



SPONTANEOUS PNEUMOTHORAX AND BULLOUS EMPHYSEMA IN A YOUNG PATIENT? ABOUT A CASE

NEUMOTÓRAX ESPONTANEO Y ENFISEMA BULLOSO EN UN PACIENTE JOVEN? A PROPÓSITO DE UN CASO

María Manuela Rodríguez-Gutiérrez ^{1,2}, Hernán Cardona-Gaviria ³, Luisa María Hincapie-Cano ¹,
María Camila Oyuela-Gutiérrez ¹, Tatiana Ximena Quevedo-Cristancho ¹, Daniela Valencia-Riascos ¹,
Juliana Gómez-Raigosa , María Carolina Díaz-Rivera ^{1,4}

ABSTRACT

Introduction: Pneumothorax is a pathology prevalent in traumatic accidents in the thorax, but it can also be found spontaneously due to causes attributable to bullous disease, pneumonia, airway obstruction, malignancy, among others. **Clinical case:** Young male patient who debuted with spontaneous pneumothorax who required management in the intensive care unit with subsequent appearance of bullae in diagnostic images and pathology. **Discussion:** Primary spontaneous pneumothorax (PSP) in the young population is influenced by psychosocial factors such as age, gender, habits, environment, and genetic factors. In 80% of patients with PSP, the presence of bullae or apical blebs has been demonstrated, in addition from the porosity of the pleura that usually occurs in tall adolescents with athletic bodies; but it is also observed that tobacco use can increase the risk. **Conclusions:** Spontaneous pneumothorax due to bullous emphysema has increased in young people due to the use of psychoactive substances, vapers, and cigarettes.

Keywords: Spontaneous pneumothorax; Emphysema; Surgery; Case report. (Source: MESH-NLM)

RESUMEN

Introducción: El neumotórax es una patología prevalente en accidentes de tipo traumático en tórax, pero que también se puede encontrar de forma espontánea por causas atribuibles enfermedad bullosa, neumonía, obstrucción de las vía aérea, malignidad, entre otras. **Caso clínico:** Paciente masculino joven quien debuta con neumotórax espontaneo requirió manejo en unidad de cuidados intensivos con posterior aparición de bullas en imágenes diagnósticas y patología. **Discusión:** El neumotórax espontaneo primario (PSP) en población joven, se ve influenciada por factores psicosociales como la edad, genero, hábitos, entorno y factores genéticos, en el 80% de los pacientes con PSP se ha demostrado presencia de bullas o blebs apicales, además de la porosidad de la pleura que suele ocurrir en adolescentes altos con cuerpos atléticos; pero también se observa que el consumo de tabaco que puede aumentar el riesgo. **Conclusiones:** El neumotórax espontaneo por enfisema bulloso ha incrementado en los jóvenes por el uso de sustancias psicoactivas, vapeadores, cigarrillos.

Palabras clave: Neumotórax espontaneo; Enfisema; Cirugía; Reporte de caso. (Fuente: DeCS- BIREME)

¹ Semillero de investigación en Ciencias Médicas Quirúrgicas, Facultad de Medicina, Fundación Universitaria Autónoma de las Américas, Pereira, Colombia.

² Capítulo Futuros Cirujanos, Asociación Colombiana de Cirugía.

³ Cirujano General Universidad Nacional Bogotá, Colombia.

⁴ Cirujana General Fundación Universitaria Ciencias de la Salud, Bogotá, Colombia.

Cite as: Rodríguez-Gutiérrez MM, Cardona-Gaviria H, Hincapie-Cano LM, Oyuela-Gutiérrez MC, Quevedo-Cristancho TX, Valencia-Riascos D, Gómez-Raigosa J, Díaz-Rivera MC. Spontaneous pneumothorax and bullous emphysema in a young patient? About a case. Rev Fac Med Hum. 2023;23(3):172-175. doi:10.25176/RFMH.v23i3.5878.

Journal home page: <http://revistas.urp.edu.pe/index.php/RFMH>

Article published by the Magazine of the Faculty of Human Medicine of the Ricardo Palma University. It is an open access article, distributed under the terms of the Creative Commons License: Creative Commons Attribution 4.0 International, CC BY 4.0 (<https://creativecommons.org/licenses/by/4.0/>), that allows non-commercial use, distribution and reproduction in any medium, provided that the original work is duly cited. For commercial use, please contact revista.medicina@urp.edu.pe



INTRODUCTION

Pneumothorax is the presence of air within the pleural space. The evidence indicates the loss of integrity of the visceral or parietal pleural membrane, allowing air from the environment or airways to accumulate in the pleural space⁽¹⁾. This pathology has an incidence of 1 to 2% of spontaneous pneumothorax; it has a prevalence for the male gender, with respect to the female gender with a ratio of 30:1^(2,3). It is classified as primary, when there is no attributable cause, unlike secondary pneumothorax, which is related to a previous underlying disease such as pneumonia due to different microorganisms, airway obstruction, interstitial disease, malignancy, trauma, and collagen diseases⁽⁴⁾. Spontaneous pneumothorax does not have a specific etiology; it has been related to predisposing factors such as coagulopathies, vasculopathies, neoplasms, sequestration, and bullous emphysema^(5,6).

