

A RARE COMPLICATION OF VATS: ACQUIRED INTERCOSTAL LUNG HERNIATION

VATS'ın Nadir Bir Komplikasyonu: Edinsel İnterkostal Akciğer Herniasyonu

Serkan UYSAL¹  Mesut Melih ÖZERCAN²  Yiğit YILMAZ¹  Ulaş KUMBASAR¹ 

¹ Department of Thoracic Surgery, Hacettepe University Faculty of Medicine, ANKARA, TÜRKİYE

² Department of Thoracic Surgery, Kırıkkale University Faculty of Medicine, KIRIKKALE, TÜRKİYE

ABSTRACT

Lung herniation is a rare condition defined as the protrusion of lung parenchyma through a defect in the thoracic wall. It is usually caused by trauma or iatrogenic factors. A 57-year-old male patient underwent thoracoscopic surgery for a solitary pulmonary nodule in the right upper lobe in 2017. He presented in late 2019 with a worsening cough and a painful bulging mass on the anterior chest wall. Computed tomography (CT) confirmed the diagnosis of lung herniation. Surgical repair was performed using a prosthetic mesh. The patient was discharged on the second post-operative day with complete resolution of symptoms. We present this case to highlight pulmonary herniation as a rare complication following video-assisted thoracoscopic surgery (VATS) and discuss it in light of recent literature.

Keywords: Lung herniation, VATS, complication

ÖZ

Akciğer herniasyonu, akciğer parankiminin göğüs duvarındaki bir defektten dışarı protrüzyonu olarak tanımlanan nadir bir durumdur. Genellikle travma veya iyatrojenik faktörlerden kaynaklanır. 2017 yılında sağ üst lobdaki soliter pulmoner nodül nedeniyle torakoskopik cerrahi uygulanan 57 yaşında erkek hasta; 2019 yılı sonlarında şiddetlenen öksürük ve ön göğüs duvarında ağrılı şişlik şikâyetiyle başvurdu. Bilgisayarlı tomografisi (BT), akciğer herniasyonu tanısını doğruladı. Prostetik yama (mesh) kullanılarak cerrahi onarım gerçekleştirildi. Hasta, semptomları tamamen düzelmiş olarak postoperatif ikinci günde taburcu edildi. Bu olguyu, video yardımlı torakoskopik cerrahi (VATS) sonrası nadir bir komplikasyon olan akciğer herniasyonuna dikkat çekmek ve güncel literatür ışığında tartışmak amacıyla sunuyoruz.

Anahtar Kelimeler: Akciğer hernisi, VATS, komplikasyon



Correspondence/Yazışma Adresi:

Department of Thoracic Surgery, Hacettepe University

Phone/Tel: +905324087481

Received/Geliş Tarihi: 28.11.2025

Dr. Serkan UYSAL

Faculty of Medicine, ANKARA, TÜRKİYE

E-mail/E-posta: drsuysal@msn.com

Accepted/Kabul Tarihi: 02.03.2026

INTRODUCTION

Lung herniation is defined as the protrusion of lung parenchyma through a defect in the thoracic wall and was first described by Roland in 1499.¹ It is most commonly secondary to trauma, previous thoracic surgery, or congenital defects. Spontaneous herniation is quite rare.² Although VATS is minimally invasive, port site complications can occur. In this report, we present a case of acquired lung herniation in a patient presenting with severe cough, pain, and bulging at the previous surgical incision site.

CASE REPORT

A 57-year-old male patient was admitted to our clinic with complaints of severe cough, pain, and a bulging mass at the site of a previous surgical incision, particularly triggered by coughing. His medical history included hypertension, chronic obstructive pulmonary disease (COPD), and peripheral artery disease. The pain had been present specifically for the past month.

