

Influence of Environmental Factors on the Primary Spontaneous Pneumothorax

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Pneumothorax is the presence of air between the two pleural effusions, making the pleural space from a virtual cavity to a real one. At present, we are facing a particular phenomenon: trying to establish with certainty the mechanisms underlying the occurrence of primary spontaneous pneumothorax and how to find and implement the best strategies for the application of treatment methods. Considering the classical conception that the incidence of spontaneous pneumothorax has a seasonal variability, we followed its distribution after the season, calendar month, by checking the statistical significance of the data obtained. Regardless of the dynamics factor involved and the likely mechanism of action, it seems to have an influence on the average duration of hospitalization and the length of time elapsed from intervention to discharge.

Keywords: Primary spontaneous pneumothorax, pleura, etiopathogenesis

Pneumothorax is the presence of air between the two pleural effusions, which transforms pleural space from a virtual cavity into a real one [1,2].

Spontaneous primary pneumothorax (PSP) is a common medical condition in hospital practice, but it is a continuing challenge for clinicians because of the morbidity it can have in a certain epidemiological context [3,4].

The theories on the occurrence of subliminal bubbles are multiple and incriminate both genetic and familial / hereditary factors, bronchial anomalies, distal airway inflammation, somatic features [5], smoking all leading represents the anatomopathological substrate of the formation of blebs, sub-bubbles and visceral pores [6,7].

At present, we are facing a particular phenomenon: trying to establish with certainty the mechanisms underlying the occurrence of primary spontaneous pneumothorax [8] and how to find and implement the best strategies for the application of treatment methods [9,10].

The exact mechanism behind the occurrence of primary spontaneous pneumothorax (PSP) remains unclear [11]. Many authors believe that the rupture of subpleural blebs and / or bubbles, frequently located in apical segments - of upper lobes is the cause of P.S.P [12].

Experimental part

Material and method

A retrospective study was performed involving a group of 557 patients admitted to the diagnosis of primary spontaneous pneumothorax between 1 January 2010 and 31 December 2017 at the Thoracic Surgery Clinic of the Iasi Clinical Pneumophysiology Hospital.

The inclusion criteria in the study, which aimed at delimiting a subgroup of patients with spontaneous pneumothorax, namely those with PSP, and comprising: 18-55 years of age, spontaneous primary spontaneous first, episode recurrent or controllable, radiologically confirmed, patients agree that their data be used for scientific purposes.

Exclusion criteria from the study were: Recent history of recent thoracic trauma, recent maneuvering at the pleuro-pulmonary level: fibrobronchoscopy, pleural puncture, transthoracic biopsy puncture that can generate a iatrogenic pneumothorax, recent history of general anesthesia with oro-tracheal intubation or any other cause requiring ventilator support, pneumothorax developed on a pre-existing lung disease known at the time of admission, recent surgery in the ENT or abdominal sphere, acute respiratory disease at the time of admission, existence of a severely associated disease, especially dialysis patients, with significant hepatic or cardiac damage, history of malignancy, epileptic patients, patients who left the hospital on demand or without advice prior to the termination of treatment, lack of radiographic dossier or radioscopically diagnosis diagnosis, in patients with partial spontaneous primary pneumothorax, a therapeutical maneuver was applied, no radiographic control was performed, or no case was found in the hospital archive, important omissions from the observation sheet.

Results and discussions

The study group included 557 patients, of whom 484 men and 73 women, with an average age of 42.05 years.

Of the biometric data, special attention was paid to the waist (to the extent that its value was available in medical records), given the classical acceptance of its influence on the incidence of spontaneous pneumothorax. The distribution of waist values can be seen in figure 1 - mean value 174.5 cm standard deviation 7.7 cm, median 174 cm, 168 cm mode, kurtosis 0.88, skewness -0.47.

