

CASE REPORT

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# Postoperative pulmonary lymphedema after lobectomy and mediastinal nodal dissection for lung cancer

Ryota Sumitomo, Takamasa Fukui, Yosuke Otake,  
Cheng-long Huang

## ABSTRACT

**Introduction:** Lymphedema can arise due to disruption of the normal lymphatic circulation by surgery. We present a patient who had pulmonary lymphedema after thoracoscopic right lower lobe lobectomy and mediastinal nodal dissection for lung cancer. **Case Report:** A 72-year-old male presented with dyspnea two days after thoracoscopic right lower lobe lobectomy and mediastinal nodal dissection for lung cancer. **Postoperative pulmonary lymphedema was diagnosed because of the transition of pulmonary shadow in two computed tomography scans obtained in different body positions. He was given oxygen till the fourth postoperative day, and the abnormal shadow gradually disappeared. He was discharged on the 14th postoperative day. Conclusion:** Postoperative pulmonary lymphedema presents radiological findings of enlargement of interstitial shadow with ground-glass attenuation and consolidation, which resemble life-threatening complications including acute lung injury or acute respiratory distress syndrome, interstitial pneumonia, and heart failure. The shadow transition between two computed tomography images obtained

in different body positions is considered to be useful to diagnose postoperative pulmonary lymphedema.

**Keywords:** Postoperative complication, Pulmonary lymphedema, Lobectomy

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Ryota Sumitomo<sup>1</sup>, Takamasa Fukui<sup>1</sup>, Yosuke Otake<sup>1</sup>,  
Cheng-long Huang<sup>1</sup>

**Affiliation:** <sup>1</sup>MD, Department of Thoracic Surgery, Tazuke Kofukai Medical Research Institute, Kitano Hospital, Osaka, Japan.

**Corresponding Author:** Ryota Sumitomo, Department of Thoracic Surgery, Tazuke Kofukai Medical Research Institute, Kitano Hospital, 2-4-20 Ohgimachi, Kita-ku, Osaka 530-8480, Japan; Email: rt-sumitomo@kitano-hp.or.jp

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## INTRODUCTION

Pulmonary lymphedema is a rare postoperative complication. The lymphatic system of the lung provides an important route for clearance of interstitial edema fluid filtered from pulmonary blood vessels. Interstitial lung fluid volumes are strictly controlled and maintained at the minimum owing to the ability of lymphatics to match the increase in filtration rate [1]. Lymphedema can arise due to disruption of the normal lymphatic circulation by surgery [2]. We present a patient who had postoperative pulmonary lymphedema after thoracoscopic right lower lobe lobectomy and mediastinal nodal dissection for lung cancer.

## CASE REPORT

A 72-year-old male with a 20 pack-years' smoking history was referred to our hospital for the evaluation of a lung nodule. Computed tomography (CT) scan revealed a 10-mm-diameter tumor in the right lower lobe, which was suspected to be lung cancer. No lymph node or distant metastases were detected on positron emission tomography (PET) scan and magnetic resonance imaging (MRI) scan of the brain. Video-assisted thoracoscopic surgery (VATS) right lower lobe lobectomy with dissection of the hilar, superior mediastinal, and subcarinal lymph nodes was performed. The tumor was diagnosed as adenocarcinoma, 12 mm in diameter, with a pathological stage of T1b No Mo.

In the morning of the second postoperative day, the patient presented with dyspnea. His oxygen saturation level worsened, so oxygen administration was begun. Chest radiography revealed diffuse infiltrative shadow of the right lung. Laboratory test revealed no elevation of KL-6 and surfactant proteins A and D levels. Echocardiography revealed no cardiac dysfunction and congestion. Computed tomography scan of chest revealed diffuse enlargement of the interstitial shadow with ground-glass attenuation and consolidation in the residual right lung (Figure 1A). Sequentially, the patient was turned from the supine to the prone position, and chest CT scan was performed again in the prone position 30 minutes later (Figure 1B). Then, when the CT scans were compared, part of the enlargement of the interstitial shadow with ground-glass attenuation and consolidation vanished on the CT scan performed in the prone position 30 minutes later. However, new shadow emerged on the abdominal side of the residual right lung. Therefore, postoperative pulmonary lymphedema was diagnosed because of the transition of pulmonary shadow in the two CT scans obtained in different body positions. He was

given oxygen till the fourth postoperative day, and the abnormal shadow gradually disappeared. The patient was discharged from the hospital on the 14th postoperative day.