Emphysema occurs when there is an abnormal and permanent enlargement of the air spaces distal to the

terminal bronchioles of the lungs, accompanied by destruction of the alveolar walls and without obvious fibrosis⁽⁷⁾. A bulla is defined as an air space greater than 1 cm in diameter surrounded by normal parenchyma⁽⁷⁾. Bullae are typically associated with emphysema but can also be seen in conditions such as asthma and bronchiectasis⁽⁸⁾.

There are few reports in the scientific literature of patients with spontaneous pneumothorax due to bilateral bullous emphysema diagnosed by x-ray, biopsy, and intraoperative findings, so it was decided to present the case.

CLINICAL CASE

A young adult male patient with history of cigarette smoking and spontaneous left pneumothorax 18 months ago, who consulted the emergency room due to a two-day clinical picture consisting of dyspnea on medium exertion and chest pain of sudden onset, for which chest x-ray showing right pneumothorax. (Figure 1).

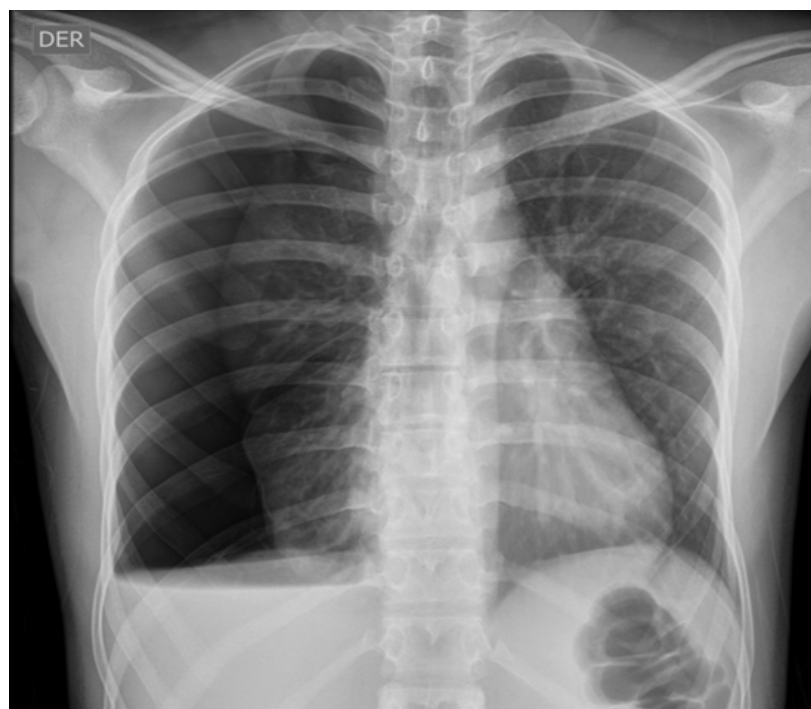


Figure 1. Chest X-ray with effacement of the costophrenic angle on the right side with the presence of an air-fluid level compatible with hydropneumothorax. Pneumothorax reaches a thickness of 7 cm at the lung base, 46 mm in the middle third of the lung field, and 50 mm in the apical region, with atelectatic changes significant in the right lung.

The patient was taken to a thoracostomy with a 1200cc right hemopneumothorax, for which he required a thoracotomy, finding middle and lower lobe lung collapse, a 500cc coagulated hemothorax, discrete thickening of the parietal pleura towards the right anterior thoracic region, for which a biopsy was taken. The patient was hospitalized in the intensive care unit (ICU), where the chest tube was removed. The next day, the patient with respiratory difficulty, dyspnea on

minor exertion, was evaluated for chest surgery who requested a new chest CT (Figure 2), and blebs were found. apical lesions, in addition a pathology report which indicated Bulla, fibrosis, chronic inflammation, for which the patient was taken to decortication, segmental lobectomy accompanied by pleurodesis by thoracoscopy with subsequent recovery of the clinical picture in the following weeks, resolving his pulmonary pathology. discharge with controls with chest surgery.



Figure 2. Chest CT with right pneumothorax with tension of approximately 70%, causing cardiac displacement and flattening of the free wall of the ventricle and the right atrium. Mild to moderate hydrothorax. Increased density of the right lung with an atelectatic appearance.

DISCUSSION

Primary spontaneous pneumothorax (PSP) in a young population presents as the accumulation of air in the pleural space in patients without apparent lung damage, trauma or adjacent pathology. It is more prevalent in male adolescents, with an average age of onset at 16 years and is one of the most common thoracic pathologies in this population group^(1,2).

