When LAM Pops Your Bubble: Lymphangioleiomyomatosis Disguised as Dyspnea

Andrew Nunno[1] MD, Zainab Qudsiya[1] MD, Bobby Shah[2] MD, [1]Division of Internal Medicine, 2 Division of Pulmonology, St. Luke's Hospital, Chesterfield, MO

INTRODUCTION

Lymphangioleiomyomatosis (LAM) is a rare systemic disease driven by abnormal smooth muscle cell growth that primarily leads to cystic development in the lungs, but lymph node and kidney involvement can occur as well. LAM is predominantly seen in women of childbearing age, and is difficult to diagnose, because its typical initial symptoms are dyspnea and fatigue, and plain radiographs are non-specific. Pneumothorax (PTX) is a common complication of LAM.

We present the case of a 36-year-old female with dyspnea, who was found to have a large PTX secondary to LAM.

CASE PRESENTATION

A 36-year-old female with a history of tobacco use, polysubstance abuse, and depression presented with progressive dyspnea on exertion, cough, and recurrent fever for three weeks. She denied history of lung disease or chest trauma. After testing negative for respiratory viruses, she was treated empirically with antibiotics for pneumonia. Her dyspnea, however, worsened, and re-evaluation at Urgent Care found a large right-sided PTX on chest X-ray (Fig. 1a). During transport to the ED, she had a syncopal episode.

On exam, she was tachypneic, hypoxic without hemodynamic compromise, and absent right-sided lung sounds. A chest tube was placed, and her symptoms improved, but CT chest showed persistent small PTX, failure to expand and multiple cystic structures in both lungs concerning for LAM (Fig. 2). CT abdomen-pelvis showed a nonfunctional 2.4 cm left adrenal adenoma with no evidence of lymphatic involvement or renal angiomyolipoma. To prevent recurrence, Video-assisted thoracoscopic surgery (VATS), total parietal pleurectomy and wedge resection of the right lower and middle lobes were performed. VEGF-D level was normal, but biopsy of the resected segments confirmed the diagnosis of LAM (Fig. 3). Patient was discharged with a chest tube, and followed up with a LAM specialist, who determined that medical treatment wasn't currently needed, because her lung function was intact.

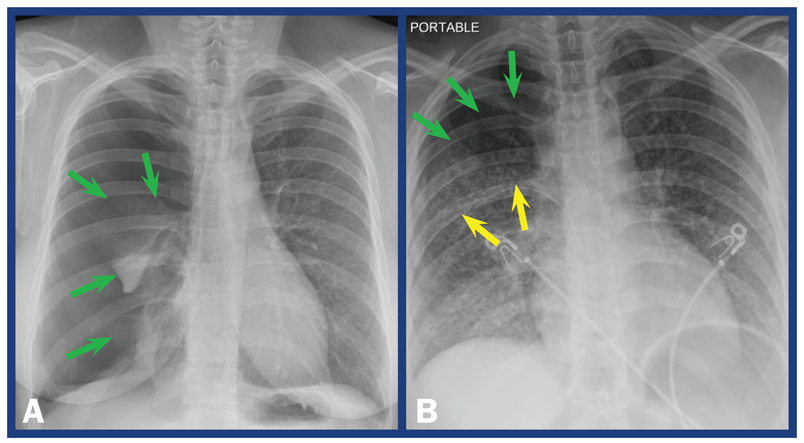

Figure 1. Chest X-rays
(A) PA & Lateral done at Urgent Care. Green arrows point to a large right PTX. (B) AP view done after chest tube placement. Green arrows point to a small PTX, and yellow arrows to the chest tube. Mild granular airspace disease is seen as well.

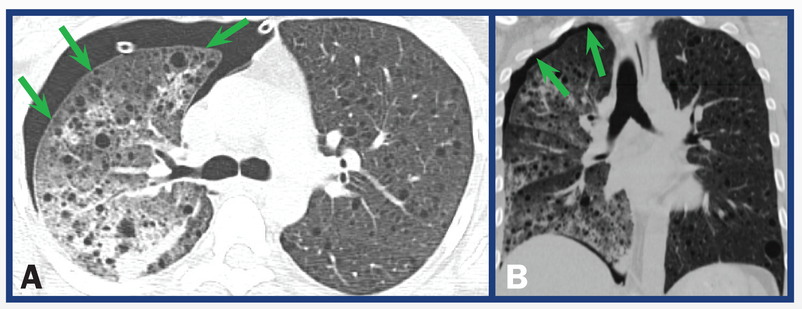

Figure 2. CT Chest w/o Contrast
Multiple tiny cystic structures present throughout both lungs consistent with LAM. Green arrows point to remaining PTX.

