

# Cervical Lung Herniation: An Anatomical Donor Case Report

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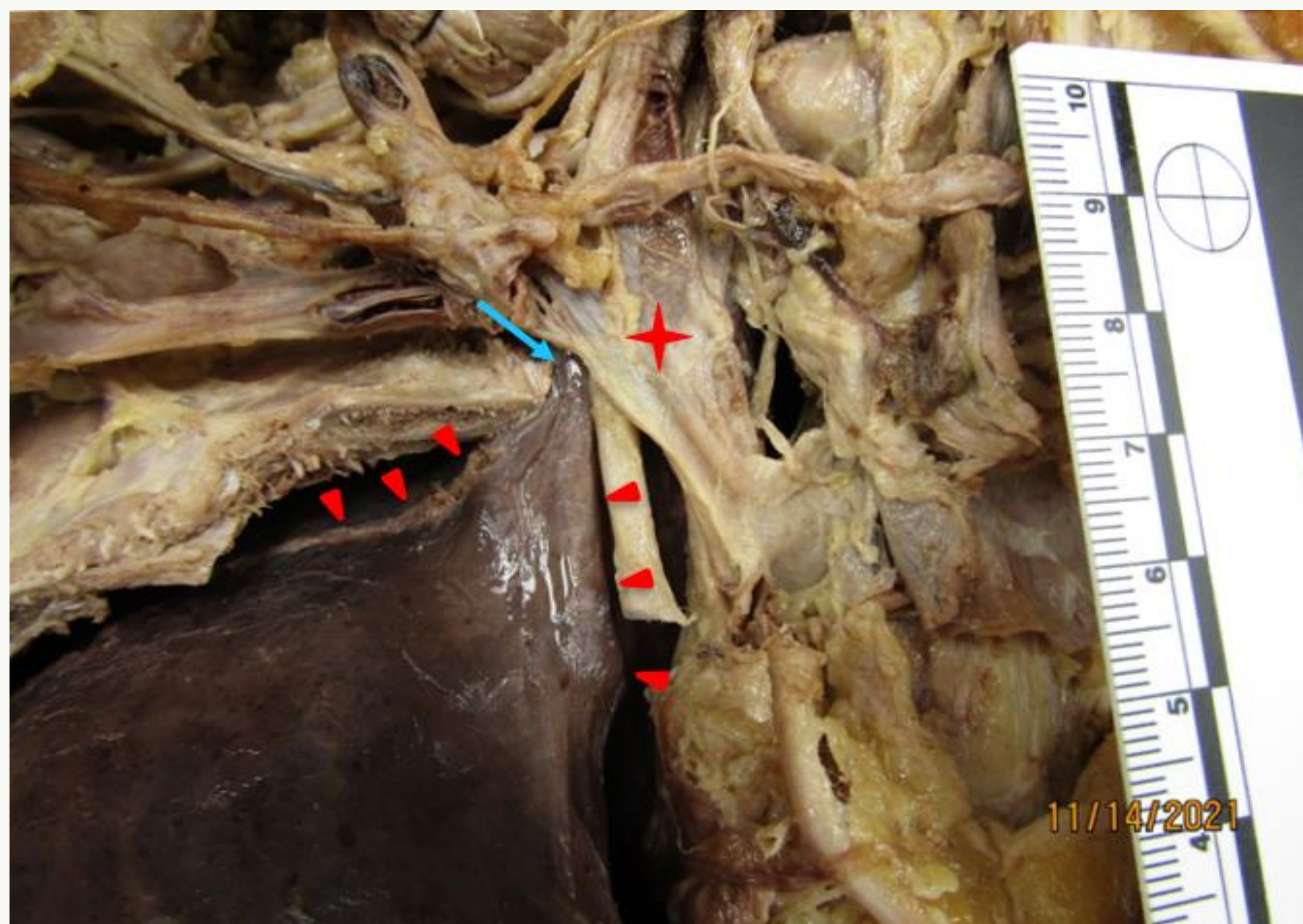
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## Introduction

In general, lung herniation is defined as the protrusion of the lungs or portions outside of the confines of the thoracic cage. Cervical lung herniation is typically secondary to abnormalities in the suprapleural membrane (Sibson's fascia) or neck musculature. With cervical hernias, there is either a definite tear in Sibson's fascia and an associated hernial sac or a diffuse laxity with no associated hernial sac.

