

Case Report

Cough-induced spontaneous intercostal lung herniation: a case report

 Azat Özel*,  Onur Akçay,  Özgür Öztürk,  Tuba Acar,  Soner Gürsoy

Department of Thoracic Surgery, Bakircay University, Cigli Training and Research Hospital, İzmir, Türkiye

ABSTRACT

Spontaneous lung herniation is a rare clinical entity caused by protrusion of lung tissue through a weakened chest wall in the absence of trauma. Due to its nonspecific presentation, diagnosis may be delayed or overlooked, particularly on initial imaging. We report the case of a 71-year-old obese male who presented with acute-onset right-sided chest pain following a severe coughing episode. Initial thoracic computed tomography revealed no significant pathology, and the patient was discharged with conservative treatment. Due to progression of symptoms, repeat imaging demonstrated a prominent lung herniation through the right 8th intercostal space, accompanied by minimal pleural effusion. Magnetic resonance imaging revealed a 9x1 cm intercostal defect. Surgical repair was performed via thoracotomy with reduction of the herniated lung tissue, approximation of the ribs, and reconstruction of the defect using a nonabsorbable polypropylene mesh. The postoperative course was uneventful, and the patient was discharged on postoperative day seven. This case highlights the diagnostic challenge of false-negative initial computed tomography and emphasizes the importance of repeat advanced imaging in patients with progressive symptoms. Spontaneous lung herniation should be considered in obese male patients presenting with localized chest pain and chest wall swelling following severe coughing. Initial imaging may fail to detect the condition, and repeat evaluation with computed tomography or magnetic resonance imaging is crucial in cases of clinical progression. Surgical repair is a safe and effective treatment option for symptomatic patients or those with large defects, leading to favorable outcomes and low recurrence rates.

Keywords: spontaneous lung herniation, intercostal, cough-induced chest wall defect

Corresponding Author*: Azat Özel, MD. Department of Thoracic Surgery, TC Sağlık Bakanlığı Bakırçay Üniversitesi Çiğli Eğitim ve Araştırma Hastanesi, Yeni Mahalle, Murat Karayalçın Bulvarı No:18, 35620 Çiğli, İzmir, Türkiye.

Email: azatozel@gmail.com Phone: +90 5453909060

Doi: 10.26663/cts.2026.013

Received 22.12.2025 accepted 03.02.2026

Introduction

Lung herniation is a clinical condition characterized by the protrusion of lung tissue beyond the thoracic cavity due to an anatomopathological weakness of the chest wall and may develop secondary to a wide range of etiologies [1,2]. Spontaneous lung herniation represents a rarer subgroup that occurs in the absence of any traumatic cause. In this report, we aim to present and discuss a case of spontaneous intercostal lung herniation—an entity rarely described in the literature and with an imprecisely defined incidence—with particular emphasis on its etiology, diagnostic approach, and management strategies in the context of current literature. This case is particularly noteworthy due to the initial false-negative computed tomography findings, the delayed radiological diagnosis following symptom progression, and the presence of morbid obesity and severe cough as the primary predisposing factors in the absence of trauma, chronic lung disease, or corticosteroid use.

Case Report

A 71-year-old male patient with a long-standing history of cough presented to the emergency department 10 days earlier with right inferolateral hemithoracic pain that was exacerbated by coughing and movement. Thoracic computed tomography (CT) performed at the initial presentation revealed no remarkable pathology; therefore, the patient was discharged with nonsteroidal anti-inflammatory drug therapy (Figure 1). Due to progression of his respiratory-related symptoms, the patient re-presented 10 days later and was subsequently admitted for further diagnostic evaluation. The decision to pursue repeat imaging was prompted by worsening localized chest pain, newly apparent chest wall tenderness and ecchymosis on physical examination, and the emergence of subtle radiographic changes suggestive of pleural involvement.

The patient had no history of trauma, known comorbidities, prior surgical interventions, or use of tobacco or corticosteroids. His body mass index was calculated as 41.8 kg/m². He reported that the chest pain began after a severe coughing episode and was described as a “stabbing” sensation localized to the right hemithorax. The pain was exacerbated by maneuvers that increased intrathoracic pressure, such as coughing, sneezing, and deep inspiration.

