



"Ghosted": Pericardial Agenesis Discovered During Robotic Left Lung Segmentectomy

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INTRODUCTION

The pericardium plays a crucial role in maintaining cardiac position, limiting distension, and reducing friction between the heart and mediastinal structures.

Congenital pericardial agenesis (CPA) is a rare variation in which the pericardium is partially or completely absent. CPA arises from the improper fusion of pleuro-pericardial membranes during embryogenesis. Partial pericardial defects, though less common, are more concerning due to greater risk of cardiac herniation, torsion or strangulation → ischemia, arrhythmias, or sudden cardiac death.

Category	Details
Prevalence	< 1 in 10,000 individuals (3:1, Male : Female)
Typical Presentation	Often asymptomatic, discovered incidentally on imaging
Nonspecific Symptoms	Chest pain, palpitations, syncope, dyspnea

CASE BACKGROUND

This patient was a 55-year-old male who presented to MD Anderson left lung adenocarcinoma and underwent robotic segmentectomy and mediastinal lymphadenectomy.

PMH: CAD (stent to Dx branch), HTN.

During surgical exploration, observed congenitally absent area of pericardium, with absent coverage from pulmonary hilum over the left atrial appendage and part of the left ventricle.

The surgery was completed uneventfully, and the patient recovered without complications on POD #1.

DISCUSSION

During thoracic surgery, anesthesia should prioritize hemodynamic stability particularly with intrathoracic pressure changes in the setting of pericardial agenesis.

- High airway pressures or aggressive fluid shifts can precipitate instability, especially during one-lung ventilation or lateral positioning.
- With agenesis, the heart has increased mobility and reduced protection, making it more susceptible to positional shifts, compression, and labile blood pressures
- While cardiac MRI is the gold standard for diagnosis, partial defects especially in patients without specific cardiac complaints—can be overlooked if CPA is not explicitly suspected.

In cases where CPA is known or suspected, anesthesiologists should consider arterial line placement, minimize positive pressure, and carefully titrate meds and anesthetics to maintain cardiovascular stability throughout the procedure.

In this case, the absence of the left pericardium was managed conservatively, in part due to the limited extent of the procedure—a segmentectomy rather than a lobectomy. Had a lobectomy been performed, the resulting increase in intrathoracic space could have allowed for greater cardiac mobility, increasing the risk of herniation or torsion. In such cases, pericardial repair or patching could be necessary to prevent postoperative complications.

