

Peer review file

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Reviewer A

Comment 1: Why was the group limited to the VATS surgery group? It could be a selection bias.

Reply 1:

Thank you very much for your suggestion.

All primary spontaneous pneumothorax cases underwent by VATS in our institute, so we did not limit to the VATS, it was just that there were no cases other than VATS.

Comment 2: So what was the VATS surgical indication?

Reply 2:

Thank you very much for your suggestion.

All spontaneous pneumothorax was indicated for VATS.

Comment 3: I think it should have been homogeneous in history of smoking and recurrence which are widely known risk factors of pneumothorax.

Reply 3:

Thank you very much for your suggestion.

We agree the reviewer's comment that smoking would be associated with pneumothorax, especially secondary pneumothorax, such as emphysema caused by long-term exposure of smoking. In this study, we limited the subject to primary pneumothorax, which does not appear to have strong relationship with smoking. In fact, Table 1 shows 67% (75/112) cases were never smoker in this study.

Comment 4: If it is hypothesized that weather changes and bullae rupture are related, it may be necessary to at least mention the presence or absence of bullae in chest CT findings. Also, it would be good if the chest CT findings were homogeneous.

Reply 4:

Thank you very much for your suggestion.

We excluded the cases without bullae in this study.

We added the sentence in the part of method (page 4, first paragraph, line 8).

"..., 329 cases with unclear date of onset, iatrogenic pneumothorax, traumatic pneumothorax, chest tube drainage only, differentiation of menstrual pneumothorax, cases without bullae and SSP were excluded."

Comment 5: It would be necessary to show at least one of the ROC curves for how to set the cut off value.

Reply 5:

Thank you very much for your suggestion.

It seemed very difficult to display the ROC curve of all variable due to space limitation. Actually, the Az value range of all ROC curve was about 0.5-0.6, which was not a good cutoff value. However, the results were similar even when statistical analysis was performed again using the media or mean value, and this time we selected the cutoff by ROC.

Comment 6: If weather changes between the four seasons are clear, what do you think about the possibility that the difference in air pollution concentration caused by weather change has affected the occurrence of pneumothorax?

Reply 6:

Thank you very much for your suggestion.

As you point out, there are report that O₃, NO₂, PM₁₀ and PM_{2.5} are significantly associated with the onset of PSP (Joo HP, Sun HL, Seong JY, *et al.* Air pollutants and atmospheric pressure increased risk of ED visit for spontaneous pneumothorax. *Am J Emerg Med.* 2018; 36(12):2249-2253). We did not evaluate the air pollution concentration in this study, but there might be possibility.

We added the sentence and reference in the part of discussion (page 8, second paragraph, line 6)

“...in addition to changes in atmospheric pressure, temperature (11), hours of sunshine (12), wind speed (13), season (14), tracheal spasm (15), ozone (16) and air pollution concentration (25) have been reported as potential influences.”

Reviewer B

Comment 1: The authors described that only VATS cases (n=112) for the PSP were included in this study. Exclusion is not well explained such as non-operated PSP cases (aspiration, chest tube or oxygen therapy only, and differentiation of menstrual pneumothorax in female cases).

Reply 1:

Thank you very much for your suggestion.

We added the sentence in the part of method (page 4, first paragraph, line 8).

“..., 329 cases with unclear date of onset, iatrogenic pneumothorax, traumatic pneumothorax, chest tube drainage only, differentiation of menstrual pneumothorax, cases without bullae and SSP were excluded.”

Comment 2: Description between onset (date of subjective symptoms?) and visiting time (initial pneumothorax in chest x-ray) or VATS seems have to be clearly defined.

Reply 2:

Thank you very much for your suggestion.

We added the sentence in the part of method (page 4, first paragraph, last 2sentence).

“The onset time of PSP was defined as the time when the symptoms, which were regarded as those induced by the pneumothorax (such as chest pain, back pain, and dyspnea), were clearly exhibited. The visiting time to hospital was initial diagnosis of PSP by chest X-ray and CT. VATS was performed in all cases via three ports with monitor vision only under general anesthesia with a double-lumen endotracheal tube for single lung ventilation.”

Comment 3: In the results, the authors concluded that no significant difference was observed in atrophic pressure at 2 days before onset. However, data on changes within 24hours in atmospheric pressure and humidity seems to show meaningful results in statistics. It seems suggest similar outcomes with prior studies about the atmospheric effect within close onset date with references.

Reply 3:

Thank you very much for your suggestion.

