

Spontaneous pneumothorax. When and how to treat



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INTRODUCTION: *Spontaneous Pneumothorax, whether primary or secondary, may occur in patients with or without a history of pneumonic disease.*

AIM OF THE STUDY: *From 1992 to 2002, we treated 275 patients, 230 male and 45 female, in the department of Thoracic Surgery of the General Hospital of Nikaia-Piraeus.*

In this study the Authors report on the data concerning the frequency correlated with age, sex, causes, symptoms, as well as the ways of treatment, in order to compare them and their results with those recorded in Greek and international literature.

CONCLUSIONS: *It is made obvious by our material that only approximately 10% of patients suffering from spontaneous pneumothorax need surgery (thoracotomy), while the remaining patients can be managed with closed thoracic drainage or conservative treatment and monitoring.*

KEY WORDS: Closed thoracic drainage, Spontaneous pneumothorax, Thoracotomy.

Introduction

When air is present in the pleuric cavity, pneumothorax occurs. Spontaneous pneumothorax may be primary or secondary¹ (Tab. I).

The aim of this study is to present our experience from treating patients suffering from spontaneous pneumothorax from 1992 to 2002.

In case of a primary pneumothorax, the damage that mostly occurs is bubbles around the top of one or more lobes.

Air may leak automatically or after physical exercise (scuba diving, underwater fishing).

It occurs more often in young men and may afflict both sides. It may also be hereditary.

Any pneumonic cyst combined with a pleuric tear may cause secondary spontaneous pneumothorax. Chronic obstructive pneumopathy – emphysematic illness – is the most common cause².

Material and methods

The studied population consists of 275 patients, 230 male and 45 female, mean aged 37 years old (Fig. 1).

36 patients out of 275 (13.04%) received conservative treatment (oxygen administration, analgesic monitoring), while 239 (86.96%) were treated with closed thoracic drainage (Büllau) (Fig. 2).

27 patients out of 275 hospitalised were operated on (9.82%), i.e. 1 out of 10.

The pneumothorax was located on the right in 165 patients (60 %), on the left in 107 (38.91%), and on both sides in 3 (1.09%) (Fig. 3).

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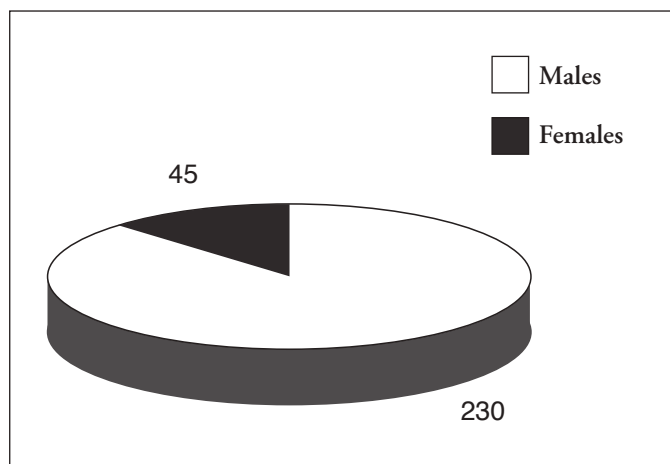


Fig. 1: Proportion of Males – Females patients.

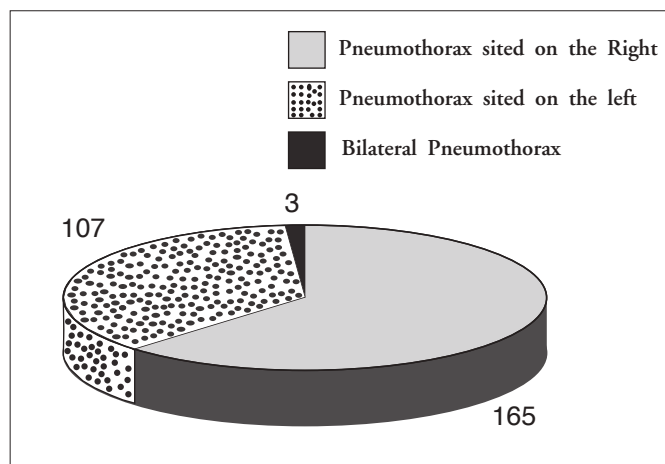


Fig. 3: Anatomic location of the Spontaneous Pneumothorax.

