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Lateral lung hernia following a low-energy trauma without bony injuries: A case report

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ABSTRACT

INTRODUCTION: Lateral lung hernias are rare, and a herniation of the lung is only reported in the context of high-energy trauma. The predilection site for lung hernias is the anterior thorax.

PRESENTATION OF CASE: We present the case of a 82-year-old male, who was admitted with dry cough, shortness of breath and breath-dependent left-sided chest pain after a fall. Chest X-ray suggested a pneumonia and subsequently the patient was treated with antibiotics. Due to persistent symptoms after 12 days a CT-scan was performed which showed an intercostal lung herniation without fractures. Surgeons were consulted and recommended an operative intervention. Intraoperatively the herniation could be confirmed and necrotic lung tissue was resected. The patient recovered well and was discharged after 10 days in good general condition.

DISCUSSION: Herniation of lung tissue occurs as a result of injured intercostal muscles in a sudden increase of intrathoracic pressure. Especially lateral herniation is rare because of the additional lateral reinforcement of the thoracic wall by the Serratus muscle. While a conservative approach is possible in asymptomatic hernias and small defect size, surgical intervention is indicated for larger hernias, possible incarceration of lung tissue with resulting infarction and symptoms like chronic pain or respiratory failure.

CONCLUSION: For an adequate differential diagnosis of thoracic pain with a history and external signs of a trauma, a CT imaging should be evaluated at an early stage even after a low-energy trauma. An operation is indicated for large defect size and persistent symptoms.

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1. Introduction

Herniation of the lung is a rare phenomenon [1,2] and defined as the protrusion of lung tissue and/or pleura through a defect of the thoracic wall. Approximately 50% of all herniations are of traumatic origin, while 20% are due to congenital defects and about 30% occur spontaneously. Acquired hernias are caused by a weakness of the intercostal muscles in combination with a sudden increase of intrathoracic pressure [3]. The main etiology of lung hernias is a high-energy blunt chest trauma, particularly following a traffic accident [4]. Complications after thoracotomies are possible as well [5]. Independent of origin the predilection site for lung hernias is the anterior thorax [6,7].

Clinical diagnosis is difficult because symptoms, such as a soft, pain-sensitive, subcutaneous mass, showing a breath-dependent expansion are difficult to detect. Therefore a chest X-ray may be

helpful, but an early CT scan is mandatory for correct diagnosis [1,8–10].

2. Case report

An 82-year-old male patient presented himself to the emergency room with dry cough, shortness of breath and breath-dependent left-sided chest pain. He reported a fall on his left side after stumbling three days prior to admission and complained about pain over the left thoracic wall. There was no evidence of an abdominal or head trauma. Past medical history was significant for arterial hypertension, deep-vein thrombosis (DVT), chronic renal failure and type II diabetes. Clinical examination revealed a large, painful left-sided ecchymosis on the level of the 9th rib (Fig. 1). Fine inspiratory left sided crackles could be auscultated. The patient had normal vital signs. The relevant laboratory findings were normal except for a slightly elevated CRP of 16 mg/l. Conventional chest X-ray showed a left-basal opacification, without evidence of pleural effusion, pneumothorax or bony injuries. (Fig. 2) At the time the patient's symptoms were interpreted as a left-sided pneumonia, and the patient was treated with antibiotics

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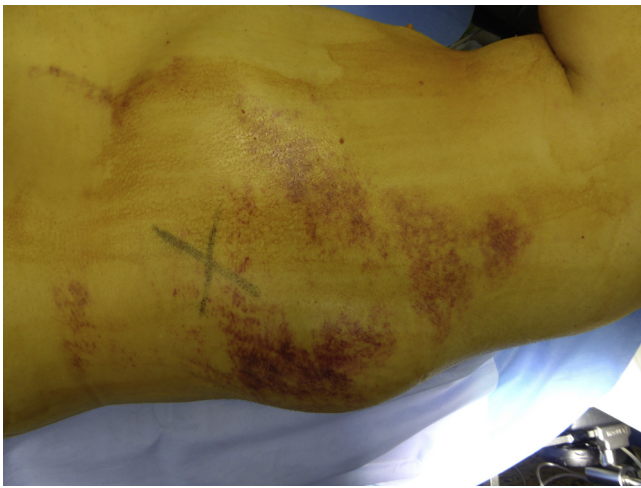


Fig. 1. This photograph shows a large subcutaneous ecchymosis on the patient's left lateral thorax before surgery.