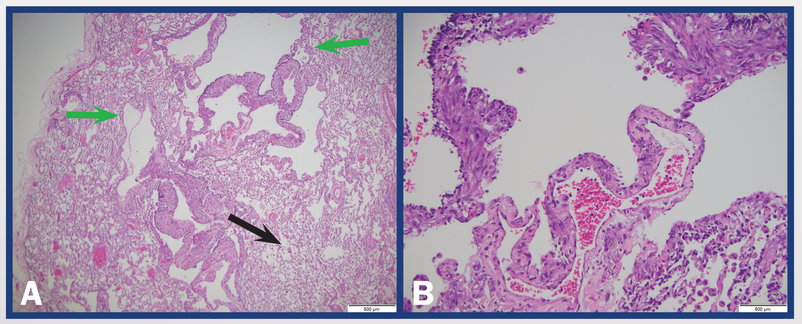

Figure 3. Histology of Right Middle and Lower Lobe Biopsy
Histology shows areas of small cystic spaces lined by cuboidal epithelium and surrounded by plumped benign spindle cells. Findings were consistent with LAM. (A) Green arrows point to cystic areas. Black arrow points to normal lung. (B) Cystic area that has been enlarged.

LABS

- WBC: 7.9 K/uL
- Procalcitonin: <0.08 ng/mL
- Respiratory 4 Plex: Negative
- UDS: + Cocaine, THC
- VEGF-D Level: 384 pg/mL (normal<600 pg/mL)

DISCUSSION

LAM occurs in only 1-3 cases per million but is found in up to 5% of women from 25 to 54 years old with a sentinel spontaneous PTX.[1] It can be associated with tuberous sclerosis and is caused by mutations of the TSC1/TSC2 genes leading to overactivation of the mTOR pathway. Lungs are the primary site of involvement, but renal angiomyolipomas, lymphangioleiomyoma and lymphadenopathy can also occur. 73% of patients first experience dyspnea and fatigue, which often delays diagnosis and contributes to why 57% of patients initially present to medical attention with a spontaneous PTX.[2]

Chest radiography is insufficient, but high-resolution CT (HRCT) can diagnose LAM in up to 91% of cases.[3] An elevated VEGF-D level is 86% sensitive in detecting LAM, and when combined with HRCT, can obviate the need for biopsy.[4] Treatment includes pleurodesis and sirolimus, an mTOR inhibitor. Without treatment, patients average 2.5 additional pneumothoraces after their first PTX, and is why screening for LAM may be cost effective in women of childbearing age with a sentinel spontaneous PTX. [1,5,6]

CONCLUSION

This case highlights how diagnosing LAM can be delayed, and that screening premenopausal women with a spontaneous PTX for LAM using HRCT is important in preventing recurrent pneumothoraces.

REFERENCES

1) Hagaman, J. T., Schauer, D. P., McCormack, F. X., & Kinder, B. W. (2010b). Screening for Lymphangioleiomyomatosis by High-Resolution Computed Tomography in Young, Nonsmoking Women Presenting with Spontaneous Pneumothorax Is Cost-Effective. American Journal of Respiratory and Critical Care Medicine, 181(12), 1376–1382.

2) Taveira-DaSilva AM, Moss J. Clinical features, epidemiology, and therapy of lymphangioleiomyomatosis. Clin Epidemiol. 2015;7:249-257. Published 2015 Apr 7.

3) Tobino, K., Hirai, T., Johkoh, T., Kurihara, M., Fujimoto, K., Tomiyama, N., Mishima, M., Takahashi, K., & Seyama, K. (2012). Differentiation between Birt–Hogg–Dubé syndrome and lymphangioleiomyomatosis: Quantitative analysis of pulmonary cysts on computed tomography of the chest in 66 females. European Journal of Radiology, 81(6), 1340–1346.

4) Young, L. R., Inoue, Y., & McCormack, F. X. (2008). Diagnostic Potential of Serum VEGF-D for Lymphangioleiomyomatosis. The New England Journal of Medicine, 358(2), 199-200.

5) Bintcliffe, O. J., Hallifax, R. J., Edey, A., Feller-Kopman, D., Lee, Y., Marquette, C., Tschopp, J., West, D. B., Rahman, N. M., & Maskell, N. A. (2015). Spontaneous pneumothorax: time to rethink management?The Lancet Respiratory Medicine, 3(7), 578–588.

6) Gupta, N., Langenderfer, D., McCormack, F. X., Schauer, D. P., & Eckman, M. H. (2017). Chest Computed Tomographic Image Screening for Cystic Lung Diseases in Patients with Spontaneous Pneumothorax Is Cost Effective. Annals of the American Thoracic Society, 14(1), 17–25.

St. Luke's