Considering the classic conception that the incidence of spontaneous pneumothorax has a seasonal variability, we followed its distribution by the season or the calendar month, checking the statistical significance of the obtained data. There is an increase in the incidence of cases in January, May, June and August (possibly due to variations in atmospheric pressure).

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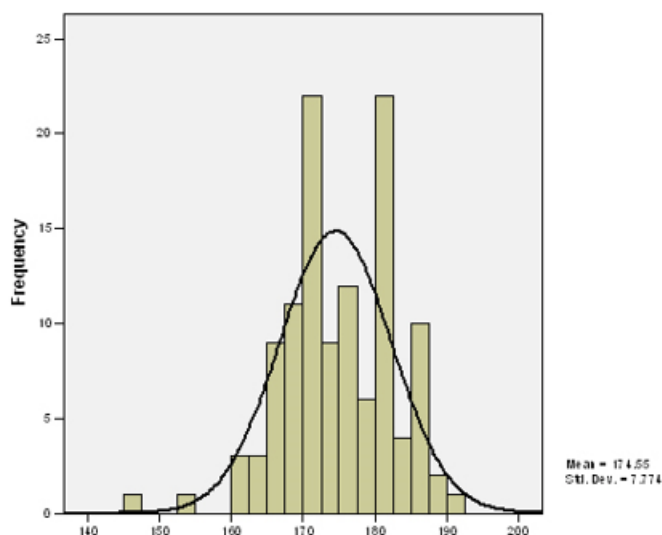


Fig.1 Waist histogram on study lot

The influence of the calendar period seems to be exercised over the average duration of hospitalization (fig. 2), and the duration from intervention to discharge (fig. 3).

However, definitive conclusions can not be drawn in this direction given the significance threshold $p = 0.24$ for the average duration of hospitalization and $p = 0.25$ for the duration of the intervention-discharge, most probably because of the disproportion between the relatively small menses and the size of the present lot. It is interesting to note the effect of increasing the average values of these efficiency parameters for February, March, April and October, periods characterized by more intense and diverse meteorological phenomena.

Recurrence cases were followed separately to find a seasonal variability similar to that encountered in the total batch, with an increase in incidence during the summer months (differences not showing statistical significance, fig. 4).

Regardless of the dynamics factor involved and the likely mechanism of action, it seems to have an influence on the average duration of hospitalization and the length of time elapsed from intervention to discharge.

