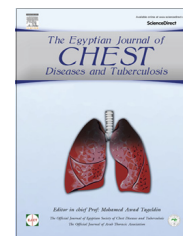


HOSTED BY



The Egyptian Society of Chest Diseases and Tuberculosis
Egyptian Journal of Chest Diseases and Tuberculosis

www.elsevier.com/locate/ejcdt
www.sciencedirect.com



Outcome of primary spontaneous pneumothorax: Could drug abuse have an effect?

Hend M. Esmaeel ^{a,*}, Rania A. Radwan ^b

^a Chest Department, Faculty of Medicine, Sohag University, Sohag, Egypt

^b Forensic Medicine & Clinical Toxicology Department, Faculty of Medicine, Sohag University, Sohag, Egypt

Received 9 August 2016; accepted 2 October 2016

KEYWORDS

Primary spontaneous
 pneumothorax (PSP);
 Drug abuse

Abstract *Background:* The progressively rising issue of drug abuse in Egypt among young adults could affect the outcome of a well known problem encountered in such age group as primary spontaneous pneumothorax (PSP).

Objective: To assess the impact of an oral drug abuse on the outcome of primary spontaneous pneumothorax.

Methods: This prospective observational study was conducted on 65 male patients, mean age 25.85 ± 5.08 , admitted to the inpatient chest department, Sohag University hospital with primary spontaneous pneumothorax, they were followed during their hospital stay and after hospital discharge for 6 months, in the period from February 2015 to June 2016, after written consent. All participants were subjected to thorough history taking, full clinical examination, chest X-ray and routine laboratory investigation. Toxicological screening for qualitative detection of drugs of abuse was done.

Results: Toxicological drug screening revealed positive results in 38.5% of cases. Length of stay was statistically significant longer in relation to smoking status and index which was not the case in estimation of length of stay in relation of drug abuse. Incidence of tuberculosis was significantly more within those patients with positive drug screen (40%) than those with negative screen (12.5%). Our observation is that drug abuse did not significantly affect the recurrence rate in the following 6 months.

Conclusion: Increased prevalence of drug abuse in Egypt may change the face of commonly diagnosed respiratory diseases in young adults as PSP.

© 2016 The Egyptian Society of Chest Diseases and Tuberculosis. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Abbreviations: PSP, Primary spontaneous pneumothorax; THC, Tetrahydrocannabinol.

* Corresponding author.

E-mail address: hendomr@gmail.com (H.M. Esmaeel).

Peer review under responsibility of The Egyptian Society of Chest Diseases and Tuberculosis.

<http://dx.doi.org/10.1016/j.ejcdt.2016.10.001>

0422-7638 © 2016 The Egyptian Society of Chest Diseases and Tuberculosis. Production and hosting by Elsevier B.V.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Please cite this article in press as: H.M. Esmaeel, R.A. Radwan, Outcome of primary spontaneous pneumothorax: Could drug abuse have an effect?, Egypt. J. Chest Dis. Tuberc. (2016), <http://dx.doi.org/10.1016/j.ejcdt.2016.10.001>

Introduction

Pneumothorax is defined as air in the pleural space—that is, between lung and the chest wall [1]. Spontaneous pneumothorax can be classified as either primary or secondary. Primary spontaneous pneumothorax (PSP), which is defined as a pneumothorax without underlying lung disease, predominantly occurs in young, thin males. It is usually caused by ruptured pleural blebs or bullae [2].

Psychoactive Substance (PAS) use is becoming commonly known for compromising the health and resulting in the death of millions of individuals every year. PAS include licit, illicit, and prescribed psychoactive medications [3]. In Egypt, drug dependence is considered one of the serious problems that worry both the people and government; however, epidemiological data on drug dependence are still few [4].

So we need special attention toward the growing problem of drug abuse and how it can not only be hazardous by itself but it can affect the outcome of other commonly diagnosed health issues in young population as spontaneous pneumothorax.

To our knowledge previous studies only referred either to traumatic pneumothorax due to attempted intravenous injection in the supraclavicular fossa, the so-called “pocket shot” [5] or to pneumothorax related to inhalational drugs, particularly crack [6].

Aim of the work

The aim of this study was to investigate the impact of an oral drug abuse on the outcome of primary spontaneous pneumothorax.

Subjects and methods

This prospective study was carried out on patients who admitted to the inpatient chest department, Sohag University hospital with primary spontaneous pneumothorax, they were followed during their hospital stay and after hospital discharge for 6 months, in the period from February 2015 to June 2016, after written consent.

