Simultaneous Bilateral Spontaneous Pneumothorax: A Rare Emergency Clinical Condition

Eş Zamanlı Bilateral Spontan Pnömotoraks: Nadir Acil Bir Klinik Durum

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Abstract

Objective: Spontaneous pneumothorax is a disease that may cause serious respiratory distress and can be a life-threatening condition. A total of 1.3% of all spontaneous pneumothorax cases are simultaneous bilateral spontaneous pneumothorax (SBSP). In this study, because of its rarity, we discuss SBSP cases in light of previously reported cases.

Materials and Methods: Between January 2004 and December 2009, SBSP was detected in five patients.

Results: All patients were male, and the mean patient age was 18.6 (between 16 and 22 years of age). All patients had various degrees of dyspnea and chest pain. All diagnoses were established by chest X-rays. Two patients (40%) had primary spontaneous pneumothorax (PSP), and three (60%) had secondary spontaneous pneumothorax (SSP) (two patients had silicosis, and one had Staphylococcus aureus pneumonia). Previously, bilateral tube thoracostomies were performed on all patients. One PSP patient had a left apical pleurectomy with axillary thoracotomy; the other had a right apical pleurectomy. Tetracycline pleurodesis was performed on one of the silicosis patients. No additional surgical procedure or pleurodesis was performed on the other silicosis patient or on the pneumonia patient. No recurrence of pneumothorax was observed in any patient.

Conclusions: SBSP could be a life-threatening condition; therefore, urgent diagnosis and appropriate treatment of this condition can save patients’ lives.

Key Words: Primary, secondary, simultaneous bilateral spontaneous pneumothorax

Introduction

Spontaneous pneumothorax is a type of pneumothorax that occurs spontaneously, in the absence of iatrogenic or traumatic factors. PSP occurs with the rupture of subpleural apical blebs in the lungs of healthy people who have no additional lung disease. By contrast, SSP occurs in patients with an underlying lung disease that causes pneumothorax. PSP mostly affects young, thin males, whereas SSP mostly affects the elderly [1]. In the US, the incidence of PSP is 7.4/100,000 in men and 1.2/100,000 in women; the incidence of SSP is 6.3/100,000 in men and 2/100,000 in women [2]. SBSP is a rare condition and forms only 1.3% of all spontaneous pneumothorax cases [3]. In this study, five SBSP cases that we identified are presented and compared to other cases reported in the literature.

Materials and Methods

In the Thoracic Surgery department of the Faculty of Medicine of Ataturk University between January 2004 and December 2009, SBSP was detected in five patients. Patient age, gender, symptoms, underlying diseases, diagnostic methods, applied treatment methods, indications of surgical therapy, perioperative morbidity and mortality and recurrence of disease were retrospectively reviewed.

Results

All patients were male, and the mean age was 18.6 (between 16 and 22 years of age). All patients had various degrees of dyspnea and chest pain. In addition, two patients with silicosis had produc-
tive coughs, one experienced sweating, and the other experienced weight loss and malaise. All patients had histories of smoking. Diagnoses were established by chest X-ray in all patients. Two patients (40%) had PSP, and three (60%) had SSP (two patients had silicosis and one had Staphylococcus aureus pneumonia). Previously, bilateral tube thoracostomies were performed on all patients. Due to continuous leakage from the left chest tube in one PSP patient, a left apical pleurectomy with axillary thoracotomy was performed. Another PSP patient experienced continuous leakage from the right chest tube; therefore, a right apical pleurectomy was performed. Tetracycline pleurodesis was performed on one of the silicosis patients. No additional surgical procedure or pleurodesis was performed on the other silicosis patient or on the pneumonia patient (Table 1). Lung expansion was achieved by taking chest tubes with negative pressure. Pneumothorax recurrence was not seen in any patient. Posteroanterior chest radiographies of case 1 were shown in Figures 1-3.

Discussion

Although in clinical practice, spontaneous pneumothorax is a frequently encountered disease, SBSP is rarely reported in the literature. In SBSP cases, there is usually an underlying lung disease. Most SBSP cases are seen as a result of an underlying pulmonary disease, such as chronic obstructive pulmonary disease, malignant neoplasm or lung tuberculosis. Infrequently, SBSP may be caused by the pleural window communicating with the bilateral pleural spaces [4]. In the literature, SBSP reports are found along with malignancies [5]. Very few cases consist of primary SP cases. Between 1971 and 1990, Esther et al. [3] detected 5 cases of PSP and 7 cases of SSP in a total of 12 cases of SBSP. Five cases of SBSP were reported in our study; three patients had SSP and two had PSP. No cases were found in conjunction with malignancy.

Pleural involvement is rare in silicosis. Pneumothorax is the only known pleural complication in silicosis. Generally, pneumothorax is rare and unilateral. It frequently emerges during chronic silicosis and is accompanied by progressive massive fibrosis, which could be fatal. Pneumothorax is not common in acute or accelerated forms of silicosis; however, sporadic spontaneous pneumothorax cases have been reported in accelerated silicosis [6]. Iraj et al. [7] reported that in both acute and accelerated silicosis, there is a significant association between bullae and secondary spontaneous pneumothorax, and former bullae cause pneumothorax in silicosis. It is believed that silica crystals have the greatest pathogenicity when they are smaller than 1 cm in diameter [6]. Aerodynamic considerations have been reported as particulates enter and are retained in the upper lobes of the lung. Direct tissue damage by silica particles causes an imbalance between inflammatory response products, affecting the elasticity of the alveolar walls and formation of alveolar blebs in the upper lobes or some congenital defects. Thus, pneumothorax development can be seen in the dysfunction of type 2 cells [8]. As in our silicosis patients, serious systemic diseases could be present in SBSP cases, and respiratory stress could be life threatening [9]. For this reason, patients should be carefully evaluated and receive clear diagnoses. It is accepted that the rupture of subpleural emphysematous blebs located in the apex of the lungs causes PSP. It has been reported that spontaneous pneumothorax is seen more frequently in smokers than in nonsmokers. PSP is most frequently seen in people aged 20-29, whereas SSP generally occurs in the elderly. Although SSP was seen in three of our patients, they were young and had histories of smoking.