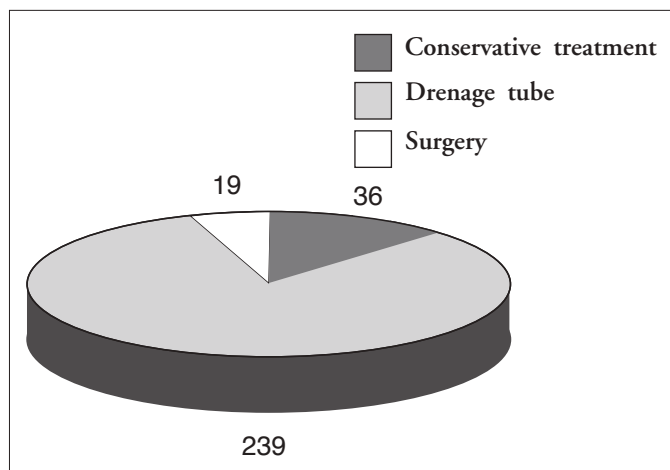


Fig. 2: Treatment of the Spontaneous Pneumothorax.

TABLE I – Classification of the Spontaneous Pneumothorax

PRIMARY

- Rupture of subpleural bullae

SECONDARY

- Emphysema – Chronic Obstructive Pulmonary Disease (COPD)
- Cystic fibrosis
- Spontaneous rupture of the esophagus
- Marfan's syndrome
- Eosinophilic granuloma
- *Pneumocystis carinii*, especially in patients affected from AIDS
- Metastatic cancer, especially Sarcoma
- Pulmonitis with pulmonary abscess
- Menstruation
- Asthma
- Lung Cancer
- Lenphangioleiomyomatosis

NEONATAL

Results

Our average patient was 37.06 years old (max 86, min 15), while the average hospitalisation period spanned 7.8 days (max 37, min 1).

Older patients had to be hospitalised longer. There is an important positive ratio between the patient's age and the duration of hospitalisation ($r = 0.209$, $n = 275$, $p < 0.001$).

28 of our patients relapsed two, three, or even four times. They were readmitted 69 times in total, 1 out of 4 having relapsed (25.09%). The total hospitalisation duration was 598 days, with an average of 21.35 days of hospitalisation.

Nineteen out of 28 patients were admitted twice (16 male and 3 female). Upon admission, closed thoracic drainage was performed on all of them. When they relapsed and had to be readmitted to the clinic, 1 patient was treated conservatively, while we used a pipe to drain the ailing hemithorax on the remaining 18.8 patients had to be operated on. There were no relapses. An elderly, 86-year old, man who could not be treated surgically due to old age, received a blood patch.

In Tab. II, it is shown that 6 male patients were admitted thrice each. 2 of them were operated on.

In Tab. III, it is shown that 3 male patients were admit-

TABLE II – Treatment of the Spontaneous Pneumothorax in Male patients who had 3 clinical admissions each

	Age	1 st Admission	2 nd Admission	3 ^d Admission
1.	28	D.T. R	D.T. R	Cons.R
2.	44	D.T. R	Cons.R	D.T. R + Surger. R
3.	77	D.T. L	D.T. L	D.T. L
4.	22	D.T. R	D.T. L	D.T. R
5.	21	D.T. L	D.T. L	Cons.L
6.	22	D.T. R	D.T. R	D.T. R + Surger. R

Legend: D.T.: Drainage Tube; Cons.: Conservative Treatment; Surger: Surgical Treatment; L: Left Side; R: Right Side.

TABLE III – *Treatment of the Spontaneous Pneumothorax in Male patients who had 4 clinical admissions each*

	Age	1 st Admission	2 nd Admission	3 ^d Admission	4 th Admission
I.	17	D.T. R	D.T. R	D.T. R+Surger. R	D.T. R
2.	26	Cons.L	D.T. L	D.T. L	D.T. L+Surger. L
3.	29	D.T. L	D.T. R	D.T. R	D.T. R+Surger. R

Legend: see Table II.

ted four times. All of them were surgically treated, two of them upon the forth admission. The third patient had been operated upon his third admission, but relapsed – he presented pneumothorax on the right side, the one we had treated. This relapse was managed with a pipe in the ailing hemithorax.

Discussion

Spontaneous primary pneumothorax occurs mostly in young people. It rarely occurs before puberty. It is more common in men than women in a 6:1 ratio, as is the case with smokers ¹.

The average patient is tall, thin, with narrow shoulders, having experienced a belated puberty or early maturity. The patient reports tightness and coughing, as well as tachycardia, sweating, low blood pressure and paleness. The clinical examination varies according to the severity of the pneumothorax. In case of a minor pneumothorax, the clinical findings may be misleading and a radiography of the thorax is necessary. Flatulence during percussion and reduction of respiratory whisper are typical of a major pneumothorax. In case of a pneumothorax under tension, the above-mentioned findings are still valid and elated, in addition to the displacement of the windpipe towards the healthy hemithorax, which becomes apparent in radiography, as well as with clinical examination during palpation of the shaft above the sternum.

