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RESPIRATORY CASE REPORTS

Lung Hernia as a Rare Complication of Thoracic Surgery: A Case Series

Göğüs Cerrahisinin Nadir Bir Komplikasyonu Olan Akciğer Hernisi: Olgu Serisi

Serkan Bayram[1], Mustafa Akyıl[1], Deniz Gürer[2], Pelin Erdizci[1], Aysun Kosif[1], Ayse Eece Yucel[1], Çağatay Saim Tezel[3], Volkan Baysungur[1]

Abstract

The four cases presented here reveal the possibility of herniation in the lung from defects in the chest wall following surgical procedures. A review was made of four cases who developed cough and a visible swelling of the chest wall after surgery between February 2009 and June 2017. Lung hernia is a rare condition that is most commonly associated with trauma rather than thoracic surgery. In the four presented cases, the herniation occurred following thoracotomies in two cases, VATS in one case and tube thoracostomy in one case. All cases had an intercostal localization. Aside from one patient who was at risk of pneumothorax, all patients were operated after being followed up with a pressure dressing for two weeks. No postoperative complications occurred other than in one patient who was using methotrexate, and this patient was discharged without complications after myoplasty. Lung herniation is a rare complication of thoracic surgery and should always be kept in mind. Symptomatic surgery results are encouraging from the perspectives of pain and aesthetics.

Key words: *Lung herniation, iatrogenic, complication.*

Öz

Sunulan bu olgular, cerrahi işlemler sonrası göğüs duvarındaki bir defektten akciğer hernisi olabileceğini göstermeyi amaçlamıştır. Şubat 2009 ile Haziran 2017 arasında, ameliyattan sonra öksürük ve göğüs duvarında gözle görülür şişlik gelişen dört hasta incelendi. Akciğer hernisi, göğüs cerrahisinden ziyade en sık travmaya bağlı görülen nadir bir durumdur. Olgularımızda iki torakotomi, bir VATS ve bir tüp torakostomide herniasyon görüldü. Olguların tamamı interkostal yerleşimliydi. Pnömotoraks riski taşıyan bir hasta dışında tüm hastalar iki hafta baskılı pansuman ile takip edildikten sonra ameliyat edildi. Metotreksat kullanan bir hasta dışında postoperatif komplikasyon görülmedi. Bu hasta miyoplasti sonrası komplikasyonsuz olarak taburcu edildi. Akciğer hernisi göğüs cerrahisinin nadir görülen bir komplikasyonudur ve daima akılda tutulmalıdır. Semptomatik cerrahi sonuçları ağrı ve kozmetik nedenler açısından cesaret vericidir.

Anahtar Sözcükler: *Akciğer hernisi, iyatrojenik, komplikasyon.*

[1]Süreyyapaşa Chest Diseases and Thoracic Surgery Training and Research Hospital, İstanbul, Türkiye
[2]Medikal Park Mersin Hospital, Mersin, Türkiye
[3]Liv Hospital, İstanbul, Türkiye

[1]Sağlık Bilimleri Üniversitesi Süreyyapaşa Göğüs Hastalıkları Ve Göğüs Cerrahisi Eğitim Ve Araştırma Hastanesi, İstanbul
[2]Medikal Park Mersin Hastanesi, Mersin
[3]Liv Hastanesi, İstanbul

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Correspondence (İletişim): Pelin Erdizci, Süreyyapaşa Chest Diseases and Thoracic Surgery Training and Research Hospital, İstanbul, Türkiye

e-mail: pelinerdizci@hotmail.com

Lung herniation is defined as the protrusion of the lung tissue surrounded by the pleura from a defect in the chest wall. The cases presented here show the possibility of lung herniation from a defect in the chest wall following minor or major surgical procedures such as thoracotomy, video assisted thoracoscopy (VATS) or even tube thoracostomy.

CASE

Case 1: A 66-year-old male patient was admitted to our clinic with a seroma on the incision line and a mass causing swelling outside the thoracic wall from the same location upon Valsalva maneuver after a neurogenic tumor excision with a right thoracotomy 6 months earlier (Figure 1). An image compatible with a pulmonary hernia was detected to which we applied conservative treatment with a pressure dressing for two weeks. A revision decision was made after the patient reported no regression in the complaint and that the pain and swelling were increasing. The old incision line was opened, the layers in the anatomical plan were crossed, the ribs in the area in which the defect was detected were approximated and repaired with a prolene patch, and a thorax tube was placed and closed. The drain of was terminated in the absence of complications on follow-up on the first postoperative day, and the patient was discharged with recovery on the second postoperative day.

