



## კლინიკური შემთხვევის აღწერა: 19 წლის კაცი სუნთქვის მწვავე უკმარისობით

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### აბსტრაქტი

**შესავალი:** მწვავე სუნთქვის უკმარისობა და დისკომფორტი გულმკერდის არეში ჩვეულებრივ ასოცირდება უეცარ ფიზიოლოგიურ ცვლილებებთან, როგორცაა პნევმოთორაქსი. პნევმოთორაქსი ვითარდება ჰაერის შეღწევით პლევრის ღრუში. მათ შორის სპონტანური პნევმოთორაქსი ეწოდება ერთ-ერთ მის ფორმას, თუ ის განვითარდა ტრავმის გარეშე აქამდე ჯანმრთელ ადამიანში.

**შემთხვევის აღწერა:** 19 წლის ბიჭი, რომელიც არ უჩივის რაიმე ავადმყოფობის ისტორიას, გადაიყვანეს გადაუდებელი დახმარების განყოფილებაში (ED) მოულოდნელად დაწყებული მწვავე სუნთქვის უკმარისობისა და გულმკერდის ტკივილის გამო. გულმკერდის რენტგენოგრაფიამ აჩვენა მარჯვენა ფილტვის პნევმოთორაქსი, მოგვიანებით გულმკერდის CT-ზე აღმოჩნდა აპიკალური სუბპლევრალური ბულები. საბოლოოდ, დადგინდა სპონტანური პნევმოთორაქსის დიაგნოზი. თავდაპირველად ჩატარდა პლევრის ღრუს დრენაჟი მარჯვენა მხარეს, მაგრამ რეციდივის გამო პაციენტს ჩატარდა ფილტვის თორაკოსკოპიული ბულის რეზექცია (VATS).

**დასკვნა:** სპონტანური პნევმოთორაქსის დიაგნოსტიკისას მნიშვნელოვანია პირველად და მეორად მიზეზებს შორის დიფერენცირება, უფრო მეტიც, რეკომენდირებულია CT კვლევა ფილტვის სუბპლევრალური ბულების არსებობის გამოსარიცხად და საჭიროების შემთხვევაში მისი მოცილება რეციდივის თავიდან ასაცილებლად.

**საკვანძო სიტყვები:** სპონტანური პნევმოთორაქსი, სუნთქვის მწვავე უკმარისობა, VATS, აპიკალური სუბპლევრული ბულა.

# A Case Report: 19-year-old Boy with Shortness of Breath and Chest Pain

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## Abstract

Acute shortness of breath with chest discomfort is usually associated with sudden physiological changes, such as pneumothorax. Pneumothorax is the presence of gas in the pleural space. A spontaneous pneumothorax is one that occurs without antecedent trauma in healthy individuals.

A 19-year-old boy with no significant medical history was admitted to the emergency department (ED) with sudden onset of acute shortness of breath and right-sided chest pain. Chest films showed a right-sided pneumothorax, on the chest CT apical subpleural bullae was present so the diagnosis of Spontaneous Pneumothorax was established. Firstly drainage of the pleural cavity on the right side was performed but because of recurrence patient underwent thoracoscopic bleb resection (VATS) of the affected lung.

When spontaneous pneumothorax is diagnosed, it is important to differentiate between a primary and secondary cause, moreover CT scan is recommended to exclude presence of subpleural bullae and if necessary remove it to prevent recurrence.

**Keywords:** spontaneous pneumothorax, acute shortness of breath, VATS, apical subpleural bullae.

## Introduction

Dyspnea has many causes, the tempo of onset and the duration of a patient’s dyspnea are likewise helpful in determining the etiology. Acute shortness of breath is usually associated with sudden physiological changes, such as laryngeal edema, bronchospasm, myocardial infarction, pulmonary embolism, or pneumothorax[1][2].

Pneumothorax is the presence of gas in the pleural space. A spontaneous pneumothorax is one that occurs without antecedent trauma to the thorax with an estimated annual incidence in the United States of 7 per 100,000 among men and <2 per 100,000 among women [3]. Risk factors include male sex, smoking, family history, and Marfan syndrome. The symptoms are usually sudden in onset, and dyspnea may be mild; thus, presentation to medical department is sometimes delayed.

Approximately one-half of patients with an initial primary spontaneous pneumothorax will have a recurrence. The most common cause is rupture of an apical subpleural bleb. CT findings of multiple small bullae or a large bleb are associated with an increased risk of recurrent pneumothorax [4].