The pathophysiology of communication between the alveolar and pleural spaces is multifactorial and is influenced by psychosocial factors such as age, gender, habits, environment, and genetic factors⁽³⁾. The presence of apical bullae or blebs has been demonstrated in 80% of patients with PSP, so their

rupture is considered the first mechanism that causes pneumothorax. Regarding the pathophysiology of bullae in adolescence, there are two theories; The first involves the porosity of the pleura; This concept speaks of the mesothelial cells of the visceral pleura that tend to be replaced by a more porous inflammatory layer that allows air to leak into the pleural space.

Additionally, PSPs typically occur in tall adolescents with athletic bodies. Research has discussed the rapid growth of adolescents as a risk factor for increased distending pressure at the apex^(1,2). Thus, both the increase in porosity and the increase in distention are risk factors for the production of blebs⁽¹⁾.



Among the risk factors for developing PSP due to blebs is tobacco use, which can increase the risk 4 to 7 times more in moderate smokers and up to 100 times more in heavy smokers⁽¹⁾. Since 1984, the correlation between cannabis consumption and PSP has been shown, and it has also been concluded that the pulmonary emphysema produced by this consumption can be greater than with tobacco consumption, and in patients with chronic consumption, there are findings of blebs in middle and upper lung lobes; These patients usually present with PSP at a younger age, as was found in our patient in the case report^(2,5).

There are also reports of increased risk with the use of vapers; The pathophysiological mechanism is still not clear, but it is hypothesized that diacetyl and 2,3-pentadiene are among the inhaled toxins, which can alter the transcriptional profile of bronchial epithelial cells in addition to altering genetic expressions within the immune system. innate to the airways causing high levels of metalloproteinase that produce inflammation and tissue damage, resulting in thinning of the alveolus

and allowing air to dissect through its interstitial tissue, accumulating in the fibrous layer of the pleuravisceral and finally producing bullae⁽³⁾.

The literature is still limited to determining recurrence predictors and thus identifying patients who require more aggressive management; nevertheless, current measures to reduce the possibility of new lesions include bleb resection and pleurodesis⁽¹⁾. In addition to video-assisted thoracic surgery (VATS), which has shown much lower recurrences than with other types of interventions and other advantages such as reduced hospital stays and better cosmetic results⁽²⁾.

CONCLUSIONS

Spontaneous pneumothorax caused by bullous emphysema is not always as easy to diagnose in a young patient as in our patient. It should be noted that currently there is an increase in the use of vaping devices, cigarettes and consumption of psychoactive substances that generate an increase in these pathologies.

Authorship statements: The authors are managers of the manuscript, data collection, and interpretation of the same.

Funding: Self-financed.

Correspondence: *María Manuela Rodríguez Gutiérrez.*

Address: *Av. de las Américas ##98 -56, Pereira, Risaralda.*

Telephone number: +57(6)3200303

E-mail: maria.rodriguez@uam.edu.co

Conflicts of interest: The authors declare that they have no conflict of interest in the publication of this article.

Received: August 16, 2023

Approved: September 05, 2023

REFERENCES

- Kimura B, Kidokoro T, Hashizume M, Tokimitsu S, Takaoka K, Oishi F, Murata Y. [11 operated cases of spontaneous hemopneumothorax]. *Kyobu Geka*. 1994 Sep;47(10):822-4. Japanese.
- Ng CS, Wong RH, Wan IY, Lau RW, Hsin MK, Yeung EC, Wan S, Underwood MJ. Spontaneous haemopneumothorax: current management. *Postgrad Med J*. 2011 Sep;87(1031):630-5.
- Tatebe S, Kanazawa H, Yamazaki Y, Aoki E, Sakurai Y. Spontaneous hemopneumothorax. *Ann Thorac Surg*. 1996 Oct;62(4):1011-5.
- Huan NC, Sidhu C, Thomas R. Pneumothorax: Classification and Etiology. *Clin Chest Med*. 2021 Dec;42(4):711-727.
- Rodríguez-de Mingo E, Fraga-Pérez A, Morón-Eroz S. Un caso de hemoneumotórax espontáneo [Spontaneous haemopneumothorax: A case report]. *Aten Primaria*. 2019 Jun-Jul;51(6):382-383. Spanish.
- Chen Y, Guo Z. Unusual case of primary spontaneous hemopneumothorax in a young man with atypical tension pneumothorax: a case report. *J Med Case Rep*. 2018 Jul 2;12(1):188.
- Pahal P, Avula A, Sharma S. Emphysema. 2023 Jan 26. In: *StatPearls* [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan.
- Stern EJ, Webb WR, Weinacker A, Müller NL. Idiopathic giant bullous emphysema (vanishing lung syndrome): imaging findings in nine patients. *AJR Am J Roentgenol*. 1994 Feb;162(2):279-82.