Inclusion criteria

All patients admitted at chest department, Sohag university hospital with the diagnosis of primary spontaneous pneumothorax were included in the study period.

Exclusion criteria

Any patient with history suggestive of underlying lung disease or recent trauma was excluded.

All patients were subjected to:

- I. Full history taking and physical examination with recording of smoking status and smoking index, addiction history (regular and recent use of any illicit drugs). Main presenting symptom was also recorded.
- II. Plain Chest X-ray P-A view was done to confirm the diagnosis of PSP, size and side. It was also used to exclude the presence of underlying lung disease.
- III. Laboratory investigations:
 - (a) Routine laboratory investigations were done to all patients including complete blood picture, liver and kidney function.
 - (b) Repeated sputum analysis for acid fast bacilli (3 morning samples) was done for all patients.
 - (c) Urine samples were screened by dipstick test named ABON™ Multi-Drug which is a one step screening test panel used for qualitative detection of drugs of abuse which includes Tramadol, Opiate, tetrahydrocannabinol THC, Amphetamine, Barbiturate, Benzodiazepines. Only positive cases were confirmed by drug analyzer (Thermo Fisher CDx90).
 - (d) Pleural fluid analysis in any patient who developed pleural effusion after insertion of intercostal tube, pleural adenosine deaminase level and tuberculin skin test.

Statistical analysis

Data were analyzed using SPSS computer program version 22.0.

Quantitative data were expressed as mean \pm standard deviation, median and range. Qualitative data were expressed as number and percentage. The data were tested for normality using Kolmogorov–Smirnov test which significant the use of nonparametric tests as data weren't normally distributed. Nonparametric Mann–Whitney test was used for comparing two quantitative variables.

The Kruskal–Wallis test was used for comparison between more than two quantitative variables. Chi-Square test and Fisher's Exact test was used for comparison between qualitative variables. A 5% level was chosen as a level of significance in all statistical tests used in the study.

Results

This study included 65 male patients, their demographics, smoking status, smoking index and drug abuse history are shown in Table 1, it also shows that chest pain was a more common presenting symptom than dyspnea and the pneumothorax was mostly right sided and complete.

Results of drug screening are shown in Table 2, positive results found in 25 patients (38.5%) of cases. This means that 5 more patients discovered to have positive results in addition to the 20 patients who gave positive drug abuse history.

As regards outcome results, length of stay was recorded and compared according to smoking status, index and drug screening results (Table 3).

Table 4 shows that 10 patients out of 25 with positive toxicological screen proved to have active tuberculosis (40%) while only 5 patients out of 40 with negative screen found to have TB (12.5%). *P* value was significant. Note that all the five cases in the negative group and 8 cases in the positive group were diagnosed with tuberculous pleural effusion while the

Table 1 Demographic variables, smoking and addiction history ($N = 65$).

Variables	No. (%)
Age (Mean \pm SD)	25.85 \pm 5.08
<i>Smoking history</i>	
Current smoker	40 (61.5%)
None smoker	25 (38.5%)
<i>Smoking index</i>	
Severe	25 (38.5%)
Moderate	5 (7.7%)
Mild	10 (15.3%)
Non Smoker	25 (38.5%)
<i>Drug abuse history</i>	
Negative	45 (69.2%)
Positive	20 (30.8%)
<i>Presenting symptoms</i>	
Chest pain	50 (76.9)
Dyspnea	15 (23.1)
<i>Location of pneumothorax</i>	
Left	8 (12.3)
Right	57 (87.7)
<i>Type of pneumothorax</i>	
Complete	55 (84.6)
Partial	10 (15.4)

Table 2 Results of drug toxicological screening ($N = 65$).

Drug screening	No.	Percentage (%)
Positive	25	38.5
THC	12	18.5
Tramadol	8	12.3
Amphetamine	3	4.6
Benzodiazepine & barbiturate	2	3.1
Negative	40	61.5

remaining 2 cases in the positive group had positive smear pulmonary tuberculosis.

During the 6 month follow up period, recurrence was observed in 6 cases of the positive drug screen patients (24%) and in 12.5% in the negative group however the P value was not significant.

Distribution of the studied population in each drug group according to the diagnosis of tuberculosis is shown in Table 5.

