

ORIGINAL ARTICLE

Management Of Spontaneous Pneumomediastinum: Are Hospitalization And Prophylactic Antibiotic Treatment Necessary?

Spontan Pnömomediastinumun Yönetimi: Hastaneye Yatış Ve Profilaktik Antibiyotik Tedavisi Gerekli Midir?

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ABSTRACT

Aim: Spontaneous pneumomediastinum (SPM) is defined as the presence of free air in the mediastinum without concomitant disease. It is rare but usually benign and self-limiting. Usually, patients with SPM are hospitalized and sometimes prophylactic antibiotics are administered to prevent mediastinitis. The present study aims to describe the practices regarding the feasibility of outpatient treatment and follow-up of SPM and the necessity of prophylactic antibiotics.**Material and Method:** Patients with SPM between August 2020 and December 2023 were retrospectively evaluated. Patients who showed free air in the mediastinum on chest radiography or thorax computed tomography were considered to have SPM and were included in the study. All case records were analysed for demographic data, symptoms, precipitating events, diagnostic studies, prophylactic antibiotic use, length of hospitalization and complications.**Results:** Of 46 patients included in the study, 29 were male (63.1%) and 17 were female (36.9%). In terms of triggering events, 41.3% of patients (19 of 46) did not have a specific trigger (at rest). Suspected triggering events included asthma attacks, physical exercise, cough (with or without upper respiratory tract infection), sneezing, childbirth, shouting and sneezing. The mean duration of hospitalization was 2.4 days. Prophylactic oral antibiotherapy was administered to 18 patients. No patient developed complications such as tension pneumomediastinum, delayed pneumothorax, airway compromise and mediastinitis.**Conclusion:** SPM is a benign condition seen primarily in young adults with uneventful recovery. Our study supports the feasibility of outpatient treatment and follow-up in stable patients. However, in patients where the underlying disease requires special treatment and the possibility of mediastinitis or organ perforation cannot be excluded, further diagnostic work-up, prophylactic antibiotics and inpatient treatment are required.**Keywords:** Antibiotic, complication, hospitalization, spontaneous pneumomediastinum

ÖZ

Amaç: Spontan pnömomediastinum (SPM), eşlik eden bir hastalık olmaksızın mediastende serbest hava bulunması olarak tanımlanır. Nadirdir ancak genellikle iyi huyludur ve kendi kendini sınırlar. Genellikle SPM'li hastalar hastaneye yatırılır ve bazen mediastiniti önlemek için profilaktik antibiyotikler uygulanır. Bu çalışmanın amacı, spontan pnömomediastinumun ayakta tedavi ve takibinin uygulanabilirliği ve profilaktik antibiyotiklerin gerekliliği ile ilgili uygulamaları tanımlamaktır.**Gereç ve Yöntem:** Ağustos 2020 ile Aralık 2023 arasında spontan pnömomediastinumlu hastalar retrospektif olarak değerlendirildi. Göğüs radyografisinde veya toraks bilgisayarlı tomografisinde mediastende serbest hava görülen hastalar SPM olarak kabul edildi ve çalışmaya dahil edildi. Tüm vaka kayıtları demografik veriler, semptomlar, tetikleyici olaylar, tanı çalışmaları, profilaktik antibiyotik kullanımı, hastanede kalış süresi ve komplikasyonlar açısından analiz edildi.**Bulgular:** Çalışmaya dahil edilen 46 hastanın 29'u erkek (%63,1) ve 17'si kadındı (%36,9). Tetikleyici olay açısından hastaların %41,3'ünün (46'nın 19'u) belirli bir tetikleyicisi yoktu (dinlenme sırasında). Şüpheli tetikleyici olaylar arasında astım atağı, fiziksel egzersiz, öksürük (üst solunum yolu enfeksiyonu ile veya enfeksiyonu olmadan), hapsizme, doğum, bağırma ve hapsizme yer alıyordu. Ortalama hastanede kalış süresi 2,4 gündü. 18 hastaya profilaktik oral antibiyotik tedavisi uygulandı. Hiçbir hastada gerginlik pnömomediastinum, gecikmiş pnömotoraks, hava yolu tıkanıklığı ve mediastinit gibi komplikasyonlar gelişmedi.**Sonuçlar:** SPM, esas olarak genç erişkinlerde görülen ve sorunsuz iyileşen iyi huylu bir durumdur. Çalışmamız, stabil hastalarda ayakta tedavi ve takibin uygulanabilirliğini desteklemektedir. Ancak, altta yatan hastalığın özel tedavi gerektirdiği ve mediastinit veya organ perforasyonu olasılığının dışlanmadığı hastalarda, daha ileri tanı çalışmaları, profilaktik antibiyotikler ve yatarak tedavi gereklidir.**Anahtar kelimeler:** Antibiyotik, hastaneye yatış, komplikasyon, spontan pnömomediastinum

Introduction

Spontaneous pneumomediastinum (SPM) is defined as the presence of free air in the mediastinum without obvious comorbidity. It is rare, usually has a mild clinical course and is self-limiting. The pathophysiology of this disease is based on the pressure gradient between the alveoli and the lung interstitium. This pressure gradient can lead to alveolar rupture and consequent airflow

into the interstitium. Once entering the lung interstitium, air flows along the pressure gradient between the lung periphery and mediastinum towards the hilum and mediastinum (1).