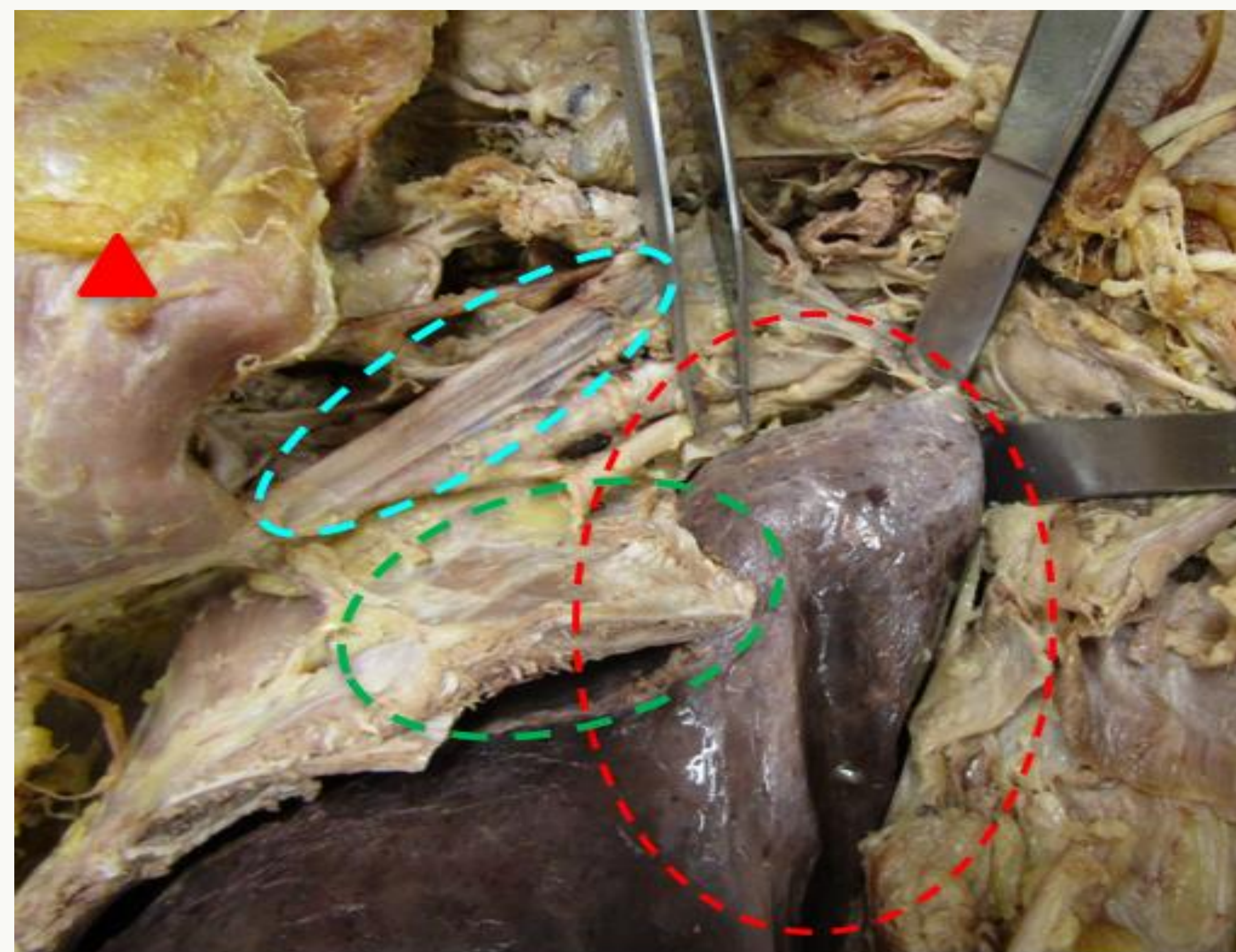
Etiologies include thoracic trauma (MVA, fall, etc.), congenital defects, or pathologic (neoplastic or inflammatory) processes. The classic presentation of lung herniation includes signs and symptoms such as acute chest pain after sneezing or coughing, a bulge, and ecchymosis. This pathology has a low incidence rate with approximately 300 cases reported in literature as of 2006. This case discusses the discovery of a cervical lung herniation (pneumocele) while prosecting an 80-year-old female anatomical donor at the Michigan State University Human Prosection Lab.