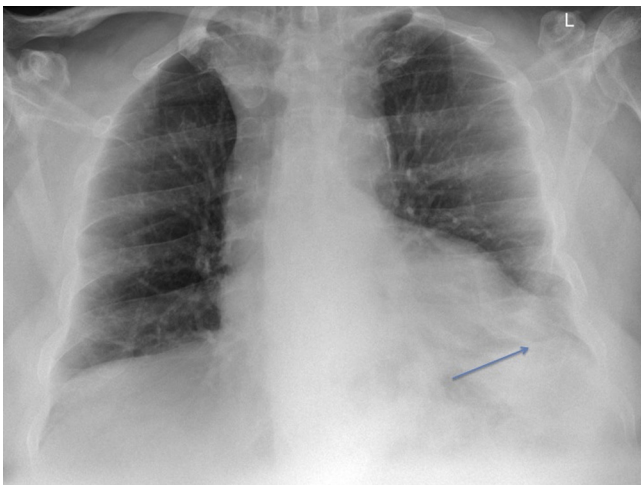


Fig. 2. The chest X-ray on admission shows a left basal transparency reduction (blue arrow).

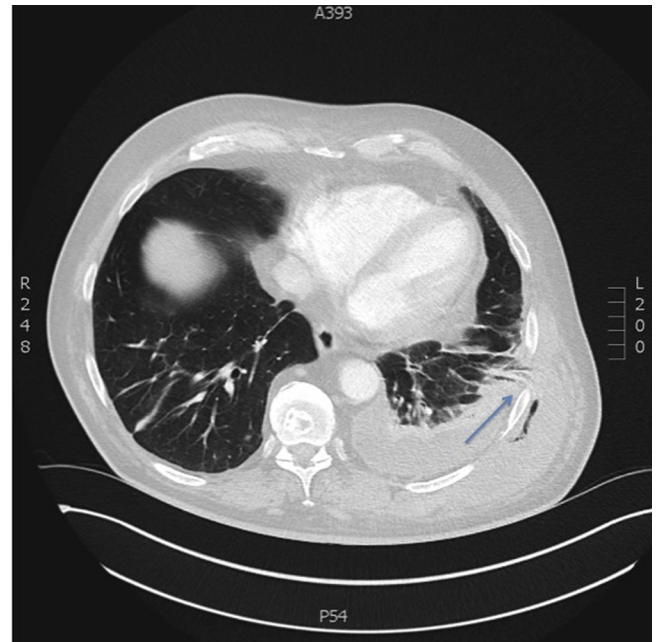


Fig. 3. The CT-scan on the 12th day following admission reveals a herniation of the lung through the left lateral chest wall between the 8th and 9th rib (blue arrow).