Patients with SPM classically present with chest pain and dyspnoea. Chest pain is typically behind the sternum and radiates to the back and/or neck. Chest pain increases

with inspiration, sitting position and swallowing. Other frequently reported symptoms include cough, dysphonia, dysphagia and neck swelling. Chest X-ray is the first and most important investigation to be performed when a patient has symptoms and history suggestive of SPM. The role of chest computed tomography (CT) is not only to diagnose SPM but also, in many cases, to diagnose the underlying abnormality. Bronchoscopy or oesophageal endoscopy has an important diagnostic role in cases where tracheal or oesophageal pathology is considered (2).

Patients with SPM are generally, hospitalized, followed up and treated. Panacek et al. evaluated only three of 17 patients (17.6%) as outpatients (2). In retrospective studies on SPM, some authors reported a mean hospital stay of two to eight days (3,4). However, patients with benign and self-limiting SPM may not require hospitalization. Prophylactic antibiotics are occasionally administered to prevent mediastinitis in cases of SPM (5-7). However, prophylactic antibiotic coverage in SPM is a controversial issue. Therefore, the present study aimed to investigate the necessity of hospitalization and prophylactic antibiotic use in patients with SPM.

Materials and Method

We retrospectively evaluated 46 patients hospitalized in our thoracic surgery clinic between August 2020 and December 2023 in terms of SPM. Patients with free air in the mediastinum on chest radiography or thoracic CT were accepted as SPM and included in the study (Figures 1 and 2). Paediatric patients were also included. Patients with pneumomediastinum caused by tracheal or oesophageal perforation, iatrogenic factors (pneumomediastinum after thoracic or cardiac surgery), chest injuries, or any disease involving the neck or abdomen were excluded. All

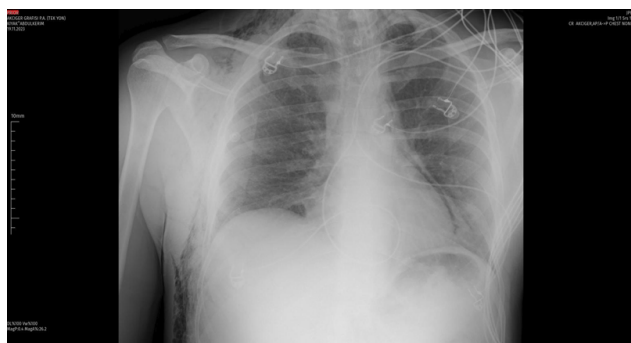


Figure 1. Pneumomediastinum on PA chest radiography case records were carefully reviewed, taking into account demographic data, symptoms, precipitating

events, diagnostic studies, prophylactic antibiotic use, length of hospital stay and complications. Complications included tension pneumomediastinum, pneumothorax, airway compression and mediastinitis.

