factors between parents, such as amount and type of tobacco smoked. Previous studies have shown an association between greater lung function impairment and a greater number of cigarettes smoked by fathers.[6,11]

Although some earlier observations found higher susceptibility to passive smoking in girls,[13] no differences were found in our series.

Other potential risk factors, such as age, sex, atopy, pets, and nutritional status, also occurred in our series.[12] It is important to highlight that the multivariate analysis revealed only passive smoking as an independent risk factor for impaired lung function in asthma, and both passive smoking and atopy for exacerbation severity.

The study is limited by its retrospective nature, which prevented us from collecting data on the frequency and burden of smoking by parents in the home. Nor were cotinine levels determined in urine, as this test was not routinely available in our laboratory.[14]

Not only is second-hand smoking a preventable risk factor,[7] it is also one of the main causes of worsening of asthma[5] and the main environmental determinant of lung function decline.[15] In our series, 41% of the children were passive smokers, a proportion in line with previous studies, yet very high, considering these children were asthma patients.[4]

Knowing that the quality of life of these children may be significantly compromised,[15] we believe it is essential to insist on measures to prevent passive smoking in the family environment.[10]

References

1. Fernández-Plata R, Rojas-Martínez R, Martínez-Briseño D, García-Sancho C, Pérez-Padilla R. Effect of passive smoking on the growth of pulmonary function and respiratory symptoms in schoolchildren. Rev Inves Clin. 2016;68:119–27.
2. García-Marcos L, Quirós AB, Hernández GG, Guillén-Grima F, Díaz CG, Urena IC, et al. Stabilization of asthma prevalence among adolescents and increase among schoolchildren (ISAAC phases I and III) in Spain. Allergy. 2004;59:1301–7.
3. González-Barcala FJ, Takkouche B, Valdés L, Temes E, Leis R, Cabanas R, et al. Tabaquismo parental y función pulmonar en niños y adolescentes sanos. Arch Bronconeumol. 2007;43:81–5.
4. Suárez RG, Galván C, Oliva C, Aquirre-Jaime A, Vázquez C. Grupo de Trabajo sobre Tabaquismo en la Infancia y Adolescencia de la Sociedad Española de Neumología Pediátrica. Exposición al humo de tabaco del niño asmático y su asociación con la gravedad del asma. An Pediatr. 2013;78:35–42.
5. Anderson WC, Apter A, Dutmer CM, Searing DA, Szefler SJ. Advances in asthma 2016: designing individualized approaches to management. J Allergy Clin Immunol. 2017;140:671–80.
6. Valsamis C, Krishnan S, Dozor AJ. The effects of low-level environmental tobacco smoke exposure on pulmonary function test in preschool children with asthma. J Asthma. 2014;51:685–90.
7. Janson C. The effect of passive smoking on respiratory health in children and adults. Int J Tuberc Lung Dis. 2004;8:510–6.
8. McEvoy CT, Spindel ER. Pulmonary effects of maternal smoking on the fetus and child: effects on lung development. Respiratory morbidities, and life long lung health. Paediatr Respir Rev. 2017;21:27–33.
9. Drummond D, Baravalle-Einaudi M, Lezmi G, Vibhushan S, Franco-Montoya ML, Hadchouel A, et al. Combined effects of in utero and adolescent tobacco smoke exposure on lung function in C57Bl/6J mice. Environ Health Perspect. 2017;125:392–9.
10. Vanker A, Gie RP, Zar HJ. The association between environmental tobacco smoke exposure and childhood respiratory disease: a review. Expert Rev Respir Med. 2017;11:661–73.
11. Venners SA, Wang X, Chen C, Wang B, Ni J, Jin Y, et al. Exposure-response relationship between paternal smoking and children's pulmonary function. Am J Respir Crit Care Med. 2001;164:973–6.
12. GEMA 2017. Guía Española para el Manejo del Asma (GEMA 4.2). Available from: www.gemasma.com (accessed 10.08.17).
13. Dai X, Dharmage SC, Lowe AJ, Allen KJ, Thomas PS, Perret J, et al. Early smoke exposure is associated with asthma and lung function deficits in adolescents. J Asthma. 2017;54:662–9.
14. Wang Y, Yang M, Huang Z, Tian L, Niu L, Xiao S. Urinary cotinine concentrations in preschool children showed positive associations with smoking fathers. Acta Paediatr. 2017;106:67–73.
15. Carlsen KH, Lødrup Carlsen KC. Parental smoking and childhood asthma: clinical implications. Treat Respir Med. 2005;4:337–46.