On admission, the patient’s vital signs were as follows: oxygen saturation (SpO₂) 97%, heart rate 81 beats/min, and blood pressure 135/75 mmHg. Physical examination revealed ecchymosis and marked tenderness on palpation over an approximately 4-cm area at the level of the 8th intercostal space on the lateral as-

pect of the right hemithorax. Widening of the intercostal space was also noted in the same region. Examination of the other systems was unremarkable.

Laboratory investigations revealed no abnormalities. Following the detection of blunting of the right costophrenic angle on posteroanterior chest radiography, thoracic CT was performed, demonstrating minimal pleural effusion in the right hemithorax and a prominent lung herniation at the level of the right 8th intercostal space (Figure 2). To better delineate the extent of the herniation, thoracic magnetic resonance imaging (MRI) was obtained, revealing a 9x1 cm intercostal defect (Figure 3). The initial CT images were retrospectively re-evaluated after the diagnosis; however, no definite signs of lung herniation were identified. After multidisciplinary discussion at a joint Pulmonology and Thoracic Surgery board meeting, surgical intervention was recommended.

Following completion of the preoperative evaluations, the patient was taken to the operating room. Exploration was initiated through a 4th intercostal space port for videothoroscopic assessment, while the definitive thoracotomy incision was made at the level of the 8th intercostal space directly overlying the defect to achieve optimal exposure and secure mesh placement. The localization of the defect directly influenced the choice of thoracotomy site. Intraoperative videothoroscopic assessment revealed that the defect measured approximately 25x1 cm, the discrepancy between measurements was attributed to the oblique course of the defect and its extension into the subcutaneous tissues (Figure 4). The discrepancy between radiological and intraoperative measurements was attributed to the fact that MRI measurements were obtained in the axial plane, whereas intraoperative assessment revealed the total oblique length of the defect, including its extension into the subcutaneous tissues. A skin incision of approximately 20 cm was made at the level of the 8th intercostal space. After reduction of the herniated lung tissue back into the thoracic cavity, the ribs were approximated, and the defect was reconstructed using a nonabsorbable polypropylene mesh (Figure 5). An open thoracotomy was preferred over a minimally invasive approach due to the considerable length of the defect, its oblique extension into the chest wall, the need for stable rib approximation, and secure placement of a prosthetic mesh.

The postoperative course was uneventful, and the patient was discharged on postoperative day 7. Informed consent was obtained from the patient for publication of this case report and accompanying images.

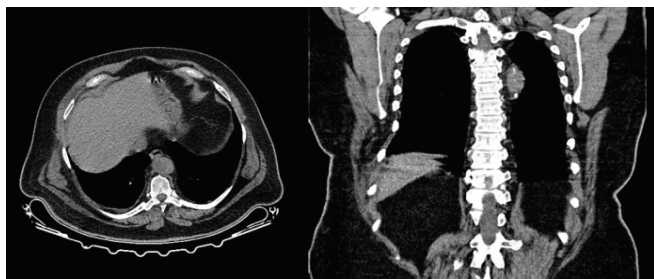


Figure 1. Initial presentation CT scan.

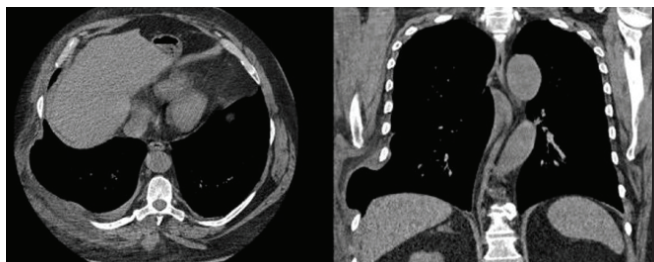


Figure 2. CT scan at the second presentation demonstrating minimal pleural effusion in the right hemithorax and a prominent lung herniation at the level of the right 8th intercostal space.

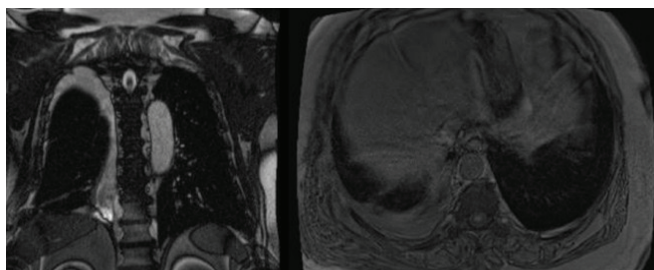


Figure 3. Thoracic magnetic resonance imaging revealing a 9x1 cm intercostal defect.

