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Brief communication - Thoracic general

Aluminium and primary spontaneous pneumothorax. A suggestive but unconfirmed hypothesis

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Abstract

A prospective case-control study was designed to confirm the higher plasma concentration of aluminium in primary spontaneous pneumothorax patients recently reported in literature. Ten consecutive patients with PSP entered the study. Comparison with the control group obtained from the database of the Pharmacology Department did not show any significant difference. The conclusion was that in patients with PSP from the Maritime Alps region aluminium concentration was not abnormal. Therefore, the study was stopped.
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Keywords: Pneumothorax; Aluminium; Video-thoracoscopy

1. Introduction

Surgical exploration of the lung does not reveal any anomaly in approximately 50% of patients with spontaneous primary pneumothorax [1]. In such a situation, etiology of pneumothorax remains uncertain. The presence of accompaining area of mesothelial hyperplasia of the visceral pleura, sometimes severe even in young people, could suggest a role of environmental dusts. Recently, a surprisingly higher plasma concentration of aluminium in Turkish patients having spontaneous pneumothorax has been reported in the on-line discussion of the Interactive Cardiovascular and Thoracic Surgery [2].

To verify these findings, a small prospective study enrolling patients from the French Maritime Alps region was started.

2. Materials and methods

At the University Hospital of Nice, a prospective study was started on February 2004, designed to include 10 consecutive patients hospitalised for surgical treatment of primary spontaneous pneumothorax. After their informed consent, they had aluminium tested in plasma the day before surgery. One control for each patient was found in the database of the Pharmacology Department, matched for age and sex and living in the same region. Plasma levels were compared by a Student *t*-test and differences were considered significant if $P<0.05$. The inclusion was closed on March 21st.

3. Results

Results showed no difference in aluminium level between pneumothorax patients (mean 3.83 ± 1.21 μg/l, median 4.08, SD 0.383) and the control group (mean 4.57 ± 1.8 μg/l, median 5, SD 0.569). Paradoxically, aluminium levels resulted higher in the control group but the difference was not significant ($P=0.19$, Table 1). Considered these preliminary findings, it was decided to stop the study.

4. Comments

The hypothesis that aluminium accumulation in the visceral pleura could explain mesothelial hyperplasia often found in the apical region of the upper lobe, usually around blebs, was very attractive but it was not confirmed by our results.

Why such a difference from Han's results [2]? In our opinion, it is probably due to a different environmental exposure, considering that in both series no patient had exposure due to professional reason. Concerning higher

Table 1
Results from our study did not confirm the higher plasma level of aluminium in pneumothorax patients reported recently by Dr Han

Study	*n*	Alum./controls	Alum./pnx	*P*
Leo	20	4.57 ± 1.8	3.83 ± 1.21	0.19
Han [2]	60	2.66 ± 0.81	18.43 ± 14.63	<0.001

The most probable explanation is a difference in the environmental exposure between the two populations.

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levels in control patients, it is probably related to the fact that they were selected mainly from a gastroenterology subgroup of patients. It is logical to assume that their consomption of aluminium hydroxide or phosphate was higher than in the pneumothorax group.

Even if the role of aluminium is not confirmed, the idea to keep on searching on pneumothorax pathogenesis is important, trying to explain Vanderschueren class I pneumothorax [3]. Do other particles play a role in such a condition? Can minimal amiante accumulation justify visceral pleural hyperplasia and minimal air leak? The way is still long to go.

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Appendix A. ICVTS online discussion

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eComment: Firstly, I am pleased to see your interest in this subject. Our study is being continued and the number of patients is still 51. The average aluminium level is 22 ± 2 for this patient number. In my opinion, environmental factors may be important for this study. Further research into this topic is necessary and our clinic will try to complete this study.

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