María López Blázquez,* Jimena Pérez Moreno, Sara Vigil Vázquez, Rosa Rodríguez Fernández

Servicio de Pediatría y sus Áreas Específicas, Hospital General Universitario Gregorio Marañón, Madrid, Spain

* Corresponding author.
E-mail address: mlblazquez@salud.madrid.org (M.L. Blázquez).

1579-2129/

Anisocoria Associated With Spontaneous Pneumomediastinum☆

Anisocoria como síntoma asociado a neumomediastino espontáneo

To the Editor,

Pneumomediastinum is defined as the presence of free air in the mediastinum. This is a rare manifestation and usually presents spontaneously, as a consequence of injury, rupture of a hollow viscus, or gas-producing infection.

It generally occurs in young adults exposed to a sudden change in intrathoracic pressure that results in the rupture of alveolar septa and alveoli, causing air to escape from the pulmonary interstitial tissue to the peribronchiolar and perivascular tissues of the upper mediastinum and the neck. In clinical practice, it is often the result of precipitating factors such as previous muscle exertion (physical exercise, coughing fit, or asthma attack), which lead to a Valsalva maneuver or an increase in intrathoracic pressure. In many cases, it is difficult to differentiate spontaneous pneumomediastinum from more subtle causes of secondary pneumomediastinum, such as esophageal perforation, small tears in the central tracheobronchial tree, or lung or mediastinal infections.[1]

The most commonly described symptom is central chest pain, which may radiate to both sides of the chest and the neck. Dyspnea and irritative cough may also appear. Dysphagia, hypernasal speech, and tachycardia are less common. The classic triad of spontaneous pneumomediastinum consists of chest pain, dyspnea, and subcutaneous emphysema.[2] However, no symptoms associated with compression of the cervical neurovascular bundle (pupillary changes, loss of visual acuity, headache, etc.) have been described in the literature.

We report the case of a patient with a diagnosis of spontaneous pneumomediastinum associated with anisocoria.

This was a 19-year-old man, with no significant clinical history or known toxic habits, who attended the emergency room due to a 12-h history of cervical neck pain associated with central chest discomfort, and a “crackling” sound on palpation of the neck. He reported watery rhinitis in the previous days, and 2 episodes of

☆ Please cite this article as: López LL, Bueno AR, Kubarsepp A. Anisocoria como síntoma asociado a neumomediastino espontáneo. Arch Bronconeumol. 2018;54:437–439.

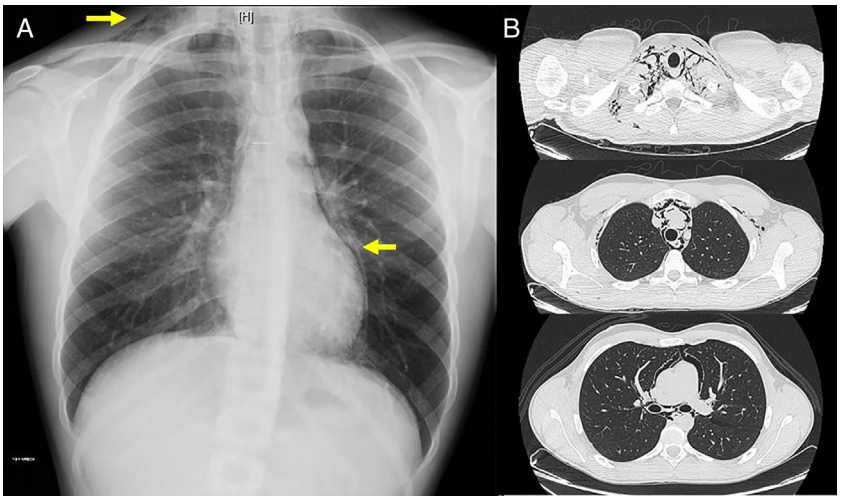

Fig. 1. (A) Chest X-ray, showing (arrows) signs of subcutaneous emphysema the right laterocervical region and an area of left paracardiac hyperlucency, suggestive of pneumomediastinum. (B) Chest CT (parenchymal window) showing extensive pneumomediastinum in several regions, dissecting the mediastinal structures.

self-limited vomiting of small amounts of food in the hours prior to presentation in the emergency room. No other symptoms, such as coughing or shortness of breath, were reported. The patient denied a history of trauma in the previous days; he only mentioned that he had resumed his musical activity, playing a wind instrument (cornet).