## DISCUSSION

Pulmonary lymphedema is a rare postoperative complication. Lymphedema can arise due to disruption of the normal lymphatic circulation. Lymphatic vessels are inevitably damaged during lobectomy and nodal dissection for lung cancer; thus, pulmonary lymphedema could occur after lobectomy. A previous study reported that lymph flow in the lung runs directly to mediastinal lymph nodes through the superficial subpleural lymphatic vessel and to hilar lymph nodes through the deep lymphatic vessel [3, 4]. In the present case, the hilar, superior mediastinal, and subcarinal lymph nodes were dissected. Excessive dissection of mediastinal lymph nodes during lobectomy may cause congestion of lymph flow, resulting in pulmonary lymphedema.

Imaging findings revealed that the enlargement of interstitial shadow with ground-glass attenuation and consolidation on chest high-resolution CT scan are characteristic of pulmonary lymphedema due to the congested lymph flow. The differential diagnoses of these findings include acute lung injury (ALI) or acute respiratory distress syndrome (ARDS), interstitial pneumonia, and heart failure, which is sometimes life-threatening [5]. However, in the present case, the CT scans showed that the shadow moved downward probably because of the gravity after conversion from the supine to the prone position. The transition of the shadow is cannot be recognized in ALI or ARDS, interstitial pneumonia, and heart failure. Therefore, this finding is considered to be useful to diagnose postoperative pulmonary lymphedema.

Concerning the treatment of postoperative pulmonary lymphedema, any special treatment was not required for improvement in the present case. Postoperative pulmonary lymphedema may become gradually improved as time passes.

## CONCLUSION

Postoperative pulmonary lymphedema presents radiological findings of enlargement of interstitial shadow with ground-glass attenuation and consolidation, which resemble life-threatening complications including acute lung injury or acute respiratory distress syndrome, interstitial pneumonia, and heart failure. The shadow transition between two computed tomography images obtained in different body positions is considered to be useful to diagnose postoperative pulmonary lymphedema.

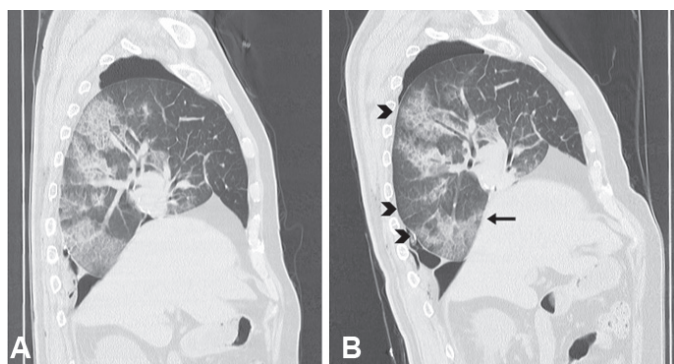


Figure 1: (A) Sagittal image of initial computed tomography (CT) scan showing diffuse enlargement of interstitial shadow with ground-glass attenuation and consolidation in the residual right lung, (B) Sagittal image of second CT scan, obtained in the prone position 30 minutes after the initial CT scan. Part of the enlargement of the interstitial shadow with ground-glass attenuation and consolidation had vanished (arrow heads), and a new shadow can be observed on the abdominal side of the residual right lung (arrow).

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### Author Contributions

Ryota Sumitomo – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Takamasa Fukui – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Yosuke Otake – Substantial contributions to conception and design, Revising it critically for important intellectual content, Final approval of the version to be published

Cheng-long Huang – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

### Guarantor

The corresponding author is the guarantor of submission.

### Conflict of Interest

Authors declare no conflict of interest.

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