We corrected the Table3.

Data on changes within 24hours in atmospheric pressure ($p=0.097$).

Comment 4: How about the data on increasing or decreasing humidity, not by the average humidity in sentence 107.

Reply 4:

Thank you very much for your suggestion.

We tried to analyze the rate of change in humidity, but no significant difference was found (data was not shown in this manuscript).

Comment 5: In discussion, there were repeated “and” with single phrases which may not easily understood by readers (line 110-113).

Reply 5:

Thank you very much for your suggestion.

We corrected the sentence in the part of discussion (page 7, second paragraph, line 3).

“Different air masses cover the Japanese archipelago in summer and winter, then stable weather conditions continue. While the weather changes periodically in spring and autumn, because mobile high atmospheric pressure and extratropical cyclones are swept by westerlies”

Comment 6: If data of recurrent cases (n=42) contain another date of prior pneumothorax, more incipient cases seem be added in dataset regardless of surgical procedures.

Reply 6:

Thank you very much for your suggestion.

We are terribly sorry for making you bother. Table 1 showed “n=112”, which the number of pneumothorax onset days (Figure 1). That is the number of cases of pneumothorax which underwent VATS. Since the number of recurrence cases is double count, the number of pneumothorax patients in Table 1 was 106, but the number of operations is 112 (6 patients had a recurrence once each).

We corrected the sentence in the part of method (page 4, first paragraph, 7 line from the bottom)

“Recurrence cases was double counted, so finally, 112 cases (106 patients, but 6 had a recurrence once each) met the selection criteria”

We corrected the sentence in the part of results (page 6, first paragraph, line 1)

“All 112 cases who underwent VATS for PSP were retrospectively reviewed (Figure 1).”

We corrected the sentence in the part of discussion (page 7, first paragraph, line 2)

“...between onset of PSP and meteorological conditions in 112 eligible cases who underwent VATS...”

Comment 7: In sentence 111, weather changes in spring and autumn is periodic in references. More descriptions about possible correlations with seasonal prevalence and warm front coming will be helpful with seasonal results in this study, if possible.

Reply 7:

Thank you very much for your suggestion.

We agree the reviewer’s suggestion. We added the seasonal prevalence data as figure 3.

We added the sentence in the part of result (page 6, last paragraph)

“The figure 2 showed the monthly number of PSP. Although there was no significant difference, the prevalence was low in midsummer (August) and midwinter (December), and it seemed that PSP occurred tend to be high at the transition from spring to summer (May and July).”

We added the sentence in the part of discussion (page 10, second paragraph).

” Since the fronts tend to form at the boundary between warm and cold air, so fronts are unlikely to occur in midsummer and mid winter when air masses cover the Japanese archipelago, and they often occur at the turn of the season. In this study, the prevalence of PSP was low in midsummer (August) and midwinter (December), and it seemed that PSP occurred tend to be high at the transition from spring to summer (May and July) (Figure 2). It is presumed that the extremely low occurrence of PSP in June might be related to the fact that the rainy season in Iwate is started in June. In brief, because the rainy front which is a stationary front has occurred, it is considered that there is little change of temperature and humidity rise which are hypothesize to be the cause of PSP.”

Comment 8: Do the authors think that same results can be adapted to recurrent cases or secondary pneumothorax with bullous emphysema?

Reply 8:

Thank you very much for your suggestion.

In the case of secondary pneumothorax, it appears to depend on the situation of the primary disease, and it is considered that the change in weather is not related. Whereas in the case of pneumothorax such as COPD, the weather change may affect the onset of pneumothorax, but we have not examined in this study. We think the future study is expected in the future.

Comment 9: In lines 160-178, this paragraph seems to deal with relationship between pneumothorax and airline travel seems unnecessary descriptions with references (25-31) in this article.

Reply 9:

Thank you very much for your suggestion.

We deleted that paragraph and reference.

Comment 10: Description of IBR approval number is not yet written in sentence 51.

Reply 10:

Thank you very much for your suggestion.

Please confirm that the IRB number was described in the part of method (page 4, first paragraph, line 5).

“This retrospective study was approved by the institutional review board at Iwate Medical University (permit number: MH2020-115).”

Comment 11: Limitations with small numbers of cases in a local region, public big data on the PSP may present more detailed correlations with warm front effect by matching 10 year weather data, not by with small numbers of surgery cases in single institutions. In Figure 1, 2020 might be 2010.

Reply 11:

Thank you very much for your suggestion. We corrected the figure1.