The contribution of radiography is beyond dispute. Diagnosis can be made by viewing a thorax radiography taken in an upright position. A radiography taken in a semisupine position may not be suitable for the diagnosis of pneumothorax. If the patient is unable to stand erect, a lateral reclining radiography of the suspected ailing hemithorax can provide enough insight. Radiologists believe that a thorax radiography taken during a full inhalation will be more helpful as more air is kept in the pleural cavity, thus projecting the pneumothorax.

CT scanning can help detect a very small pneumothorax, that may be missed in a common radiography.

The treatment of spontaneous pneumothorax is referred in Table IV.

Small pneumothorax can be treated conservatively (administration of oxygen, analgesics, bronchodilators, and monitoring). It should also be noted that only 36 patients out of 375 (13.04%) were treated conservatively.

TABLE IV – *Means of treatment of the Spontaneous Pneumothorax*

- Conservative
- Needle Aspiration
- Air Drainage Tube connected to a Büllau dispositive ® Heimlich valve
- Thoracostomy Tube connected to a Büllau dispositive ® Heimlich valve
- Thoracostomy Tube connected to an equipment that generate continuous infusion of material who can provoke pleurodesis
- Thoracoscopy (VATS = Video Assisted Thoracic Surgery)
- Thoracotomy

TABLE V – *Indications for surgical treatment of the Spontaneous Pneumothorax*

- Insistent Air Leak
- Recurrent Pneumothorax
- First Episode to Patients with Previous Pneumonectomy
- First Episode to Patients with a High Professional Risk (miners, aviators, divers)

The British Thoracic Society suggests needle aspiration to get rid of the existing air. The British have been following this protocol since 1993, using a catheter even in relapsed pneumothorax cases.

Mendis ³ and his associates argue that the hospitalisation period of patients suffering from spontaneous pneumothorax and treated with needle aspiration is smaller than that of patients treated with closed thorax drainage. Noppen ⁴ and his associates advocate that the relapse percentage of patients treated with needle aspiration (26%) is smaller than that of patients treated with closed thorax drainage (27.3%). Harvey ⁵ shares this same view (17% and 29% respectively).

We treated 239 patients (86.96%) using closed thorax drainage. We reinstalled a pipe in relapsed patients. 2 patients out of 28 that relapsed 69 times in all were treated conservatively while the rest were treated surgically or using a pipe.

Only relapsed patients provided enough cause for surgery. In Tab. V we present the indications for surgery. 27 patients out of 275 hospitalised (9.82%, i.e. 1 out of 10) underwent surgery.

All our patients underwent a dorsolateral thoracotomy, including the removal of inflated cysts and bubbles, and pleurodesis. A 17-year old male patient suffered from right pneumothorax (in the hemithorax that had been treated) three months after the surgery (removal of inflated cysts and pleurodesis); he was successfully treated using closed thorax drainage.

A 35-year old female patient suffering from right spontaneous pneumothorax during her menses was initially treated using a pipe, and was urgently operated on (dorsolateral thoracotomy) the following day due to haemopneumothorax. The hemorrhage was brought under control (adhesion cauterisation). The large inflated cyst was

removed from the right upper lobe and pleurodesis was effectuated. She was released in full health 11 days later. Spontaneous pneumothorax is rare, especially in women^{6,7}. Spontaneous hemopneumothorax is even rarer. A 63-year old female patient suffering from a diagnosed endometrium cancer with metastases in the bones presented a left secondary pneumothorax, which was treated using a pipe. She died three days later. Hers was the only recorded death in our 10-year retrospective study. Spontaneous pneumothorax is an ailment usually treated with a closed thorax drainage pipe. The prognosis is very good.

Riassunto

INTRODUZIONE: Lo Pneumotorace Spontaneo (primario o/e secondario), può manifestarsi sia in pazienti con una anamnesi positiva per pregressa patologia polmonare, ma anche in quelli senza.

SCOPO DEL LAVORO: Dal 1992 fino al 2002, nel Dipartimento di Chirurgia Toracica dell'Ospedale Generale Statale di Nikaia – Pireo, gli Autori trattano 275 pazienti affetti di Pneumotorace Spontaneo, di cui 230 di sesso maschile e 45 di sesso femminile.

Gli Autori riportano la frequenza del Pneumotorace Spontaneo in rapporto all'età ed al sesso dei pazienti, ai fattori causali, alla sintomatologia soggettiva dei pazienti che ne sono affetti, ma anche alle diverse modalità di trattamento, allo scopo di paragonare i risultati osservati con quelli riportati alla bibliografia scientifica relativa, sia Greca che internazionale.

CONCLUSIONI: Dal materiale studiato deriva che solamente il 10% dei pazienti affetti da Pneumotorace Spontaneo hanno bisogno di un vero e proprio trattamento chirurgico (toracotomia), mentre per tutti gli altri, basta eseguire un drenaggio toracico a circuito chiuso oppure un trattamento del tutto conservativo associato ad un frequente loro monitoraggio clinico.

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