**Figure 1.** Location of the herniation: The red arrowheads show the initial portion of the herniation. The rest of the protrusion extends postero-superior to the right first rib (tip of blue arrow) through the superior thoracic aperture, and deep to the right brachiocephalic vein (red star).  
Photo Credit: MSU Willied Body Program.

## Case Description

- During prosection of the cadaveric donor, a preclerkship medical student noticed that the apical portion of the right lung appeared to be protruding 2.0 cm postero-superior to the right first rib (Figure 1).
- The protrusion extended through the superior thoracic aperture and was positioned anterior to the root of the right T1 spinal nerve and the medial portion of the inferior trunk of the brachial plexus and deep to the right brachiocephalic vein (Figure 2).
- Considering that the herniated portion of the lung was in contact with the root of the T1 spinal nerve, neurogenic thoracic outlet syndrome (nTOS) was a potential.
- A retrospective review of the anatomical donor's clinical history revealed long-standing hypertension, lower extremity neuropathy, and chronic low back pain. Surgical history included bariatric surgery and hysterectomy.
- Given that there was no clinical history that was related to any typical manifestation of nTOS, it is believed that this lung herniation may have been asymptomatic. It is possible that the lung tissue did not exert substantially significant force to cause TOS symptoms.



**Figure 2.** Cervical herniation of the right apical lung in situ with neurovasculature retracted and pectoralis minor (red triangle) reflected. It is easier to appreciate the relationship of the herniated portion (red dotted circle) to the right first rib (dotted green circle) and the right T1 spinal nerve (dotted blue circle).  
Photo Credit: MSU Willied Body Program.

## Discussion

Approximately 80% of reported cases of lung herniation are acquired and most commonly occurs through the intercostal space as a result of thoracic trauma.

Patients with a high risk of lung herniation are typically those with elevated intrathoracic pressure secondary to morbid obesity or end-stage chronic obstructive pulmonary disease. Other risk factors includes tissue weakness or poor healing secondary to malnutrition, steroid usage, diabetes, etc.

Cervical lung hernias are reducible and frequently intermittent, they may not be detected on radiologic studies such as CT performed at mid-inspiration.

Diagnosis of a cervical lung herniation can be easily missed both clinically and radiologically if the examination is not made during a Valsalva maneuver.

Surgical repair may be necessary in patients with incarceration, symptoms of local compression (dysphagia from esophageal compression), or for cosmetic purposes.

## Acknowledgments

The authors are grateful to the donors and their families for their support of the education of healthcare students and professionals and for their consent in serving in this study. Additionally, we thank the Willied Body Program at Michigan State University for facilitating the use of the donated human remains.

Human Subjects Research: According to Michigan State University Human Research Protection Program (MSU HRPP), IRB approval is not required for cadaver-based studies, since cadavers do not meet the Health and Human Services definition of a human subject as stipulated in the FDA regulations at 21 CFR 50.3(g) and 56.102(e)

The "MSU Willied Body Program" is responsible for procuring the cadaveric donors along with limited PHI, which includes consent for the cadaveric donors to be dissected/prosected and studied for educational purposes. We the prosectors/researchers are never granted access to any personal identifiers except for a coded number assigned to the cadaveric donor by the MSU Willied Body Program Director. Equally, any photographic images acquired of the cadaveric donors exclude all identifiable features.