**Peer Review File**

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**Reviewer A**

Thank you for your thoughtful review of our manuscript. We appreciate your valuable feedback and have made the necessary revisions accordingly. Below is our response to your specific comments:

*1) …Rather, would it not be better to show the SPL in a thoracoscopic image or to simply describe, in the text, the interpretation of the SPL at the time of surgery?*

**Reply:** The authors deleted the phrase "past descriptions are incorrect or inaccurate" and simply described them as "our observations differ from past descriptions." In addition, to avoid misunderstanding, we also deleted the words and sentences such as “imaginal existence”.
**Changes:** Title (page 1, line 3), Abstract>Conclusions (page 2, line 36), Introduction>2$^{nd}$ paragraph (page 4, line 57), Introduction>3$^{rd}$ paragraph (page 4, line 61), Discussion, 4.6, title (page 10, line 196), Discussion 4.6>the last sentence (page 10, line 203), Conclusions>1$^{st}$ paragraph (page 13, lines 269-270)

*2) In adults, … does the SPL also regress? For example, can the SPL prevent total pneumonectomy syndrome?*

**Reply:** Changes in the SPL with aging were not investigated in this study. We have some experience with the Nuss method for pectus excavatum in young patients. In the procedure, the SPL must be bluntly or sharply opened. Based on our experience, we do not have the impression that the SPL regresses in older patients compared to younger patients. Although there may be overall changes in fibrous tissue with aging, we do not think it regresses with the thymus because the SPL is not an accessory tissue of the thymus. We don’t know if the SPL is possible to prevent pneumonectomy syndrome either. We imagine it would be difficult to prevent.

*3) This is a qualitative study, and 55 cases need to be tabled quantitatively.*

**Reply:** We added Table 1 showing the patients' characteristics. Since this study is primarily reliant on surgical observation, the length, thickness, or strength of the SPL were not measured. We had foreseen technical challenges in measuring these parameters in surgical patients before the research planning stage. Therefore, in this study, we prioritized surgically confirming the structure of the retrosternal fascia, especially the shape of the SPL and the presence of a strip-like special structure that we referred to as TPN. If the results of this study are accepted, we intend to research how to measure these quantitative aspects in the next phase of our research.
**Changes:** Table 1, Results (page 5, line 88)

**Reviewer B**
This is an interesting and original anatomical study regarding the mediastinum.

**Reply:** Thank you for your thoughtful comment. We appreciate your recognition of our anatomical study on the mediastinum. We are committed to providing valuable and original contributions to the field.

**Reviewer C**
Thank you for your thoughtful review of our manuscript. We appreciate your valuable feedback and have made the necessary revisions accordingly. Below is our response to your specific comments:

*The method description … ethical approval is essential.*

**Reply:** We revised the Methods section.
**Changes:** Methods (page 4, lines 68-84)

*I am concerned that the references are out of date. … they should be a little more up-to-date.*

**Reply:** We conducted a literature review that extended beyond humans to include zoology, incorporating relevant references. As you noted, information on the retrosternal fascia and sternopericardial ligament is exceptionally limited. We extensively searched databases such as PubMed and ProQuest. Unfortunately, even Google Scholar, the site with the highest search result count at present, produced only 61 hits since 2020 using the search term 'sternopericardial ligament,' with many of them related to animal studies. Among

these, there are no research reports on the anatomical structure of the 'sternopericardial ligament' in the human literature. We are interested in sternopericardial ligament and will continue to search for new literature.

*Finally, you point out errors in the structure…we can conclude that much based on a single-center, backward-looking study.*

**Reply:** The authors deleted the phrase "past descriptions are incorrect or inaccurate" and simply described them as "our observations differ from past descriptions." In addition, to avoid misunderstanding, we also deleted the words and sentences such as "imaginal existence".
**Changes:** Title (page 1, line 3), Abstract>Conclusions (page 2, line 36), Introduction>2nd paragraph (page 4, line 57), Introduction>3rd paragraph (page 4, line 61), Discussion, 4.6, title (page 10, line 196), Discussion 4.6>the last sentence (page 10, line 203), Conclusions>1st paragraph (page 13, lines 269-270)

**Reviewer D**

Thank you for your thoughtful review of our manuscript. We appreciate your valuable feedback and have made the necessary revisions accordingly. Below is our response to your specific comments:

- *"Consequently, we agree with the descriptions found in older textbooks" (page 4, line 55) would provide an unintended message in its current wording.*

**Reply:** We deleted this sentence.
**Changes:** Introduction (page 4, line 57)

- *The clause regarding the secondly mentioned-layered structure "in addition to connective fibrous tissues found in a layer around any organ" (page 4, line 80) needs to be removed …*