Discussion

Primary spontaneous pneumothorax remains a significant global problem; it affects young healthy people with a significant recurrence rate [7]. In Egypt, another serious rising problems is drug dependence, it worries both people and government; however, epidemiological data on drug dependence are still few [4]. So we think that we need Specific attention towards the younger age of drug users and the effect of such drug abuse on other health problem that affect mainly young people such as PSP.

In the current study we included 65 patients; all were male, who admitted to the inpatient chest department, Sohag

Table 3 Length of stay according to smoking status, index and drug abuse results ($N = 65$).

	Mean \pm (SD)	Median (range)	P -value
<i>Smoking status</i>			
Current smoker ($N = 40$)	13.9 \pm (5.6)	13.5 (6–20)	0.000*
Mild ($N = 10$)	7 \pm (1.05)	7 (6–8)	
Moderate ($N = 5$)	10	10	
Severe ($N = 25$)	17.4 \pm (3.9)	20 (10–20)	
Non-smoker ($N = 25$)	6.8 \pm (1.8)	6 (5–10)	
<i>Drug abuse</i>			
Positive ($N = 25$)	11.8 \pm (5.9)	10 (6–20)	0.73
Negative ($N = 40$)	10.75 \pm (5.7)	9 (5–20)	

P -value was calculated by Mann–Whitney test.

* Statistically significant.

Table 4 Effect of drug abuse on incidence of tuberculosis and recurrence.

	Toxicological examination		P -value
	Positive	Negative	
<i>Tuberculosis¹</i>			
Positive ($N = 15$)	10(66.7%)	5 (33.3%)	0.01*
Negative ($N = 50$)	15(30%)	35 (70%)	
<i>Recurrence²</i>			
YES ($N = 10$)	5 (50)	5 (50%)	0.49
NO ($N = 55$)	20 (36.4%)	35 (63.6%)	

¹ P -value was calculated by Chi-Square test.

² P -value was calculated by Fisher's Exact test.

* Statistically significant.

Table 5 Distribution of the studied patients by drug type and diagnosis of tuberculosis.

Drug type	Tuberculosis		P -value
	Yes No. (%)	No No. (%)	
THC	8 (66.7)	4 (33.3)	0.000*
Tramadol	2 (25%)	6 (75%)	
Amphetamine	0 (0.0)	3(100)	
Benzodiazepine & barbiturate	0 (0.0)	2(100)	
Negative	5 (12.5)	35(87.5)	

* Statistically significant.

University hospital with primary spontaneous pneumothorax. Their mean age was 25.85. It is well known that PSP typically affects a young population and it is much more common in male. The male-to-female ratio ranges from 3:1 to as high as 6:1 [8].

As regards smoking status; 61.5% of our cases were current smokers. Cigarette smoking is known as a risk factor for PSP and the lifetime risk in healthy smoking men may be as high as 12%, as opposed to 0.1% in non smokers [9].

The smoking index was severe in more than half of the current smokers. This was in agreement with the observation that

the relative risk of PSP has been shown to exhibit a dose–response relationship with the quantity of cigarettes per day and the length of exposure, increasing more than 20 times in men who smoke one half pack per day and 100 times in men who smoke one pack per day compared to nonsmokers [10]. This may be explained by cigarette-induced pathologic changes in the small airways that might contribute to the development of local emphysema with consequent formation of bulla [11].

Chest pain was the presenting symptom in 84.6% of patients, while dyspnea only reported by 15.4% of them. This was close to previous estimation that the onset of PSP is characteristically associated with chest pain (81%) and dyspnea (39%) [10].

The prevalence of drug abuse in this study was 38.5%. The toxicological screen showed that THC the active ingredient in Hashish & Cannabis comes on top of the list (23.1%) followed by Tramadol (15.4%). In agreement with these results; a study of drug abuse among university students in Sohag University reported that the prevalence of THC use is the highest followed by Tramadol.

We found positive results for Amphetamine in 4.6% of cases and for Benzodiazepine & Barbiturates in 3.1%. Hamed et al. in Sohag city found that the prevalence of sedatives, hypnotics and stimulants was 10.5% [12].

As regards the outcome of the study population, all the patients were managed by insertion of intercostal tube under water seal. For management of persistent (drainage for > 10 days) pneumothorax, the use of pleuroscopy (direct or video-assisted) is of great value [13], however this was unavailable at our institute.

Length of stay was statistically significantly longer in relation to smoking status and index which was not the case in estimation of length of stay in relation to drug abuse as the difference between those with positive screen and negative screen as regards length of stay was not statistically significant.