SBSP cases vary in clinical presentation. Patients may present alternating clinical signs and symptoms, ranging from mild dyspnea to cardiopulmonary failure [10]. Patients are usually admitted to the hospital with sudden onset of dyspnea and pleuritic chest pain on the side of the pneumothorax. Physical examinations can appear normal in minimal pneumothorax cases. Symptoms can be bilaterally equal. In patients with excessive pneumothorax, hyperresonance is detected with percussion, and breath sounds are diminished or lost. All of our patients had sudden onset of dyspnea and chest pain. Diagnoses are based on radiological findings. Chest radio-

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Table 1. Patient characteristics

<table>
<thead>
<tr>
<th>Case</th>
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<th>Primary diseases</th>
<th>Treatment</th>
</tr>
</thead>
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<td>19</td>
<td>M</td>
<td>-</td>
<td>Tube thoracostomy + Left Apical Pleurectomy</td>
</tr>
<tr>
<td>2</td>
<td>16</td>
<td>M</td>
<td>-</td>
<td>Tube thoracostomy + Right Apical Pleurectomy</td>
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<tr>
<td>3</td>
<td>19</td>
<td>M</td>
<td>Silicosis</td>
<td>Tube thoracostomy</td>
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<tr>
<td>4</td>
<td>22</td>
<td>M</td>
<td>Silicosis</td>
<td>Tube thoracostomy + Pleurodesis</td>
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<tr>
<td>5</td>
<td>17</td>
<td>M</td>
<td>Pneumonia</td>
<td>Tube thoracostomy</td>
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Figure 1. Posteroanterior chest radiography showing simultaneous bilateral pneumothorax in case 1
graphs form the basis of the radiological examination. Computerized tomography of the thorax is indicated to detect underlying causes of spontaneous pneumothorax [5, 10]. Even though pneumothorax is a relatively easily suspected disease based on a patient’s history and physical examination, a delay in hospital admission and radiological evaluation could cause a life-threatening condition due to the rapid decrease in breath sounds, respiratory difficulty, and decrease in oxygen saturation. In bilateral pneumothorax cases, diminished breath sounds in both lungs should not mislead the physician, and SBSP should be considered.

In the treatment of pneumothorax, the main aims are to achieve complete lung expansion and prevent a recurrence. There are different treatment modalities, ranging from observation to thoracotomy. These treatment modalities include needle aspiration, percutaneous catheter drainage, tube thoracostomy with chemical pleurodesis or without pleurodesis and video-assisted thoracoscopic surgery (VATS). Hatta et al. [11] immediately performed a bilateral tube thoracostomy on an 18-year-old SBSP patient. Afterward, they performed a thoracotomy with both axillary incisions and reported excellent results. Similarly, Ohara et al. [12] used the same procedure with an SBSP patient. Neal et al. [13] reported performing a bilateral bleb resection by median sternotomy. Today, VATS is accepted as a standard approach for the surgical treatment of spontaneous pneumothorax in most clinics. This surgical procedure causes smaller cosmetic scars. Compared to open thoracotomy, this procedure causes less postoperative pain. One of the important advantages of VATS is the ability to evaluate the entire thoracic area by video. If any underlying pulmonary disease is detected during surgical treatment, the existence of pleural communications should be investigated, and mediastinal pleura should be examined carefully [4]. Surgical treatment is recommended to reduce the risk of recurrence in SBSP treatment [4, 5]. Bullectomy is the most effective method for preventing recurrences. In addition, apical pleurodesis further reduces the risk of recurrence.

Chest drainage constitutes the basis of initial treatment, although there are several discussions in the treatment of SBSP [5, 10, 14]. Air leakage can be stopped in 5 hours in 52% and in 48 hours in 82% of patients with tube thoracostomies [15]. Prolonged air leakage is the most common indication for operation in the first attack. Most clinicians indicate to pass surgical treatment in cases of prolonged air leakage that last more than 7-10 days. There are some studies that indicate that air leakage absolutely needs to be stopped in 15 days, and the decision to operate would be made before the end of this period [16]. We also believe that initial drainage with a chest tube is an appropriate approach for SBSP patients. After relieving the patient clinically using a chest tube, a primary or secondary pneumothorax distinction can be made. Planning additional surgical procedures or pleurodesis according to the patient’s clinical presentation and underlying disease is more appropriate, in our opinion. In our study, immediate simultaneous bilateral tube thoracostomies were performed on all patients. In two PSP patients, mini axillary thoracotomies, on the side with air leakage, was performed due to continuing air leakage on the right or left chest tube. In both cases, apical subpleural blebs were detected, and apical pleurectomies and bleb resections were performed. With regard to the silicosis patients, their conditions were not suitable for surgery, so surgical interventions were not undertaken. Tetracycline pleurodesis was performed on one of the silicosis patients. Lung expansion was achieved by taking chest tubes with negative pressure.

In conclusion, SBSP is a rare clinical condition that frequently occurs as a result of underlying lung disease. Because the recurrence of SBSP is life-threatening, a treatment approach should be applied with the aim of preventing recurrence. Due to its life-threatening
nature, early diagnosis and appropriate treatment in SBSP cases can save patients’ lives. In SBSP cases, bilateral tube thoracostomy as the initial operation is an appropriate approach.

Conflict of interest statement: The authors declare that they have no conflict of interest to the publication of this article.

References