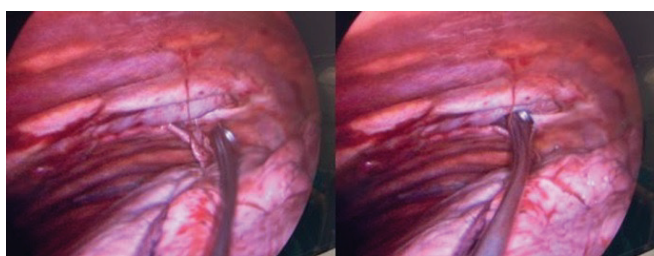


Figure 4. Thoracoscopic view of the hernia.



Figure 5. View after polypropylene mesh placement.

Discussion

Spontaneous lung herniation is a rare clinical entity that may be underestimated or overlooked during the diagnostic process. According to etiological classification, approximately 29% of lung herniations are spontaneous, as observed in our case, whereas the majority (52%) are post-traumatic in origin [2].

Although the exact etiology of spontaneous lung herniation has not been fully elucidated, it is widely believed to result from a combination of underlying medical conditions that weaken the chest wall and episodes of increased intrathoracic pressure [1,2]. In patients with chronic obstructive pulmonary disease or emphysema, weakening of the chest wall musculature together with chronically elevated intrathoracic pressure due to persistent coughing may predispose to herniation. The proposed pathogenic mechanism involves acute or chronic increases in intrathoracic pressure during activities such as severe coughing, sneezing, heavy lifting, or straining [1]. Obesity, male sex, and tobacco use are also recognized as relevant risk factors for spontaneous lung herniation. Additionally, corticosteroid use is considered a significant risk factor, as it may contribute to weakening of the thoracic wall [3]. In the present case, the patient's elevated body mass index and history of a severe coughing episode were considered potential predisposing factors.

From a mechanical perspective, lung herniations most commonly occur in the anterior thoracic wall, particularly between the 8th and 9th ribs, where muscular support is relatively weak [4]. However, intercostal herniation has also been reported in the parasternal region due to insufficient muscular coverage in this area [5]. Congenitally weak areas of the chest wall are typically described as the anterior region near the sternum, the medial region adjacent to the costochondral junction, and the posterior region near the vertebral bodies, where the intercostal musculature is composed of a single muscle layer [1,2]. In cases involving spontaneous, non-traumatic rib fractures induced by forceful coughing, the typical fracture locations are most commonly reported in the lateral or anterior portions of the ribs [2].

The clinical manifestations of spontaneous lung herniation are generally nonspecific and may include chest pain, dyspnea, and cough. On physical examination, the main findings may consist of localized swelling (bulging) and ecchymosis over the affected area. The bulge

often becomes more prominent during physical exertion or coughing, particularly with the Valsalva maneuver. Chest pain is most likely attributable to irritation of the parietal pleura. In some cases, unexplained elevations in non-cardiogenic creatine kinase (CK) levels accompanying chest pain have been reported, which may reflect injury to the thoracic musculature [1,2,6].

The diagnosis is established through a combination of physical examination and medical imaging. It may be challenging because the symptoms are nonspecific and can mimic other conditions such as pulmonary embolism, pneumonia, malignancies, lipomas, and subcutaneous emphysema [1,2,7]. On physical examination, a chest wall bulge that becomes more apparent with coughing and localized tenderness on palpation are important diagnostic clues. However, findings may not always be evident, and lung protrusion may only be palpable during the Valsalva maneuver [8].

Posteroanterior chest radiography has limited sensitivity, although findings such as a “lung beyond the rib” or a “lucent lung” sign may occasionally be observed [4]. High-resolution thoracic computed tomography and, when necessary, magnetic resonance imaging are considered the gold standard for evaluating the size of the defect, its relationship with adjacent structures, and potential complications [7]. In our case, no herniation was detected on the initial CT scan; however, repeat CT and MRI performed after symptom progression revealed a 9-cm defect. This underscores the importance of meticulous image interpretation, as also emphasized by Bresler et al. [8].