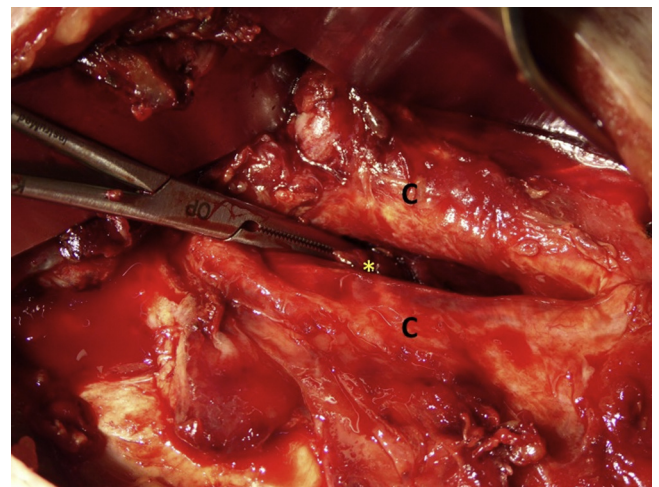


Fig. 4. This intraoperative photograph shows the intercostal gap (*) between the 8th and the 9th rib (C).

for a total of 10 days. Due to persistent pain, shortness of breath, an elevated CRP of 51 mg/l despite an adequate antibiotic therapy and a previous DVT, a CT-scan of the thorax was performed to exclude pulmonary embolism. It showed an intercostal lung herniation between the 8th and 9th rib with rupture of the intercostal muscles and soft tissue haematoma but no fractures. (Fig. 3)

After referring the patient to thoracic surgery, surgical intervention was recommended. The chest wall was explored using an open approach at the site of the suspected injury. A haematoma between the chest-wall muscles and ribs and a 5 cm long rupture of the intercostal muscles without any rib fractures or sternal lesions (Fig. 4) were identified. In the 8th intercostal space a herniated necrotic part of the left lower lung lobe was found. (Fig. 5) The existing intercostal opening was enlarged to explore the left pleural space and a wedge resection of the necrotic lung segment using a staple device was performed. After an uneventful postoperative course the patient was discharged home after 10 days in good general condition with a fully expanded lung on postoperative X-ray.

3. Discussion

Chest pain is one of the leading reasons for presentation to the emergency room, reaching up to 25% in the United States [11].

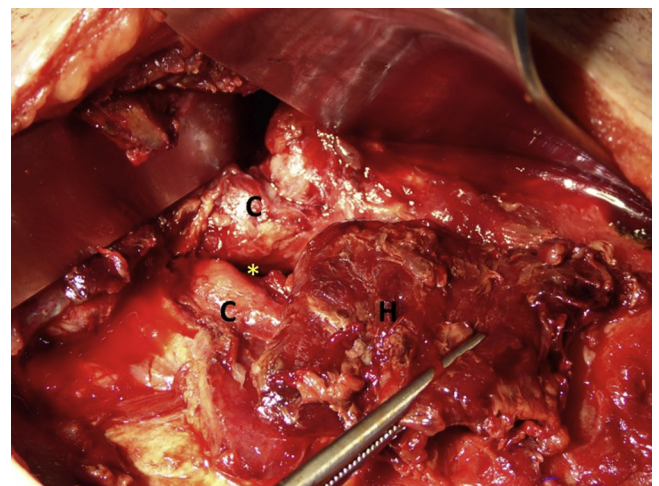


Fig. 5. This intraoperative photograph shows the herniated lung tissue (H) prolapsing through the intercostal gap (*) between the 8th and the 9th rib (C).

Although rare, a lung herniation should always be included in the differential diagnosis [12].

Herniation of lung tissue occurs as a result of injured intercostal muscles in a sudden or sustained increase of intrathoracic pressure. Especially lateral herniation is rare because of the additional lateral reinforcement of the thoracic wall by the Serratus muscle. The only case of lateral herniation found in the literature was caused by a high-energy motorcycle accident with multiple concomitant rib fractures [13].

In addition to the unusual localization in our case, the herniation followed a low-energy trauma, and surprisingly no bony lesions could be identified.

Beside definitive diagnosis, CT scan provides valuable information about the size of the intercostal opening of the chest wall and about the remaining structures of the thorax [13].

Due to the initial clinical and radiological diagnosis of pneumonia in this case, antibiotic therapy was begun and CT imaging and definite diagnosis were delayed. Considering that a large chest wall haematoma was identified on admission, relevant traumatic injuries should have been considered and CT-scan should have been requested at an earlier stage.