Of note on examination was subcutaneous emphysema in the cervical spine and both supraclavicular fossa. No changes were observed in voice tone and there was no dysphagia. A neurological examination detected significant normoreactive anisocoria (left pupil smaller than the right), with no changes in visual acuity or ptosis.

Complete blood count with serum proteins were normal. Serum biochemistry showed vitamin B_{12} levels of 172.1 pg/ml. Chest radiograph on admission (Fig. 1A) showed an area of left paracardiac hyperlucency, consistent with pneumomediastinum. A chest computed tomography (CT) was performed to confirm the diagnosis and to complete the study.

On computed tomography (Fig. 1B), the most significant findings were a large pneumomediastinum that dissected the mediastinal structures and extended along the left oblique fissure. It was also accompanied by subcutaneous emphysema in both laterocervical regions, the supraclavicular fossa (predominantly in the left side), and both axillary regions. Neither pneumothorax nor rib fractures were observed.

Given the patient's stable status, he was admitted to the general hospital ward, under the care of the pulmonology staff. A clinical judgment of spontaneous pneumomediastinum was made, although the contribution of factors associated with Valsalva maneuvers or barotrauma could not be ruled out. Conservative treatment was administered, with oxygen therapy, rest, and analgesia.

During the hospital stay, evaluation by the neurologist was requested, since anisocoria is not described in the literature as a symptom associated with pneumomediastinum (except in cases of cervical spine injuries in which the sympathetic nervous system is affected).[3] The neurological study was completed with head CT, cranial artery angio-MRI (circle of Willis), and echo-Doppler of the supra-aortic trunks, all of which were normal. We concluded that the anisocoria was associated with altered sympathetic and vagal modulation in the setting of pneumomediastinum with secondary compression of nerve structures by associated subcutaneous emphysema.

The patient was also assessed by hospital's ENT specialist, and no changes were found on fiberoptic naso-laryngoscope.

The patient was discharged 7 days after admission, with a chest X-ray showing no signs of pneumomediastinum and full reabsorption of subcutaneous emphysema. Anisocoria resolved progressively during the stay.

The course of spontaneous pneumomediastinum is benign in most cases, and observation and conservative treatment are sufficient for recovery.[4] The risk of recurrence is very low. Secondary causes that, if not promptly diagnosed, might occasion an unfavorable clinical course should be excluded,[5] including cervical spine injuries and/or contusions, vascular aneurysms, and esophageal perforation. Diagnosis requires a high level of suspicion, given the scant or unclear clinical manifestations; up to one third of patients do not present any precipitating factor, and subtle changes in the chest X-ray may go unnoticed. Given our experience, it may also be of interest to evaluate concomitant neurological changes. Though not reported in the literature, these may contribute to the differential diagnosis of this entity, and moreover, require a full assessment to rule out more severe clinical syndromes that can compromise the cervical sympathetic nervous system.

References

1. Caceres M, Ali SZ, Braud R, Weiman D, Garrett HE. Spontaneous pneumomediastinum: a comparative study and review of the literature. Ann Thorac Surg. 2008;86:962–6.
2. Álvarez-Sala JL, Casan P, Rodríguez de Castro F, Rodríguez JL, Villena V. Neumología clínica. 1.ª Barcelona: Elsevier España; 2010. p. 904.
3. Guillén-Paredes MP, Flores-Pastor B, Escobar C, de Andrés García B, Aguayo-Albasini JL. Síndrome de Horner traumático sin lesión vascular. Cir Esp. 2015;93:e139–41.
4. Hogan F, McCullough C, Rahman A. Spontaneous pneumomediastinum: an important differential in acute chest pain. Case Rep. 2014;2014, pii:bcr2014207692.
5. Iyer VN, Joshi AY, Ryu JH. Spontaneous pneumomediastinum: analysis of 62 consecutive adult patients. In: Mayo Clinic Proceedings. Elsevier; 2009. p. 417-421. Available from: http://www.sciencedirect.com/science/article/pii/S0025619611605600 [accessed 29.08.17].

Lidia López López,[a,*] Alba Ramírez Bueno,[b] Anneli Kubarsepp[c]

[a] *Servicio de Neumología, Hospital Vithas Xanit Internacional, Málaga, Spain*
[b] *Servicio de Medicina Interna, Hospital Vithas Xanit Internacional, Málaga, Spain*
[c] *Servicio de Neurología, Hospital Vithas Xanit Internacional, Málaga, Spain*

* Corresponding author.
E-mail address: lydia.lopezlopez@gmail.com (L.L. López).

