

# 2024 대한심장혈관흉부외과학회 제56차 추계학술대회

2024. 10. 31 (Thu) - 11. 01 (Fri) 여수 엑스포 컨벤션센터



## Quantitative analysis of changes in the thoracic anatomy after pneumonectomy using computed tomography

### 공지사항

- 소속기관이나 저자명이 드러나지 않도록 해주세요.
- 제목 슬라이드 포함 최대 6장, Font size 20 이상
- PPT 파일 작성 후 PDF로 전환해서 접수(필수)

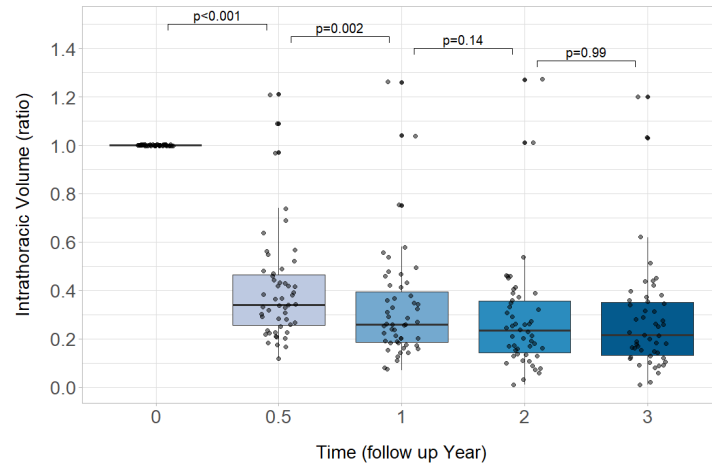
- Although the frequency of pneumonectomy has declined recently due to numerous complications, it remains an essential surgical option for certain rare diseases, such as malignant mesothelioma
- After a pneumonectomy, the thoracic cage compensates by expanding the remaining contralateral lung, elevating the diaphragm, reducing the size of the thoracic cage, and shifting the mediastinum
- Given that these changes can lead to chest deformities and post-pneumonectomy syndrome, we endeavored to develop a new intrathoracic prosthesis. However, before development can proceed, it is essential to conduct research that quantifies changes in intrathoracic structures
- The aim of our study was to quantify changes in thoracic anatomy following pneumonectomy

# Methods

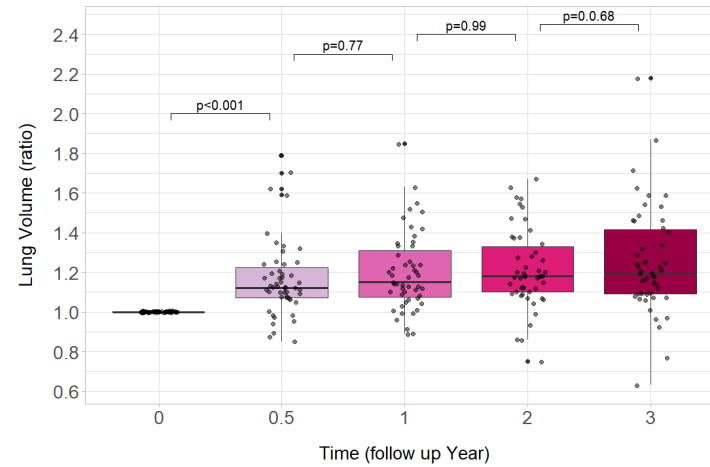
- We retrospectively identified 98 patients who underwent pneumonectomy from April 2003 to June 2019
- The CT scan was performed preoperatively, as well as at 0.5, 1-, 2-, and 3-years after surgery
- The volumes of the pneumonectomy and contralateral side were measured separately, with each side divided based on mediastinal structures
- The mediastinal angle was determined by first establishing the midline of the spinal canal at the T8 vertebra's spinous process. Angles were measured between an imaginary line from this point to the sternal body's midline, and another to the right coronary artery's os
- Estimated marginal means were utilized to compare values across the periods. To estimate trends in anatomical changes within the thorax, a random coefficient model and an exponential nonlinear regression model were employed



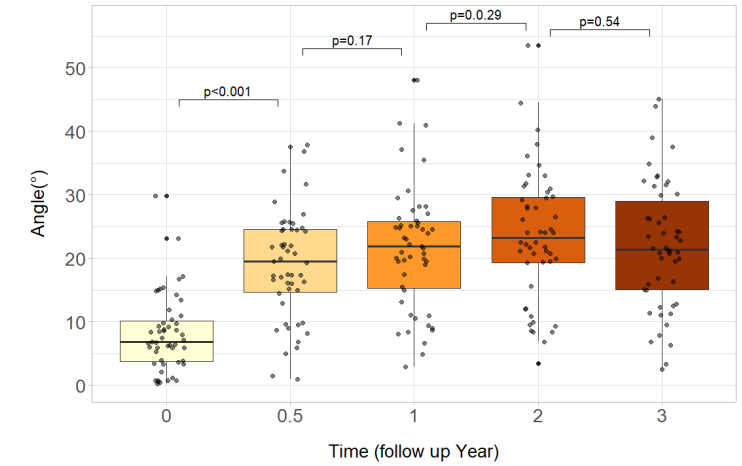
**Intrathoracic Volume Change of Left Pneumonectomy sid**