Incidence of tuberculosis was significantly more within those patients with positive drug screen (40%) than those with negative screen (12.5%). 66.7% of THC positive result was found to have tuberculosis.

It is known that Cannabinoids can influence the immune network [14]. Even aspects of their immunomodulatory effects provide the basis for a context-dependent targeted therapeutic approach, thus leading to the possibility for the use of Cannabinoids in the treatment of inflammatory disease [15]. So the abuse of Cannabinoids may affect the immune defense by a method or another that can increase the susceptibility for pathological condition as tuberculosis.

During follow up period recurrence happened in 10 patients: 5 in the positive drug group and 5 in the negative group so unlike smoking which is a known risk factor for recurrence [16], our observation is that drug abuse did not significantly affect the recurrence rate in the following 6 months. Longer follow up period may be required to confirm these results.

Conclusion

This study highlights the fact that the seriously growing problem of drug abuse in Egypt can affect the outcome of

commonly encountered health issues in young people as PSP in addition of being hazardous by itself.

Detailed studies about the relation between drug abuse and incidence of tuberculosis in Egypt are advised.

Conflict of interest

There is no conflict interest.

References

- [1] R.W. Light, *Pneumothorax, Pleural Diseases*, third ed., Williams and Wilkins, Baltimore, 1995, pp. 242–277.
- [2] O.A. Abdala, R.R. Levy, R.H. Biliboni, H.D. Viso, M. de Souza, V.H. Satler, Advantages of video assisted thoracic surgery in the treatment of spontaneous pneumothorax, *Medicina (B Aires)* 61 (2) (2001) 157–160.
- [3] A.k. Biratu, F.T. Seyoume, A.Y. Dubi, Prevalence and factors determining psychoactive substance (PAS) use among Hawassa University (HU) undergraduate students, Hawassa Ethiopia, *BMC Publ. Health* 14 (2014) 1044.
- [4] H. El-Sawy, M. Abdel Hay, A. Badawy, Gender differences in risks and pattern of drug abuse in Egypt, *Egypt J. Neurol. Psychiatry Neurosurg.* 47 (3) (2010) 413–418.
- [5] K.A. McCarroll, M.H. Roszler, Lung disorders due to drug abuse, *J. Thorac. Imaging* 6 (1991) 30–35.
- [6] M.E. Seaman, Barotrauma related to inhalational drug abuse, *J. Emergency Med.* 8 (1990) 141–149.
- [7] J.-M. Tschopp et al, *Eur. Respir. J.* 46 (2015) 321–335.
- [8] M. Noppen, Spontaneous pneumothorax: epidemiology, pathophysiology and cause, *Eur. Respir. Rev.* 19 (2010) 217–219.
- [9] A.K. Ayed, S. Bazerbashi, M. Ben-Nakhi, et al, Risk factors of spontaneous pneumothorax in Kuwait, *Med. Princ. Pract.* 15 (2006) 338–342.
- [10] L. Bense, G. Eklund, L.G. Wiman, Smoking and the increased risk of contracting spontaneous pneumothorax, *Chest* 92 (6) (1987) 1009–1012.
- [11] V. Kumar, A.K. Abbas, N. Fausto (Eds.), *Robbins and Cotran Pathologic Basis of Disease*, seventh ed., Elsevier, Amsterdam, 2004, p. 717–22.
- [12] A.F. Hamed, A.H. Zarzor, A.I. Gunina, M.A. Abd El-Aty, Effects of school-based health education program on the prevalence of smoking and on some drug abuse among secondary school students in Sohag city, Master in Public Health, South Valley University, 2002, p. 98.
- [13] D. Weissberg, Y. Refaely, Pneumothorax. Experience with 1199 patients, *Chest* 117 (2000) 1279–1285.
- [14] T.W. Klein et al, The cannabinoid system and immune modulation, *J. Leukoc. Biol.* 74 (2003) 486–496.
- [15] J. Fernandez-Ruiz et al, Cannabidiol for neurodegenerative disorders: Important new clinical applications for this phytocannabinoid?, *Br J. Clin. Pharmacol.* 75 (2) (2013) 323–333.
- [16] H.L. Lippert, O. Lund, S. Blegvad, H.V. Larsen, Independent risk factors for cumulative recurrence rate after first spontaneous pneumothorax, *Eur. Respir. J.* 4 (3) (1991) 324–331.