The therapeutic approach is determined by the patient’s symptoms, the size of the herniation, and the presence of associated complications. Although conservative management with observation and cough-suppressive therapy may be appropriate for small, asymptomatic cases, surgical repair is considered the standard of care for symptomatic or complicated herniations [2,4]. In the management algorithm proposed by Ugolini et al., the presence of pleural effusion is identified as an indication for surgical intervention [9].

In our patient, surgical repair via thoracotomy using a nonabsorbable polypropylene mesh was performed due to severe pain, the large size of the defect, and the potential risk of compression of intrathoracic organs; no postoperative complications were observed. Leivaditis et al. emphasized the importance of postoperative reha-

bilitation following successful surgical repair in a case of spontaneous lung herniation secondary to ventral rib dislocation [2]. Similarly, early mobilization and respiratory physiotherapy were implemented in our patient during the postoperative period.

In conclusion, spontaneous lung herniation should be considered in obese male patients presenting with non-specific symptoms such as acute-onset localized chest pain and chest wall swelling following severe coughing. Clinicians should be aware that herniation may be overlooked on initial imaging studies, and detailed reevaluation with computed tomography or magnetic resonance imaging is warranted in cases of clinical progression. Surgical repair represents a safe and effective treatment option for symptomatic patients, those with large defects, or cases accompanied by pleural effusion. With early diagnosis and appropriate surgical management, long-term outcomes are favorable and recurrence rates are low. This report highlights the potential for spontaneous intercostal lung herniation to be overlooked on initial imaging and underscores the importance of maintaining a high index of suspicion and performing repeat advanced imaging in patients with progressive symptoms, even in the absence of traditional risk factors. The primary learning point of this case is that spontaneous lung herniation may be missed on initial CT imaging, and repeat advanced imaging should be strongly considered in clinically progressive patients.

Declaration of conflicting interests

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding

The authors received no financial support for the research and/or authorship of this article.

Authors’ contribution

All authors contributed to the conception, data collection, writing, and final approval of the manuscript.

References

1. Detorakis EE, Androulidakis E. Intercostal lung herniation-The role of imaging. *J Radiol Case Rep* 2014; 8: 16-24.
2. Leivaditis V, Grapatsas K, Papatriantafyllou A, Koletsis EN, Charokopos N, Dahm M. Surgical Repair of Spontaneous Lung Herniation Induced by Vigorous Coughing: A Case Report and Literature Review. *Cureus* 2023; 15: e37325.

3. Seder CW, Allen MS, Nichols FC, Wigle DA, Shen KR, Deschamps C et al. Primary and prosthetic repair of acquired chest wall hernias: A 20-year experience. *Ann Thorac Surg* 2014; 98: 484-9.
4. Hamid M, Ghani AR, Ullah W, Sarwar U, Patel R. Spontaneous Lung Herniation Leading to Extensive Subcutaneous Emphysema, Pneumothorax, Pneumomediastinum, and Pneumopericardium. *Cureus*. 2018; 10: e2861.
5. Novakov I, Hadzhiminev V, Timonov P. Complicated spontaneous intercostal lung hernia-A rare clinical case. *Turk J Emerg Med* 2021; 21: 221-4.
6. Maeda T, Sato R, Luthe SK, Russell MC. Spontaneous Intercostal Lung Hernia. *Am J Med* 2017; 130: 399-400.
7. Ucgun A, Ozturk EK, Ozturk S. Spontaneous Chest Wall Hernias: Intercostal Lung Hernia and Inverted Intercostal Hernia. *Indian J Radiol Imaging* 2024; 34: 78133.
8. Bresler R, Rabadi T, Bellia K, Ogbunike J, Harris S. Spontaneous intercostal herniation of lung and pleural fluid. *Respir Med Case Rep* 2023; 46: 101925.
9. Ugolini S, Abdelghafar M, Vokkri E, Sharkey AJ, Fontaine E, Voltolini L et al. Case Report: Spontaneous lung intercostal hernia series and literature review. *Front Surg* 2023; 9: 1091727.

This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).