Case 2: A 42-year-old male patient with a history of methotrexate use for the treatment of rheumatoid arthritis presented with a soft mass that expanded outwards with coughing on the old incision line and pain in the same area after an operation one month earlier. In the patient's history, empyema had developed one month after a tube thoracostomy due to a pleural effusion, for which he underwent decortication with a right thoracotomy. There was no improvement after two weeks of conservative treatment with a pressure dressing and so surgery was decided in which a polytetrafluoroethylene (PTFE) patch was used to repair the chest wall defect. In the second postoperative week, infection developed at the incision area due to steroid therapy for underlying rheumatoid arthritis, due to steroid therapy for underlying rheumatoid arthritis, due to steroid therapy for underlying rheumatoid arthritis, and myoplasty was performed using the latissimus dorsi muscle along with an appropriate antibiotherapy. The patient was discharged on the 14th day following the revision.

Figure 1: *Image of Case 1 before revision, normal and swelling due to lung tissue protruding out of the thorax with coughing*

Figure 2: *Inspiratory and expiratory images of Case 3*

Case 3: A 45-year-old male patient who had been followed for chronic obstructive pulmonary disease (COPD) for many years and had undergone a left tube thoracostomy due to secondary pneumothorax developed swelling and pain two years later at the old incision that became evident with coughing (Figure 2). Direct chest radiography and thorax CT examinations were performed (Figure 3) and a bulla on the left pleural wall was detected protruding from the intercostal space in which a tube thoracostomy was performed. Surgery was preferred over conservative treatment due to the risk of pneumothorax. The defect was repaired primarily by not using a patch. A 32 F thorax tube was placed and the thorax was closed. On the second postoperative day, the drain was terminated and the patient was discharged without complications.

Case 4: A 46-year-old male patient was admitted to our clinic with complaints of pain, cough and swelling in the right chest, four years after a right VATS thymectomy. Physical examination and thorax imaging revealed a hernia of lung tissue from the auxiliary incision line to the outside of the thorax. Conservative treatment was applied for two weeks involving a pressure dressing, and surgery was subsequently planned due in the absence of the expected improvement. The herniated lung tissue was replaced with an incision made above the swelling, and the defect in the rib area was repaired with a polytetrafluoroethylene (PTFE) patch (Figure 4). The procedure was terminated without placing a drain. The patient was discharged on the second postoperative day without complications.

DISCUSSION

We analyze here four cases who applied to our clinic with complaints of external swelling and cough at the incision line on the chest wall after thoracic surgery. Of the four patients, who were aged 42–66 years, two had a thoracotomy, one had VATS and one patient had a history of tube thoracostomy. The mean operation time was 30 minutes; no preoperative complications developed in any of the cases; the mean hospital stay was four days; no complication developed in any of the cases except one during postoperative follow-up; and all four cases were discharged with full recovery after treatment.

There are few reports in the literature addressing the issue of lung herniation. The condition was first defined by Roland, and classified according to pathology and localization by Morel-Lavallee in 1847. The most common forms are iatrogenic herniations, as in the four cases presented here. The acquired form is categorized into four groups as pathological, spontaneous, traumatic and iatrogenic. Intercostal defects are prominent and can often be seen following surgical interventions such as thoracotomy, tube thoracostomy or video-thoracoscopy, less frequently as penetrating traumas, and rarely as a result of blunt trauma (1). In blunt and high-energy traumas, lung herniation from the anterior chest wall, in which strong muscle support is lacking, is more common in cases of multiple rib fractures and fractures in the sternocostal region (2-5). Lung hernias seen following penetrating traumas or after thoracotomy or video-assisted thoracoscopic surgery (VATS) develop in the long or short term, and can often be attributed to ineffective closure of the ribs or weakness in the intercostal muscle tissue (6). In symptomatic cases, the most common complaint is pain followed by aesthetic concerns and body image disorder. Dyspnea and hemoptysis are rare symptoms, and asymptomatic cases can also be encountered. The specific finding upon physical examination is palpation of a mass protruding from the thorax with coughing that expands with the cough. Although rare, complications include incarceration, hemoptysis, pneumothorax and recurrent infections. For the treatment of lung hernia, both surgical and conservative treatments are recommended, and spontaneous recovery is not possible. Symptomatic patients often require surgical treatment due to the risk of incarceration of the pulmonary parenchyma, while asymptomatic cases can be followed up with pressure dressings (1,3-7).

Our preference is to first try conservative treatment involving a pressure dressing for two weeks in cases of lung hernia, however the lack of response to conservative treatment in three of the cases we present here led to surgical treatment. Since there was a high risk of pneumothorax in one case, we decided to operate without first trying conservative treatment. Literature includes a case of pulmonary hernia who underwent emergency surgery due to incarceration (8).