## Clinical Case:

A 19-year-old boy with no significant medical history was admitted to the emergency department (ED) with sudden acute shortness of breath and right-sided pleuritic chest pain. The patient's temperature was 37.4°C; heart rate was 105 beats per minute; respiratory rate, 26 breaths per minute; and blood pressure, 120/90 mm Hg. Oxygen saturation was 100% on room air. He had no nasal flaring but used accessory respiratory muscles. The trachea was in midline. Breath sounds were markedly diminished on the right side, with good air entry on the right. No crepitus, wheezing, stridor, or crackles were heard. Cardiac examination revealed a normal cardiac sounds, without any murmurs, rubs, or gallops. Mediastinal shift could not be detected clinically.

Chest films showed a right-sided pneumothorax. Initially chest tube was inserted and drainage of the pneumothorax continued [photo 1; 2]. Later on because of persistent leak of air and recurrent pneumothorax episodes chest CT was performed. On CT apical subpleural bullae was present so the diagnosis of Spontaneous Pneumothorax was established [photo 3]. Patient underwent thoracoscopic management of the disease (i.e., bleb resection with thoracoscopy- VATS). The young boy recovered after surgery and he was discharged home.



*Fig. 1 initial x-ray*



*Fig. 2 x-ray after tube placement*



*Fig. 3 CT Scan after tube placement)*

## Discussion

The mentioned case is not frequent, but in this case scenario it is important to establish a correct diagnosis and intervene quickly so that complications do not develop. The acute symptoms of the patient despite the young age and without history of any chronic illness are significant. Usually, after chest radiograph the diagnosis is straightforward, but occasionally other entities should be considered (pneumomediastinum, pneumopericardium, tension pneumothorax, hemithorax)

A chest X-ray in 2 projections is necessary, where lung atelectasis should be detected at the moment of exhalation. In cases of primary spontaneous pneumothorax, when the presence of bullae in the right apical area of the lung is suspected, a chest CT is appropriate to confirm the diagnosis.

As a first option tube thoracostomy was performed. Chest tube insertion helped to relieve the pneumothorax and improve symptoms but it doesn't corrected the etiological cause that's why

recurrent air leakage in pleural place was present. Finally thoracoscopic apical bulla resection surgery (VATS) was performed [5].

## Conclusion

If the chest pain is associated with shortness of breath, especially in a thin adolescent without significant disease history, spontaneous pneumothorax must be considered. When spontaneous pneumothorax is diagnosed, it is important to differentiate between a primary and secondary cause, moreover CT scan is recommended to exclude presence of subpleural bullae and prevent recurrence. After successful treatment patient must be advised to avoid smoking, high altitudes and extreme sports in the future.

## References

1. 1. Editors. In: Jameson J, Fauci AS, Kasper DL, Hauser SL, Longo DL, Loscalzo J. eds. Harrison's Principles of Internal Medicine, 20e. McGraw Hill; 2018. P.76.
2. 2. Berliner D, Schneider N, Welte T, Bauersachs J. The Differential Diagnosis of Dyspnea. *Dtsch Arztebl Int.* 2016;113(49):834-845. doi:10.3238/arztebl.2016.0834
3. Melton LJ, Hepper NG, Offord KP. Incidence of spontaneous pneumothorax in Olmsted County, Minnesota: 1950 to 1974. *Am Rev Respir Dis.* 1979 Dec;120(6):1379-82.
4. Warner BW, Bailey WW, Shipley RT. Value of computed tomography of the lung in the management of primary spontaneous pneumothorax. *Am J Surg.* 1991;162(1):39-42.
5. Schwartz's Principles of Surgery. Eleventh. McGraw-Hill; 2019. P.705-706.
6. Gorrochategui M, Ramsey, MD A, Niknejad M, et al. Pneumothorax. Reference article, Radiopaedia.org (Accessed on 11 Jan 2024) <https://doi.org/10.53347/rID-4578>
7. Mendogni P, Vannucci J, Ghisalberti M, et al. Epidemiology and management of primary spontaneous pneumothorax: a systematic review. *Interact Cardiovasc Thorac Surg.* 2020;30(3):337-345. doi:10.1093/icvts/ivz290
8. Chang J, Ratnaraj V, Fu V, et al. Pleural abrasion versus apical pleurectomy for primary spontaneous pneumothorax: a systematic review and Meta-analysis. *J Cardiothorac Surg.* 2023;18(1):105. Published 2023 Apr 6. doi:10.1186/s13019-023-02207-3
9. Lee JH, Kim R, Park CM. Chest Tube Drainage Versus Conservative Management as the Initial Treatment of Primary Spontaneous Pneumothorax: A Systematic Review and Meta-Analysis. *J Clin Med.* 2020;9(11):3456. Published 2020 Oct 27. doi:10.3390/jcm9113456