lived at sea level, which leads us to suppose that there is an excess of indications for

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Table 1
Characteristics of 84 COPD Patients With Determination of SatHb in Madrid and at Sea Level.

COPD Patients	FEV_1, ml	FEV_1, %	SatHb at 723 m above Sea Level	SatHb at Sea Level
84	920 ± 450	45 ± 12	82 ± 5	91 ± 6

FEV_1: forced expiratory volume in 1 s; and SatHb: arterial saturation of hemoglobin.

HOT in Madrid simply due to the altitude effect. A somewhat similar situation has been demonstrated in critical patients with regards to the PaO_2/FiO_2 ratio. Pérez Padilla[4] has clearly observed that the patients have a lower shunt and presumably a lower degree of lung injury than residents at sea level when meeting the criteria for progressive adult respiratory distress syndrome with a PaO_2/FiO_2 ratio of 200 mmHg. This author suggests keeping in mind the effect of altitude when comparing these patients in published studies as there can be important differences in the results obtained.

The effect of acclimatization or adaptation to heights of humans is well known. There are two fundamental mechanisms developed by subjects living at moderate altitudes, these being the increase in ventilation and the decrease in plasma volume, with consequent hemoconcentration.[5] The increase in red blood cells maintains the total oxygen content of the blood and guarantees the transport of oxygen to the tissue. What is attractive is the hypothesis that the absolute PaO_2 value in a COPD patient would not be the best indicator for whether to receive home oxygen therapy. Instead, the degree of efficacy of the compensatory mechanisms of the patient and his/her degree of adaptation to the altitude in which he/she lives would be a better indication. It is necessary to develop studies that more thoroughly analyze these physiological adaptation mechanisms in order to establish dynamic criteria for considering HOT. Currently, HOT is prescribed by extrapolating the criteria established at sea level to the entire population. Thomas Petty said on an occasion: "If we applied the HOT criteria in Denver (Colorado – 1,609 m above sea level), we would have to give O_2 to the entire population".[6] Does this make sense? We should reconsider HOT criteria according to altitude.

References

1. Sanchez Agudo L, Cornudella R, Estopa R, Molinos L, Servera E. Normativa para la indicación y empleo de la oxigenoterapia continua domiciliaria (OCD). Arch Bronconeumol. 1998;34:87–94.
2. García Río F, Borderias L, Casanova C, Celli B, Escarrabill J, Gonzalez Mangado N, et al. Patología respiratoria y vuelos en avión. Arch Bronconeumol. 2007;43:101–25.
3. Gong H, Tashkin DP, Lee EY, Simmons MS. Hypoxia-altitude simulation test. Am Rev Respir Dis. 1984;130:980–6.
4. Pérez Padilla JR. La altitud modifica la relación entre la PaO_2/FiO_2 y el cortocircuito: impacto en la valoración de la lesión pulmonar aguda. Arch Bronconeumol. 2004;40:459–62.
5. Muza SR, Beidleman BA, Fulco CS. Altitude preexposure recommendations for inducing acclimatization. High Alt Med Biol. 2010;11:87–92.
6. Iseman MD, Good Jr JT, Thomas L. Petty: extraordinary clinician, bold innovator, inspiring educator, loyal friend, world-class raconteur, and waltonesque angler. Chest. 2010;137:1255–6.

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Skeletal Muscle Metastasis as Initial Presentation of Non-Small-Cell Lung Carcinoma☆

Metástasis en músculo esquelético como presentación inicial de un carcinoma no microcítico de pulmón

Dear Editor:

Although muscle tissue makes up more than 50% of the total body mass, metastatic extension to the skeletal muscle is an exceptional event in solid organ neoplasms, with an accumulated incidence of less than 1.5% in recent series, and it is usually limited to advanced phases of the disease.[1–3] Due to their clinical and radiological appearance, skeletal muscle metastases (SMM) are similar to soft tissue sarcomas, entities with greater prevalence in which case surgical resection offers potentially curative results.[2] This differential diagnosis takes on special relevance if the SMM is the initial manifestation of a primary tumor that had been clinically silent up until that moment, a situation that has been infrequently reported in the literature.[4–6]

Our patient is a 69-year-old male ex-smoker, whose medical history included the presence of arterial hypertension, dislipidemia and polymyalgia rheumatica. The patient reported the appearance of a tumor on the left thigh, with slow progressive growth and accompanied by continuous dull pain. With the exception of an unquantified weight loss, the patient denied any other systemic symptoms. After several weeks, he also reported the appearance of a second smaller lesion on his right calf. The physical examination showed that the patient was in a state of good general health, with no findings on the cardiopulmonary auscultation or palpable lymphadenopathies. On the outer side of the left thigh, there was a stone-like mass that was not painful to touch (10 cm × 5 cm), with scarce mobility on deeper planes and no signs of local inflammation, which was covered with skin that was intact. A second lesion (2 cm × 1 cm) with similar characteristics was on the right gastrocnemius. Magnetic resonance imaging (MRI) with a contrast revealed a large, very heterogeneous mass that was sarcomatous in appearance on the vastus externus muscle of the left thigh (Fig. 1), and a smaller-sized mass in the lateral gastrocnemius of the right leg. A cytology obtained from this latter lesion, using fine-needle aspiration (FNA), was consistent with a poorly differentiated carcinoma. Later, an incisional biopsy of the thigh mass confirmed infiltration by an epidermoid carcinoma with complex epithelial phenotype in the immunohistochemistry study (positivity for high molecular weight keratins, pankeratins AE1–AE3, thrombomodulin, carcinoembryonic antigen and p63). The study was completed with a thoracoabdominal computed tomography study that revealed multiple bilateral pulmonary nodules indicative of metastasis, among which there was a larger lesion in the right upper vertex (3 cm × 3.2 cm) with spiculated contours that was identified as a probable primary tumor. By means of transthoracic FNA, a sample was obtained, whose cytological study was compatible with a scarcely differentiated carcinoma. With the determination of the lesion as a stage IV non-small-cell lung cancer

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