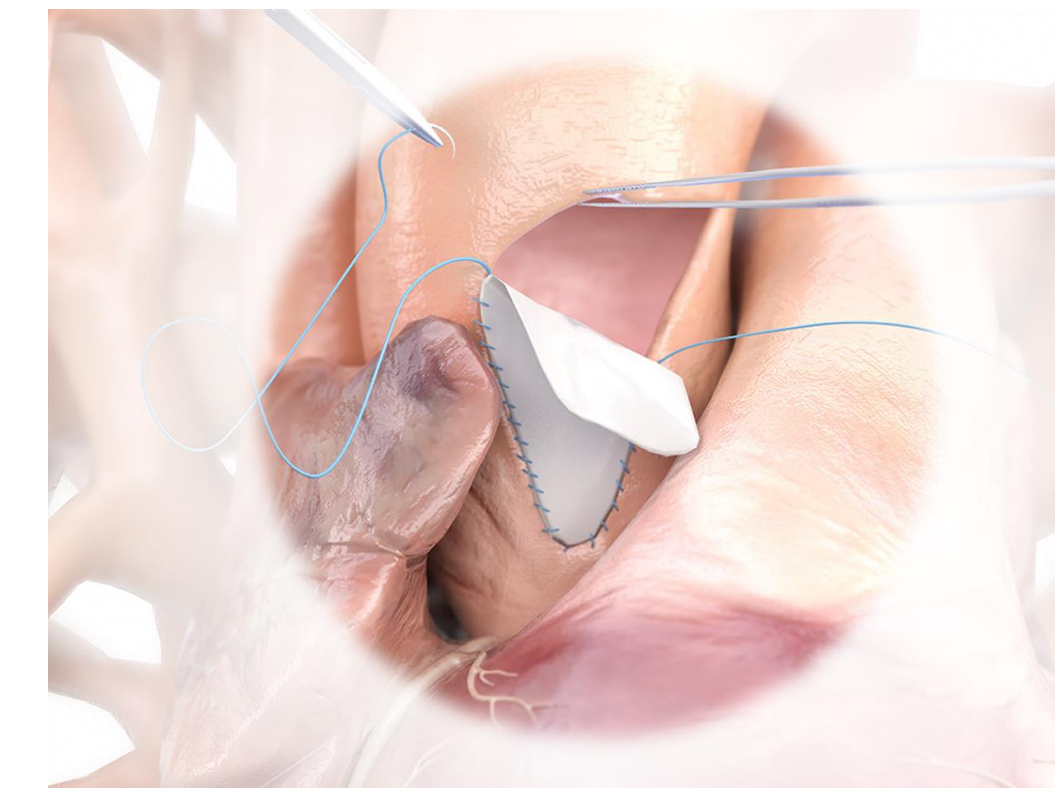


Figure 1. Image of Pericardial Patch

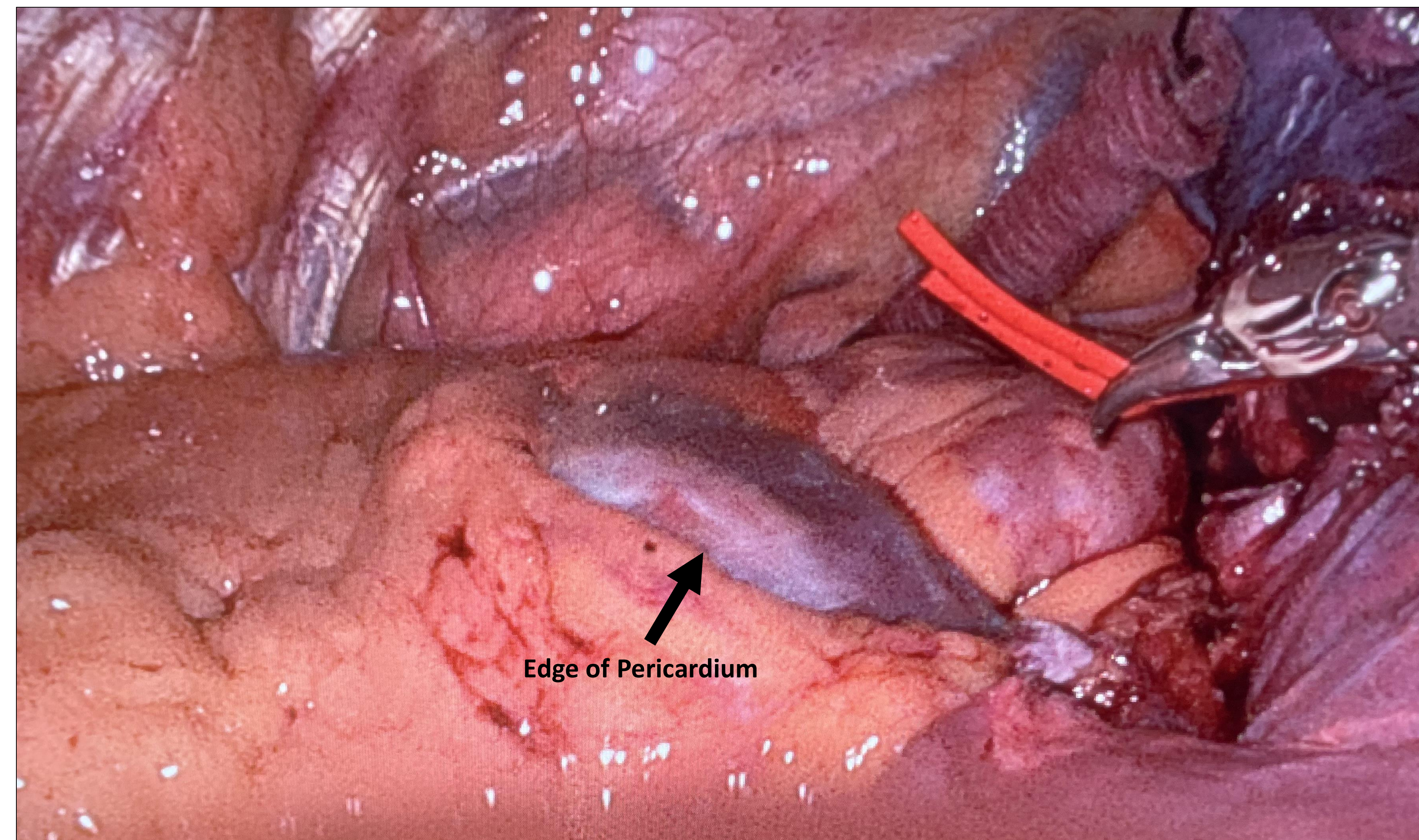


Figure 2. Image of Patient's Pericardial Agenesis

CONCLUSION

Although CPA often requires no immediate intervention, it can influence surgical risk and postoperative outcomes.

Key considerations include:

- Recognizing **partial left pericardial defects**: higher risk for cardiac herniation, ischemia, and arrhythmias.
- **Anesthetic management** must account for increased cardiac mobility and blood pressure lability, fluid balance, positioning, and ventilation strategy.
- **Extent of lung resection matters**—limited resections may not destabilize cardiac position, but more extensive procedures like lobectomies may necessitate **pericardial defect repair or patching**
- Cardiac MRI is the gold standard for diagnosis of Pericardial Agenesis

This case adds to the limited literature on CPA and reinforces the importance of surgical awareness, individualized risk assessment, and preparedness to intervene when structural cardiac anomalies are discovered.



REFERENCES