**Reply:** We deleted this phrase.
**Changes:** Results>3.1 Surgical findings (page 5, lines 93-94)

- *"Although the pericardial sac…(page 5, line 98–100). Who cut and what was cut? Do authors mean that … and that the space was discontinuous to the pericardial cavity?*

**Reply:** To avoid misunderstanding, we deleted the latter part of the sentence and revised it.
**Changes:** Results>3.1 Surgical findings (page 6, lines 110-112)

- *"…anterior to the arterial hilum" (page 7, line 155–156) should be "located anteriorly to the…"*

**Reply:** We revised the phrase as noted.
**Changes:** Discussion>4.3 Characteristics of TPN (page 8, line 166)

- *No descriptions for "o" in the legend of Figure 1.*

**Reply:** We added the legends of "o" and "p".
**Changes:** Figure Legends>Figure 1 (page 17, line 371)

- *No descriptions for "B" in the legend of Figure 2. I guess Figure 2B depicts the resected TPN.*

**Reply:** Figure 2A shows the TPN of a patient with thymoma and 2B shows the TPN of another patient with myasthenia gravis. Each is a photograph of a different patient.

*Regarding figure legends, it would promote readability if authors specify which structures in Figure 1 are focused on in Figure 2, 3, and 4 in such a way that;*
*- Figure 2. … legend… (corresponding to Figure 1Ba)*
*- Figure 3. … legend… (corresponding to Figure 1Ba and 1Bb)*
*- Figure 4. … legend… (corresponding to Figure 1Bc)*
*although this is optional.*

**Reply:** We revised them as noted.
**Changes:** Figure Legends>Figure 2 (page18, line 375), Figure Legends>Figure 3 (page18, line 381), Figure Legends>Figure 4 (page19, line 383)

*My major question is … because thymus is usually degenerated to become fatty tissue. Should we call it a "thymo"-pericardial ligament, rather than SPL, in concordant with the finding of neonatal autopsy in the reference 18 (page 8, line 177–180)? How strong the fibrous tissue connecting the thymus and sternum was?*

**Reply:** As you pointed out, we could not observe the SPL as an independent fibrous layer, at least behind the sternal body. However, around the thymic isthmus, we were able to clearly separate the SPL from the thymic capsule and observe cranially directed fibers. These cranially oriented tissues eventually fused into the endothoracic fascia behind the sternum. The endothoracic fascia is a sparse layer of connective tissue, consisting of a small amount of fatty tissue and fibrous tissue. It is reasonable to assume that the cranial side of the SPL gradually migrates here and disappears.
Beneath the thymic isthmus, the amount of fibrous tissues in the SPL increases, forming its own sagittal fibrous layer. Towards the lower part, the fibers are shorter in anteroposterior length and stronger in traction. This might be the reason why we observed the pericardium appearing to adhere directly to the sternum at the terminal point of the SPL (Fig. 1Bc). We consider that the entire SPL connects the sternum and pericardium.
**Changes:** Results>3.1Surgical findings (page 6, lines 100, Discussion> (page 7, lines 140-141)

*Is SPL or TPN structure visible in MRI images? If so, do MRI … of the SPL?*

**Reply:** While we conducted MRI scans for diagnostic purposes in some patients, we were unable to clearly detect the SPL or TPN. We suppose this limitation is attributed to the lower resolution of MRI compared to a CT scanner.

*The discussion part … be better to make it more concise.*

**Reply:** We shortened the Discussion part by deleting two paragraphs in chapter 4.11 of the Discussion and changed the subtitle.
**Changes:** Discussion (page 12, lines 247-258)

*Authors have stated…, the figure title "Figure 4. Surgical findings around the inferior sternopericardial ligament" is confusing.*

**Reply:** We revised the title including the legend.

**Changes:** Figure Legends>Figure 4 (page19, lines 390-396)

**Reviewer E**

Thank you for your thoughtful review of our manuscript. We appreciate your valuable feedback and have made the necessary revisions accordingly. Below is our response to your specific comments:

*Line 368. The "o" is not referenced.*

**Reply:** We revised it.
**Changes:** Figure Legends>Figure 1 (page 17, line 371)

*Line 405. The "," is missing after the "J".*

**Reply:** We revised it.
**Changes:** Figure Legends>Figure 5 (page 19, line 407)

*I think ... Could you explain it to me?*

**Reply:** To identify the SPL, we initially distinguished non-SPL fibrous structures in the retrosternal space, such as the thymic capsule, outer fibrous layer of the fibrous pericardium, the endothoracic fascia, or vessel adventitia. We tentatively referred to the remaining fibrous tissue structure as SPFL in this study. Subsequently, we analyzed whether the entire SPFL corresponds to the SPL or only a portion of it.
The results revealed that the SPFL could be synonymous with the SPL, with the exception of structures corresponding to the inferior SPL, which were not found. Based on these findings, we concluded that the SPFL refers to the SPL, and the existence of an inferior SPL was not identified