In 2017, the patient underwent video-thoracoscopic wedge resection for a solitary pulmonary nodule in the right upper lobe, which was pathologically reported as a benign mesenchymal tumor. Physical examination revealed a healed surgical scar on the anterior axillary line at the 4th intercostal space, with a palpable bulge during coughing. Although, there was no recurrence of the nodule during the two-year follow-up and the patient remained asymptomatic during the initial postoperative period. A computed tomography (CT) scan performed in May 2019 revealed lung herniation, as shown in Figure 1. The patient was admitted to our clinic in November 2019 due to the exacerbation of symptoms over the last month. Given the progression of the hernia and the impact on the patient's quality of life, surgical repair was scheduled.

Surgical repair was planned. The operation was performed in the right lateral decubitus position under selective intubation. Following the incision, the lung was freed from adhesions and reduced into the pleural cavity. During the procedure, the 4th intercostal space was identified as the site of the defect. To avoid intercostal nerve entrapment and minimize the risk of chronic postoperative pain, forced primary rib approximation was intentionally avoided. Instead, the thoracic wall was significantly reinforced using a double-layer polypropylene (prolene®) mesh. This allowed for a tension-free repair while preserving the neurovascular integrity of the intercostal space.

The final position of the mesh after fixation with prolene sutures is demonstrated in Figure 2. A 24-Fr chest tube was inserted, and the layers were closed in anatomical planes. The post-operative course was uneventful. The chest tube was removed on the first post-operative day,

and the patient was discharged on the second post-operative day.

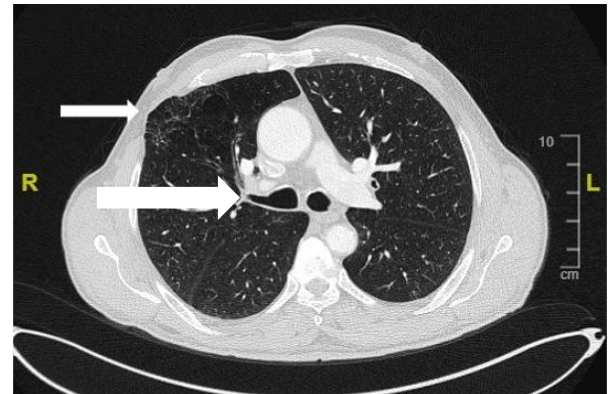


Figure 1: Chest CT revealed protrusion of a small part of the right upper lobe through the 4th intercostal space (white arrow)

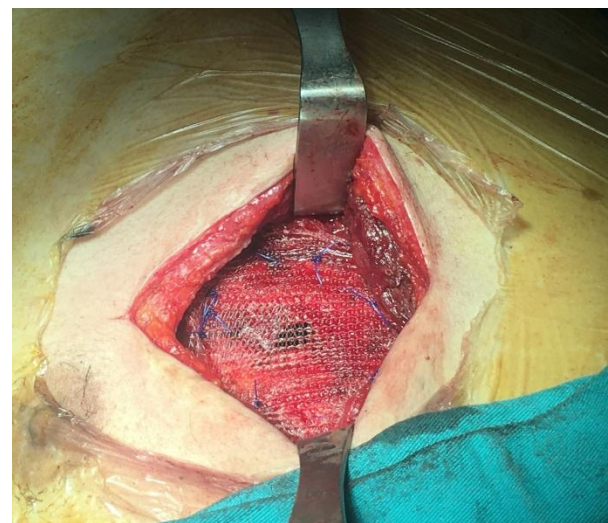


Figure 2: The thoracic wall was reinforced using a double-layer prolene mesh to prevent recurrence

DISCUSSION

Lung herniations are anatomically classified into three groups: diaphragmatic, thoracic, and cervical. Etiologically, they are categorized as either congenital or acquired. Acquired lung hernias occur four times more frequently than congenital ones.

Increased intrathoracic pressure and thoracic wall defects play a crucial role in the pathophysiology of lung herniations. Recent literature has further emphasized that improper chest wall closure combined with severe coughing are critical contributing factors, especially in minimally invasive procedures.³ This is particularly relevant in patients with COPD, where chronic cough exacerbates intrathoracic pressure.