1579-2129/

Walking Program for COPD Patients: Clinical Impact After Two Years of Follow-up☆

Programa de paseos para pacientes con EPOC: impacto clínico tras 2 años de seguimiento

Dear Editor,

In recent years, several studies have highlighted the relationship between physical activity (PA) in chronic obstructive pulmonary disease (COPD) and a lower risk of exacerbations, hospitalization, and death.[1,2] While associations have been established between respiratory function and muscle strength, and between muscle strength and the level of PA,[3,4] the influence of PA has been consistently observed in different individual characteristics, geographic settings, and instruments for measuring physical activity, irrespective of spirometric severity and other predictors of COPD progress.[5] Interest is now growing in encouraging COPD patients to exercise, although the evidence available to date is still limited.[6] Several questions need to be answered, and simple, inexpensive strategies that could be implemented in the community to promote PA in these patients need to be identified, since improved functional capacity and quality of life achieved by respiratory rehabilitation programs rarely translate into increased PA in this population.[7] In this respect, in 2009 our group drew up the initial Walking Guide for COPD Patients. This guide, available in print and online (www.pasearconepoc.es), has been updated several times since then, and now includes 94 routes in 40 walking areas in and around our city. The walks are divided into five levels of difficulty, in terms of distance and incline, and disease severity and other comorbidities were taken into account to draw up an arbitrary table to help select suitable walks (see website).

The aim of this study was to evaluate the possible clinical efficacy of a walking program in COPD patients. This was a prospective, observational non-randomized, open-label, unblinded study, comparing an intervention group with a reference group. Patients in the intervention group followed the indications of our walking guide if they lived in or around the city, and if not, they were prescribed a similar program to that of the guide. All patients in this group kept a daily record of symptoms and exacerbations and were contacted monthly by telephone to ask about their mean monthly compliance with the program. The control group, who were also recruited in respiratory medicine clinics and previously screened, followed the standard recommendations for PA given in the clinic. None of the patients included in this group had refused to participate in the walking program. Correct treatment for their disease and therapeutic compliance were confirmed in both study groups. In both groups, the variables listed in the table were determined at baseline and after 1 and 2 years of follow-up, except for moderate and/or severe exacerbations, which were quantified globally in a 2-year period prior to the study start, and during the 2-year study period. Normal distribution was confirmed, and difference in means was analyzed using the Student's *t*-test and, given the sample size, results were confirmed with the corresponding non-parametric tests.

A total of 44 patients were recruited from the respiratory medicine clinic (32 in the intervention group and 12 in the control group). Eleven participants did not complete the protocol: eight in the intervention group (five drop-outs, one deterioration, and two deaths); and three in the control group (three drop-outs). The table shows results at baseline, at 1 year and at 2 years, and the time effect in each group between baseline and 2 years. Before analysis, the population that completed the study was determined to be similar to the baseline population. The only changes detected between the two groups in the first year of follow-up were a significantly greater reduction in the CAT score in the intervention group, which was not maintained at 2 years, and an improvement in lower limb strength, which was maintained. Differences were also observed in the number of exacerbations, in favor of the group that followed the walking program. As for the time effect, the intervention group showed a significant reduction in dyspnea and CAT score and improved lower limb strength; there was a smaller reduction in number of steps at 2 years in the intervention group that did not reach statistical significance ($p = 0.07$); significantly more exacerbations occurred in the control group.

The quality of evidence on interventions aimed at increasing PA in patients with COPD is still low.[5] Despite being a small, non-randomized series, our study revealed improvements in quality of life and a reduced frequency of exacerbation that, while modest, would support the usefulness of simple walking programs in COPD. In order to help physicians prescribe the program and to make it more accessible to patients, our walking guide was initially published in print and online. Recently, Moy et al.[8] showed that PA levels can be increased with the use of motivational techniques and positive reinforcement, but only in the short term. In addition to the walking guide itself, our program also consisted of a daily record of symptoms and motivating phone calls. Translation of this approach to routine clinical practice may be difficult in many settings, raising questions regarding feasibility. Our experience prompted us to design a cellphone application ("*Paseos COPD*") which completes the original guide with motivational and record-keeping tools, and information for physicians. Assessment is pending, but we hope that it will improve results. Given the demonstrated evidence of the importance of physical activity in COPD, we believe that initiatives of this type should be implemented in routine clinical practice (Table 1).

☆ Please cite this article as: Cebollero P, Antón M, Hernández M, Hueto J. Programa de paseos para pacientes con EPOC: impacto clínico tras 2 años de seguimiento. Arch Bronconeumol. 2018;54:439–440.