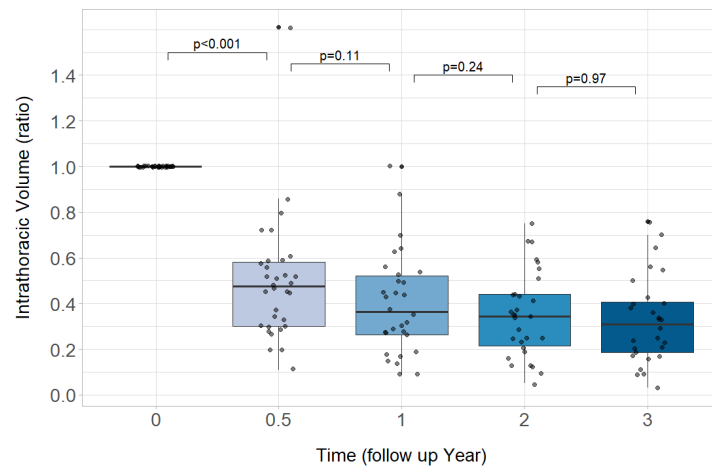
**Non-op side Lung Volume Change of Left Pneumonectomy**



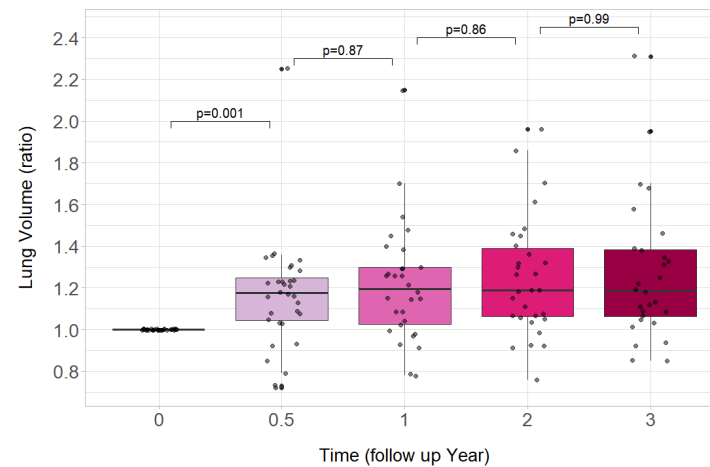
**Mediastinal Angle Shifting of Left Pneumonectomy**



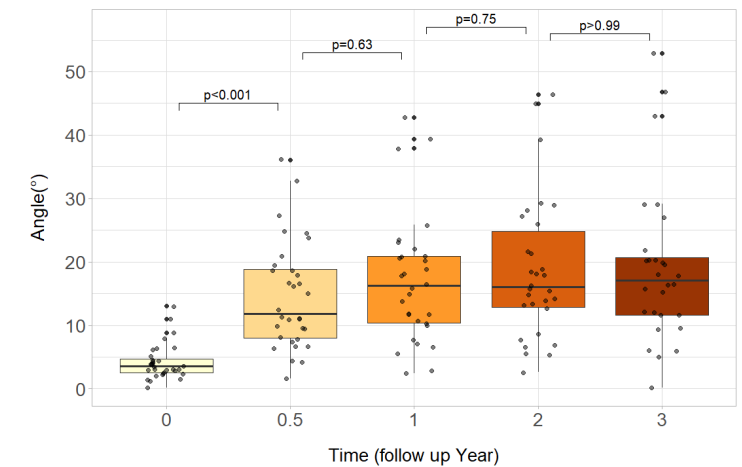
**Intrathoracic Volume Change of Right Pneumonectomy sid**