The most common location for lung herniation is the anterior chest wall at the level of the 5th to 8th intercostal spaces due to the lack of external intercostal muscles in this region.⁴ While our patient presented with symptoms two years after surgery, the timeline of herniation can vary. A very recent case report (2025) described an acute intercostal pulmonary hernia

occurring as early as the fifth postoperative day following uniportal VATS, highlighting that this complication can manifest both acutely and chronically.⁵

Due to the rarity of the condition, there is no consensus on treatment. Sadler et al. suggested follow-up for asymptomatic hernias, while Berry et al. advocated for early surgical repair.^{4,6} Conservative management involves eliminating factors that increase intrathoracic pressure and applying chest compression.

Surgically, techniques vary from direct suturing to mesh reconstruction. Although a 2025 case series demonstrated the feasibility of suture-based rib approximation without mesh for certain minimally invasive surgery-related hernias, we preferred using a prosthetic mesh.⁷ This approach was chosen to ensure a tension-free repair and to reinforce the thoracic wall against the high intrathoracic pressures caused by the patient's COPD.⁸

The necessity of formal rib approximation during the closure of VATS utility incisions is still debated. In our clinical practice, we prioritize neurovascular preservation. Forced closure of the intercostal space can lead to intercostal nerve compression, a well-known cause of long-term post-thoracotomy pain syndrome. As seen in our case, especially in patients with high intra-abdominal pressure due to chronic cough or COPD, a tension-free mesh reconstruction offers a superior alternative to primary suturing by providing structural stability without neurological morbidity.

In our case, the patient experienced coughing episodes on a background of COPD. We believe that these episodes, combined with the iatrogenic defect between the 4th and 5th ribs from the previous VATS procedure likely contributed to the development of the lung herniation. The hernia, initially detected on CT in May 2019, was managed conservatively as the symptoms were mild. However, surgical intervention is preferred when symptoms affect the patient's quality of life. We recommend surgical repair with a prosthetic patch for symptomatic cases to prevent recurrence, supported by both classical and recent literature.

Conflict of Interest: The authors have no conflicts of interest to declare.

Researchers' Contribution Rate Statement:
Concept/Design: SU, MMÖ; Analysis/Interpretation: SU, MMÖ; Data Collection: SU, MMÖ; Writer: SU, MMÖ, YY, UK; Critical Review: SU, MMÖ, YY, UK; Approver: SU, MMÖ, YY, UK.

Support and Acknowledgement: No financial support was received from any institution or person.

Ethics Committee Approval: The patient provided written informed consent for the publication of this case report and any accompanying images.

REFERENCES

1. Munnell ER. Herniation of the lung. *Ann Thorac Surg.* 1968;5(3):204-212.
2. Athanassiadi K, Bagaev E, Simon A, Haverich A. Lung herniation: A rare complication in minimally invasive cardiothoracic surgery. *Eur J Cardiothorac Surg.* 2008;33(5):774-776.
3. Hasenauer A, Dambrosio A, Happ S, Christodoulou M. Postoperative residual pleural space: A risk factor for chest wall hernia after thoracoscopic surgery. *Am J Case Rep.* 2025;26:e947322.
4. Berry B, Ghazaleh D, Matar R, et al. Acquired intercostal lung herniation: Conservative management may lead to continuation of symptoms and other adverse consequences. *Gen Thorac Cardiovasc Surg.* 2020;68(4):403-407.
5. Huang S, Song X, Shi Q, Li J. Acute intercostal pulmonary hernia on postoperative day 5 following uniportal video-assisted thoracoscopic surgery: Successful emergency manual reinsertion case report and literature review. *Medicine (Baltimore).* 2025;104(42):e45420.
6. Sadler MA, Shapiro RS, Wagreich J, Halton K, Hecht A. CT diagnosis of acquired intercostal lung herniation. *Clin Imaging.* 1997;21(2):104-106.
7. Takahashi Y, Miyajima M, Maki R, et al. Suture-based rib approximation for the repair of minimally invasive surgery-related lung hernia: A case series. *J Surg Case Rep.* 2025;2025(7):rjaf518.
8. Hara R, Matsumoto K, Yamasaki N, et al. Two cases of lung herniation treated by surgery or observation. *Gen Thorac Cardiovasc Surg.* 2016;64(10):629-632.