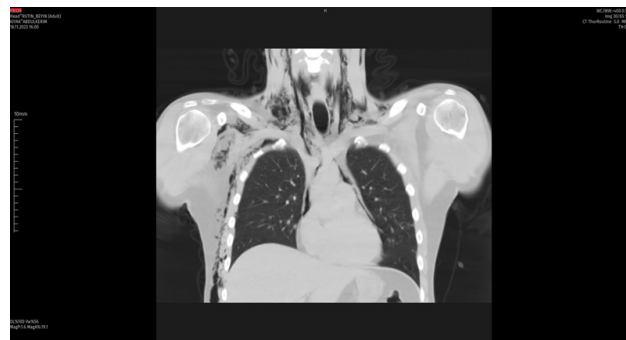


Figure 2. Pneumomediastinum on coronal section of Thorax Computed Tomography

Results

During the study period, 46 patients were included in the study [29 males (63.1%) and 17 females (36.9%)]; the mean age was found as 21.7 (13-36) years. All patients underwent chest radiography, while 34 (73.9%) patients underwent thoracic CT. Fibre optic bronchoscopy was performed in three patients and oesophagography in two patients, but no pathology was found in the oesophagus or tracheobronchial system. Chest pain was the most commonly reported symptom in 67.3% of patients (31 of 46), followed by dyspnoea in 26% (12 of 46) and sore throat in 19.5% (9 of 46). In terms of triggering events, 41.3% (19 of 46) of the patients did not have a specific triggering symptom (developed at rest). Asthma attack, physical exercise, cough (with or without upper respiratory tract infection), sneezing, labour, cold shower and sneezing were suspected triggering events. The mean duration of hospitalization was 2.4 (2-5) days. Eighteen of the patients (39.1%) received oral 1st generation cephalosporin (Cefazolin 1gr amp) type antibiotics due to asthma attacks and upper respiratory tract infection symptoms. Haemogram and biochemistry were performed on all patients during hospitalization. Infection parameters were also monitored in patients with an asthma attack and symptoms of upper respiratory tract infection. Mediastinitis was not observed clinically, laboratory and radiologically in any of the patients. None of the patients developed complications such as tension pneumomediastinum, airway pathology and mediastinitis. Minimal pneumothorax which did not require intervention developed in 2 patients. Recurrence was detected in

one of the patients on the 10th day after discharge, but since he was asymptomatic, he was followed up as an outpatient and no complication was detected (Table 1).

Table 1. Clinical and demographic characteristics of patients with spontaneous pneumomediastinum

Parameters	n (%)
Age (years)	21.7 (13-36)
Male	29 (63.1)
Symptoms	
Chest pain	31 (67.3)
Shortness of breath	12 (26.0)
Sore throat	9 (19.5)
Neck pain	5 (10.8)
Hoarseness	3 (0.6)
Triggering event	
At rest	19 (41.3)
Asthma attack	8 (17.3)
Exercise	8 (17.3)
Cough	5 (10.8)
Sneeze	2 (0.4)
Birth	2 (0.4)
Cold shower	1 (0.2)
No blowing the nose	1 (0.2)
Diagnostic examination	
PA chest radiograph	46 (100)
Thoracic CT	34 (73.9)
Bronchoscopy	3 (0.6)
Oesophagogram	2 (0.4)
Prophylactic antibiotics	18 (39.1)
Length of hospital stay	2.4 (2-4)
Complications	
Pneumothorax	2 (0.4)
Recurrence	1 (0.2)
Mortality	None

CT: Computed tomography, PA: Posteroanterior

Discussion

SPM was first described by Laennec in 1819 and further characterised in a case series by Hamman in 1939 (7). It is a rare condition with an incidence of 1:44,000 and usually follows a benign clinical course (4). SPM has been associated with triggering factors in approximately 75% of cases. The most common precipitating factors are cough, physical exercise and drug use (9). Triggering factors were present in 58.7% of our patients. Similar to previously reported cases, the most common triggers were asthma attacks, cough due to upper respiratory tract infection, and physical exercise.

There are several case series on SPM; however, only a few cases have shown poor outcomes. Takeda et al. suggest that two days may be an appropriate duration for observational hospitalization (5). On the other hand, Panacek et al. recommended

outpatient treatment and follow-up in stable patients (2). In our study, the main reason for hospitalization was the severity of the underlying disease, such as a severe asthma attack. Therefore, our results support the feasibility of outpatient treatment and follow-up in stable patients, as recommended in previous studies (2,4,6). Considering the benign nature of this condition, cases where the diagnosis is doubtful or the underlying disease requires specialised treatment should be considered for further diagnostic work-up and hospitalization. This would be a cost-effective approach.

It may be difficult to differentiate SPM from pneumomediastinum secondary to oesophageal perforation. Age over 40 years, history of severe vomiting, abdominal tenderness on physical examination, high white blood cell count, and findings of pleural effusion, marked atelectasis, pneumopericardium or pneumoperitoneum on CT scan are considered high-risk factors; therefore, when these findings are observed, patients with pneumomediastinum may require further diagnostic work-up and hospitalization (10).

Only a few small studies have reported complications in SPM cases. In a case series of 47 patients, Perna et al. reported right tension pneumothorax, mediastinal shifting and tracheal compression in 1 case, requiring right thoracotomy to open the mediastinal pleura (11). Bakhos et al. reported a case series consisting of 49 patients and reported that only 1 patient required intubation because of a severe asthma attack. However, mortality was not recorded in the study population (10).

In some previous studies, prophylactic antibiotics were recommended to prevent mediastinitis (5,6,12). In the study by Koullias et al., prophylactic antibiotics were administered to all patients (6). In our study, we administered prophylactic antibiotics to only 18 of 46 patients. Despite this, no patient developed infectious complications including mediastinitis.

Our study has limitations such as being retrospective, lack of statistical analysis and small number of patients.

Conclusion

SPM is a benign condition occurring primarily in young adults and is characterised by uneventful recovery. The likelihood of complications is low. Our study supports the feasibility of outpatient treatment and follow-up in stable patients. However, in patients in whom the

underlying disease requires special treatment and the possibility of mediastinitis or organ perforation cannot be ruled out, further diagnostic work-up, prophylactic antibiotics and inpatient treatment are required.

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