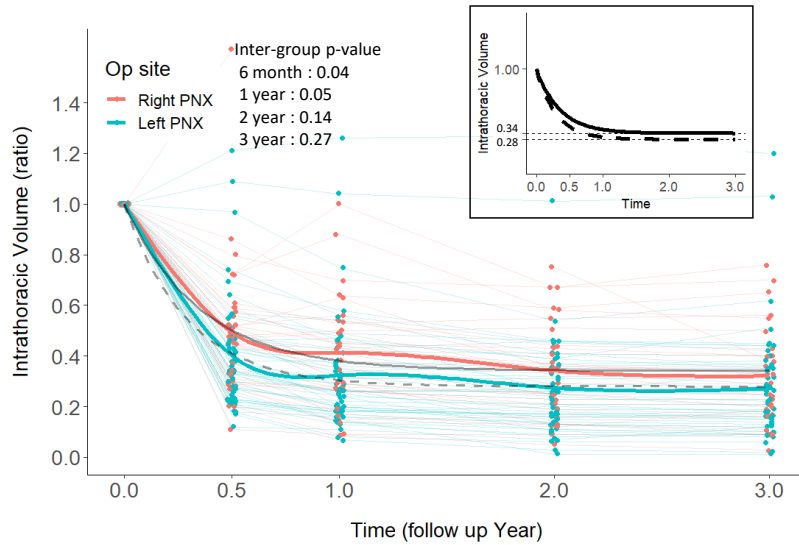
**Non-op side Lung Volume Change of Right Pneumonectomy**



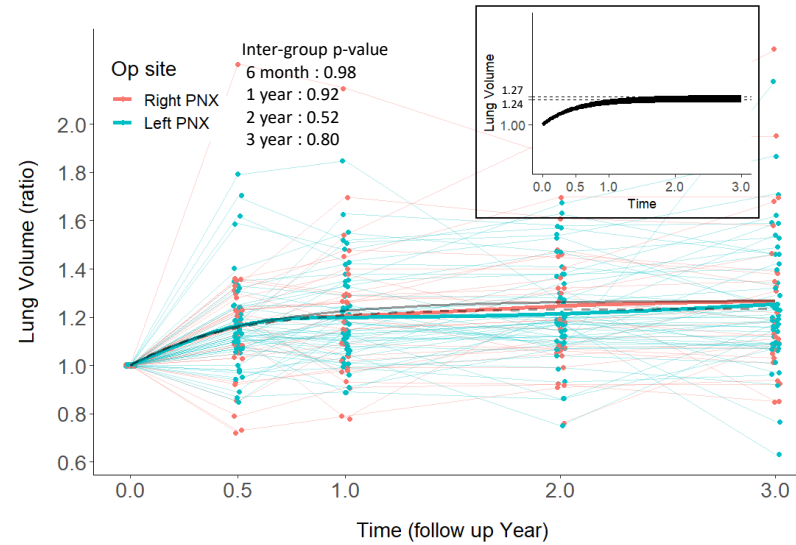
**Mediastinal Angle Shifting of Right Pneumonectomy**



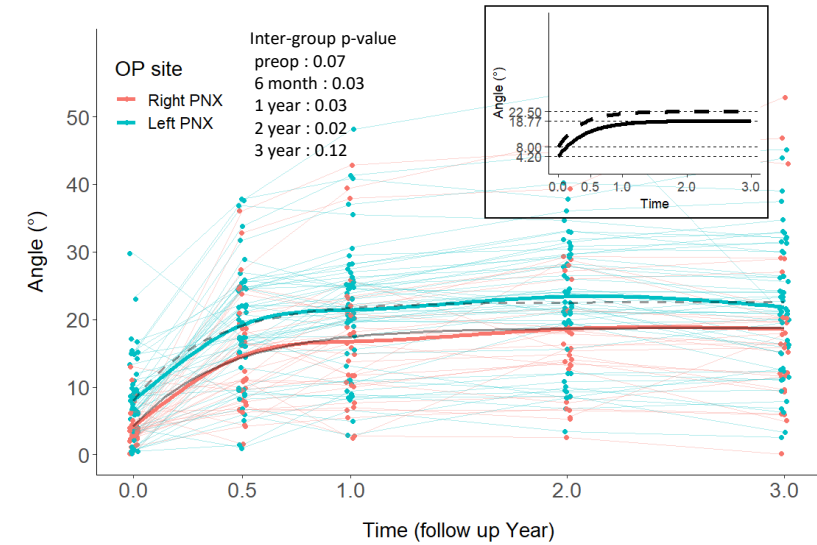
Pneumonectomy side Intrathoracic Volume Change



Non-op side Lung Volume Change



Mediastinal Angle shifting





- After a pneumonectomy, the most significant changes of contralateral lung volume and mediastinal angle occurring primarily within the first six months after surgery. On the pneumonectomy side, notable changes in cavity volume continue for up to one years after the operation.
- The lung volume on the non-operated side inflated by 1.24 times, the mediastinal angle rotated by 12.5 degrees, and the thoracic cavity volume on the pneumonectomy side decreased by 0.3 times. Although differences were observed between genders, they were not statistically significant.
- This quantitative data from this study could serve as foundational research for developing new intra-thoracic prostheses aimed at preventing chest deformities or post-pneumonectomy syndrome after the surgery.