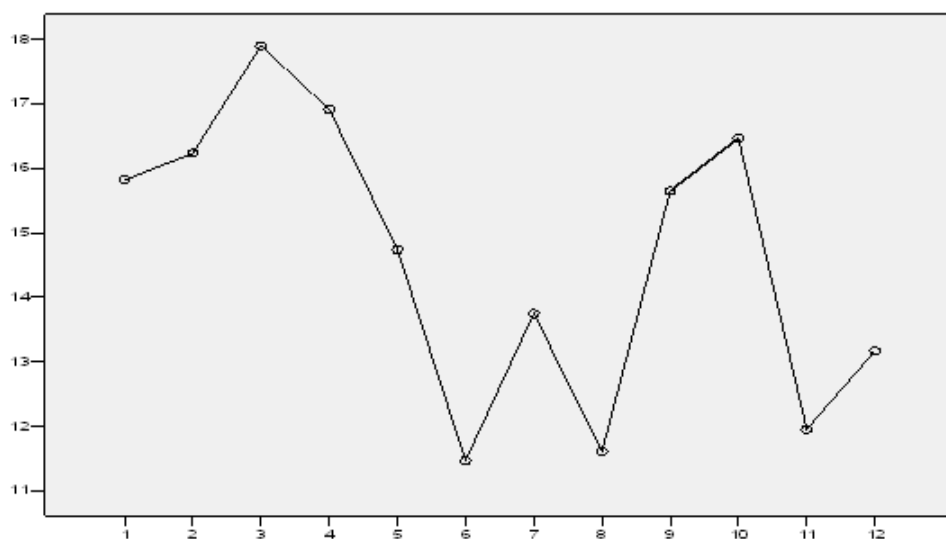


Fig.2 Average hospitalization (days) by calendarism month

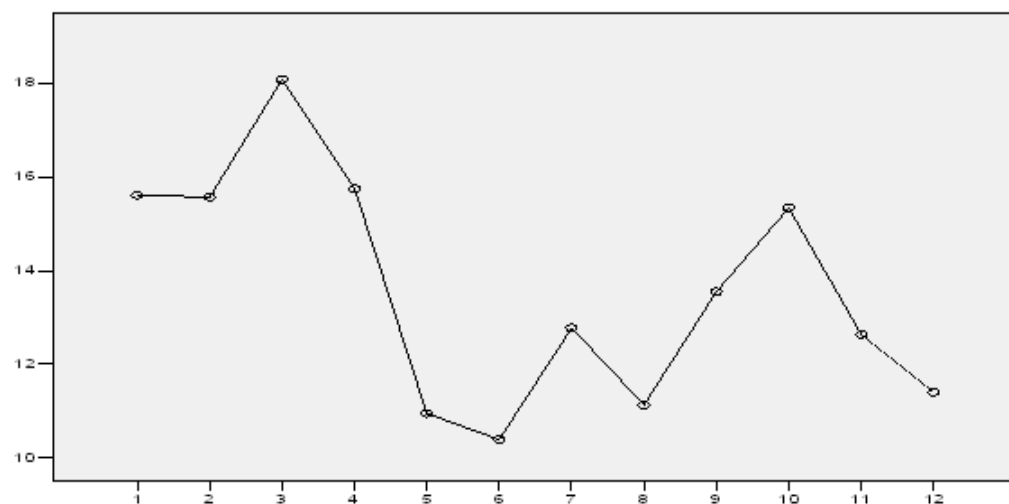


Fig.3 Time from intervention to discharge (days) by calendarism month

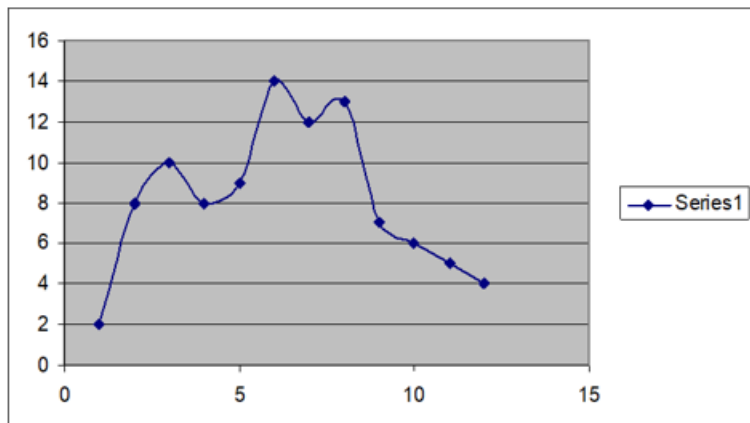


Fig.4 Incidence of recurrence by calendarism month

Conclusions

Considering the association of the spontaneous pneumothorax with a certain somatometric profile, we paid more attention to the physical characteristics of the patients, especially the waist values - the average value of 174.5 cm being high compared to the average values in the general population, even more, the distribution waist values are bimodal, the second peak being 180 cm.

We also found a variability in the incidence of new cases after the season and the calendar month, the differences being statistically significant in favor of the second quarter, a possible explanation for the existence of significant variations in atmospheric pressure during this period. Regardless of the dynamics factor involved and the likely mechanism of action, it seems to have an influence on the average length of hospitalization and the length of time elapsed between intervention and discharge; however, in this case the differences found and the lot were too small to be able to draw statistically valid conclusions. A similar situation has also been encountered in case of recurrence incidence, which appears to be agglomeration during the summer months.

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Manuscript received: 16.03.2018