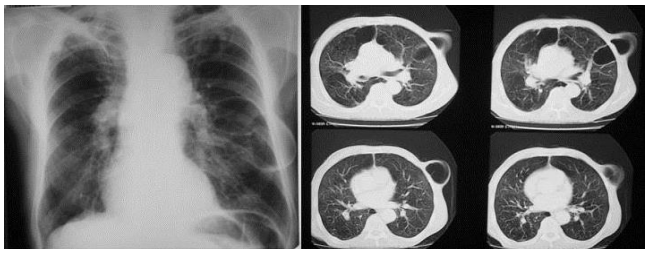

Figure 3: *CT section of Case 3 showing PA Chest X-ray and bulla hernia*

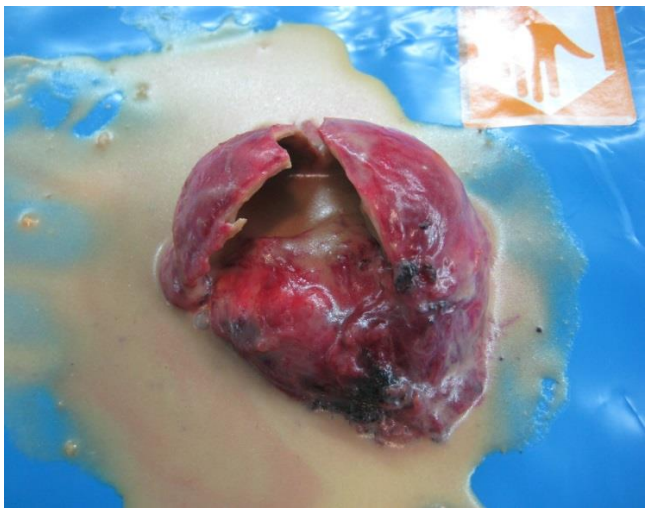

Figure 4: *The excised surgical material in Case 4*

The criteria for surgical repair are persistent symptoms or the development of complications. Surgery should be considered in patients with severe pain and cosmetic concerns, despite the application of a pressure dressing to the herniated area. The main principles in revision are the reduction of the herniated lung tissue, removal of intrathoracic adhesions and firm approximation of the ribs. In case of complications, a wedge resection of the lung parenchyma may rarely be required. Prolene mesh and PTFE mesh are the most preferred options for defect repair (9).

Although there is a dearth of information in literature on the methods and materials to be used for chest wall repair in lung hernia, publications on chest wall reconstructions have guided the selection of methods and materials to be used. Appropriate and patient-customizable materials should be preferred to ensure chest wall stability, to protect organs and muscle function, and to minimize the risk of infection. Polyglactin (Vicryl, Ethicon Inc., Somerville), polypropylene (Davol, Warwick; Prolene, Ethicon Inc., Somerville) and polytetrafluoroethylene (DUALMESH, W.L. Gore & Associates, Flagstaff) are materials that preserve muscle function, are customizable to the patient, and have a low risk of infection, making them superior to methylmethacrylate, nylon, silastic and silicone (10). Our facility uses PTFE mesh, based on clinical experience and literature. In Case 2, who underwent decortication for empyema, complications developed although PTFE mesh had been preferred due to the lower foreign body reaction and lower risk of infection, and it was necessary to perform myoplasty involving the removal of the PTFE mesh. In this case, we believe it due to the methotrexate use for the treatment of advanced stage rheumatoid arthritis, the infection could be brought under control in a very long time.

We have treated pulmonary hernias in four patients in our five-year clinical experience. While being very rare, lung hernia can have serious consequences, such as incarceration, pneumothorax and infection, and as in one of the cases presented here, can be seen even after tube thoracostomy. Furthermore, some risk factors of lung herniation following VATS procedures have been identified in literature, such as opening of an intercostal space larger than the skin incision, emphysema, chronic cough, weakness of the chest wall muscles and improper closure of the incision (7). Although taking precautions against these risk factors should be treated as a priority, when a lung hernia develops, when there is no response to conservative treatment or in emergency cases, repairs can be made very easily with prolene or PTFE mesh, as a practical and effective approach that responds positively to the expectations of the patient.

CONFLICTS OF INTEREST

None declared.

AUTHOR CONTRIBUTIONS

Concept - S.B., M.A., D.G., P.E., A.K., A.E.Y., Ç.S.T., V.B.; Planning and Design - S.B., M.A., D.G., P.E., A.K., A.E.Y., Ç.S.T., V.B.; Supervision - S.B., M.A., D.G., P.E., A.K., A.E.Y., Ç.S.T., V.B.; Funding - A.K., A.E.Y., V.B., Ç.S.T.; Materials - S.B., M.A., D.G.; Data Collection and/or Processing - P.E., M.A., S.B., D.G.; Analysis and/or Interpretation - D.G., P.E., Ç.S.T.; Literature Review - A.K., A.E.Y., V.B.; Writing - S.B., P.E., V.B.; Critical Review - A.K., A.E.Y., M.A., Ç.S.T.

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