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Background

- Symptomatic pulmonary vein stenosis (PVS) is an uncommon consequence of catheter-based radiofrequency ablation (RFA) for atrial fibrillation, reported rate of <1%.
- Balloon dilation and stenting effectively treat 70-90% of symptomatic PVS.¹⁻³
- Surgical lung resection (lobectomy/pneumonectomy) addresses dilation and stent failures, but there is no comprehensive review of the indications, findings, and outcomes.

Objective: We aim to review the topic of anatomic lung resection for the treatment of recurrent pulmonary vein stenosis post-RFA ablation to assess the role in the management of symptomatic PVS.

Methods

- Case Report**
- We detail a PVS case unresponsive to multiple dilation/stenting attempts, ultimately necessitating lobectomy.

- Literature Analysis**
- PubMed, Web of Science, and Library of Congress were searched using "post-ablation pulmonary vein stenosis," "recurrent post-ablation pulmonary vein stenosis," and "lobectomy" or "pneumonectomy."

Case Report

- 39-year-old male with severe exertional dyspnea from 3-vein anatomic PVS
- Recurrence of symptoms after stenting x 2 and balloon angioplasty x 3
- Underwent robotic lobectomy with 1.8 L blood loss due to friable venous collaterals
- Subsequent hemothorax evacuation cleared 1L
- Discharged on post-operative day 16
- No recurrence of symptoms at 36 months.

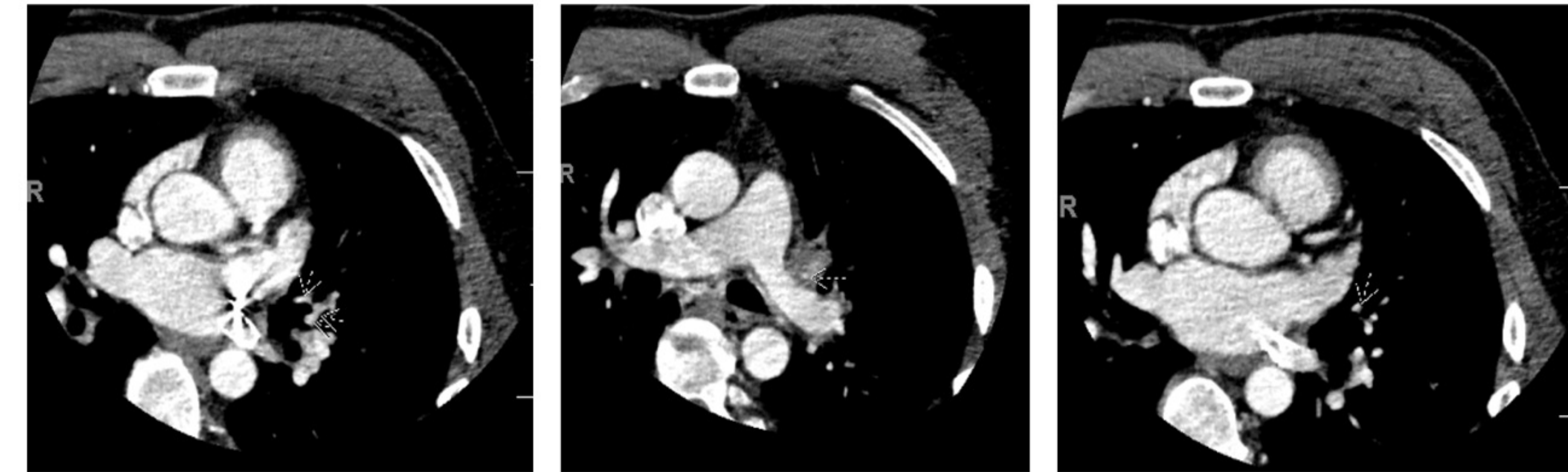
Literature Analysis

- 22 articles dealing with symptomatic PVS requiring anatomic lung resection yielded **24 patients**
- **Median Age:** 49 years (17-68)
- **Lesion location:** Left side in 20 (83%), right side in 4 (17%), bilateral in 3 (13%)
- **Number of lesions:** Single stenosis in 14 (67%), two lesions in 4 (19%), three lesions in 2 (10%), four lesions in 1 (5%).
- **Presenting Symptom:** Hemoptysis in 17 (81%), severe hemoptysis in 4 (24%), dyspnea in 5 (24%), cough in 6 (29%), chest pain in 5 (24%).
- **Surgical Interventions (n=21 reported):**
 - 18 (86%) lobectomies
 - 10 (48%) left upper lobectomy, 7 (33%) left lower, 1 (5%) right lower
 - Thoroscopic approach was utilized in 3 (14%) cases
 - Robotic in 1 (5%)
 - 2 (10%) right pneumectomy
 - 1 aborted lobectomy due to the presence of significant fibrothorax and adhesions.
- **Operative Findings (n=16):** adhesions (31%), tortuous collaterals (31%), contracted lobe (31%)
- **Immediate outcomes (n=14):** 4 (29%) symptom-free post-op, 2 (8%) fatalities.
- **Hospital Stay (n=4):** median 8 days (3-63).
- **Long-term Outcomes (n=11):** average follow up of 18 months (6-36); all symptoms resolved without recurrence

3-Year Time Intervals 2003-2023	Total Number of Patients During Time Interval	Number w Ages of Patients	Number of Cases w Vein Stenosis Location	Number of Cases w Symptoms and/or Signs	Number of Cases Mentioning Lung Resection Type	Number of Cases w Findings and Short Term Outcomes	Number of Cases w Long Term Outcomes
2003-2006	1	0	0	0	0	0	0
2007-2010	3	3	3	3	3	2	1
2011-2014	3	3	3	3	3	3	1
2015-2018	10	8	8	8	8	8	5
2019-2023	7	7	7	7	7	5	6

Table 1: Analysis of Case Reports from the Literature Search

Acknowledgements	References
I would like to thank the UTW Medical School and the UTSW Department of Cardiovascular & Thoracic Surgery for providing support and funding. I would like to thank the other members of our team for their guidance throughout this project.	1. Raeisi-Giglou P, Wazni OM, Saliba WI, et al. Outcomes and Management of Patients With Severe Pulmonary Vein Stenosis From Prior Atrial Fibrillation Ablation. <i>Circ Arrhythm Electrophysiol.</i> 2018;11(5):e006001. 2. Schoene K, Arya A, Jahnke C, et al. Rate of acquired pulmonary vein stenosis after ablation of atrial fibrillation referred to electroanatomical mapping systems: Does it matter? <i>Cardiol J.</i> 2019;26(5):451-458. 3. Schoene K, Sepehri Shamloo A, Sommer P, et al. Natural course of acquired pulmonary vein stenosis after radiofrequency ablation for atrial fibrillation-Is routine follow-up imaging indicated or not? <i>J Cardiovasc Electrophysiol.</i> 2019;30(10):1786-1791.



Conclusions & Future Work

- Anatomic resection provides long-term relief and benefit to patients with iatrogenic pulmonary vein stenosis.
- Even pneumonectomy provides benefit and maybe necessary for cases of recalcitrant hemoptysis.
- Intraoperatively, friable venous tributaries may prove difficult to manage and can result in significant intraoperative and post-operative bleeding.
- Minimally invasive procedures, including robotics, have been successful.

Recommendations: In cases of refractory PVS, a lobectomy or pneumectomy can prove vital with excellent outcomes. The creation of a multi-nation registry would be beneficial in management of PVS patients.