Management follows different criteria. A conservative approach with cough medication and thoracic strapping is possible in asymptomatic hernias and small defect size due to possible spontaneous reposition [2,13]. Surgical intervention is indicated for larger hernias, possible incarceration of lung tissue with resulting infarction and symptoms like chronic pain or respiratory failure [2]. In our case, surgical treatment was justified due to the lack of clinical improvement and signs of infection. Moreover conservative management would have been unsuccessful because of the necrotic lung tissue found during surgery.

4. Conclusion

For an adequate differential diagnosis of thoracic pain with a history and external signs of a trauma, CT imaging and surgical consultation should be evaluated at an early stage even after a low-energy trauma. Surgical management of herniated lung tissue is recommended for persistent symptoms and large defect size.

Conflicts of interest

The authors have no conflicts of interest.

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Ethical approval

None.

Consent

We obtained a written consent by the patient which can be forwarded to the editorial office if requested.

Authors' contribution

A. Abu Tair: author of manuscript.

C. Kull: review of manuscript.

R. Rosenberg: review and correction of manuscript.

R. Mechera: conception and review of manuscript; responsible surgeon.

Guarantor

R. Mechera.

References

- [1] D. Weissberg, Y. Refaely, Hernia of the lung, *Ann. Thorac. Surg.* 74 (6) (2002) 1963–1966.
- [2] B. Francois, A. Desachy, E. Cornu, E. Ostyn, L. Niquet, P. Vignon, Traumatic pulmonary hernia: surgical versus conservative management, *J. Trauma* 44 (1) (1998) 217–219.
- [3] D.B. Hiscoe, G.J. Dugman, Types and incidence of lung hernias, *J. Thorac. Surg.* 30 (3) (1955) 335–342.
- [4] A. Arslanian, A. Oliario, G. Donati, P.L. Filosso, Posttraumatic pulmonary hernia, *J. Thorac. Cardiovasc. Surg.* 122 (3) (2001) 619–621.
- [5] K. Athanassiadi, E. Bagaev, A. Simon, A. Haverich, Lung herniation: a rare complication in minimally invasive cardiothoracic surgery, *Eur. J. Cardiothorac. Surg.* 33 (5) (2008) 774–776.
- [6] J. Forty, F.C. Wells, Traumatic intercostal pulmonary hernia, *Ann. Thorac. Surg.* 49 (1990) 670–671.
- [7] L. Lang-Lazdunski, P.M. Bonnet, F. Pons, L. Brinquin, R. Jancovici, Traumatic extrathoracic lung herniation, *Ann. Thorac. Surg.* 74 (3) (2002) 927–929.
- [8] D. Tack, A. Wattiez, J.C. Schtickzelle, C. Delcour, Spontaneous lung herniation after a single cough, *Eur. Radiol.* 10 (3) (2000) 500–502.
- [9] M.V. Brock, R.F. Heitmiller, Spontaneous anterior thoracic lung hernias, *J. Thorac. Cardiovasc. Surg.* 119 (5) (2000) 1046–1047.
- [10] A. Getzoff, S. Shaves, Y. Carter, H. Foy, Traumatic lung herniation, *Am. J. Roentgenol.* 172 (4) (1999) 1032.
- [11] R. Niska, F. Bhuiya, J. Xu, National hospital ambulatory medical care survey: 2007 emergency department summary, *Nat. Health Stat. Rep.* 26 (2010) 1–31.
- [12] C.H. Choe, J.J. Kahler, Herniation of the lung: a case report, *J. Emerg. Med.* 46 (1) (2014) 28–30.
- [13] F. Petteruti, P. Pepino, G. De Luca, S. Griffo, L. Di Tommaso, P. Stassano, An unusual case of lateral pulmonary hernia, *J. Thorac. Cardiovasc. Surg.* 132 (1) (2006) 189–190.

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