

# CyPath® Lung in Practice: From Uncertainty to Clarity and Confidence

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CyPath® Lung

## Case Study Gloria: CyPath® Lung detects rare pulmonary mucinous adenocarcinoma at Stage 1A

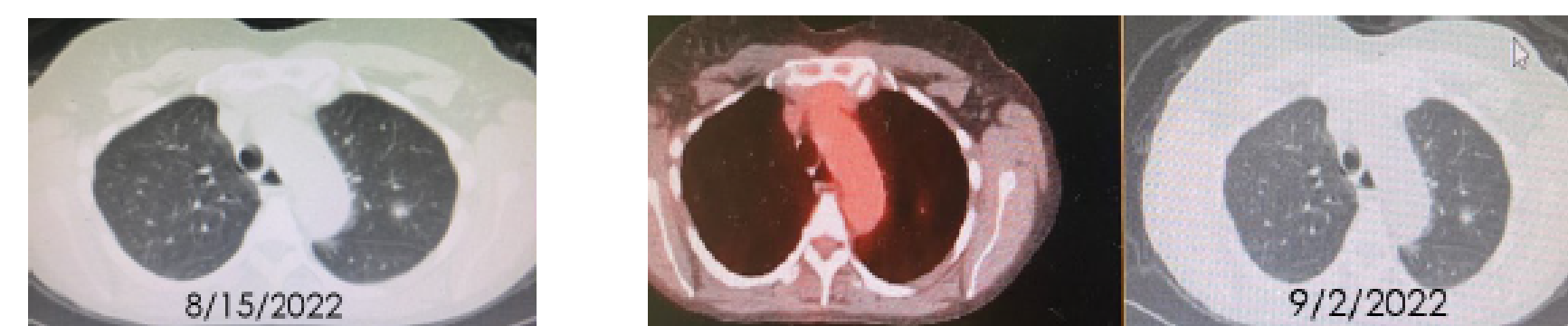
### Patient Information and Initial Workup

- **Age:** 62 years old
- **Sex:** Female
- **Smoking status:** 100+ pack-year history
- **Medical history:** Stage 1 COPD (FEV1 109%)
- **Status:** High risk due to heavy smoking history and COPD
- **Presentation:** Chest X-ray with abnormal hyperinflation
- **Scans:** LDCT in August 2022, May 2023 and July 2024; PET in September 2022
- **Surveillance:** Patient missed recommended follow-up appointments

NOTE: Actual patient case, but name has been changed to ensure privacy.

### Imaging Results

LDCT on 08/15/22 revealed 12mm LUL mixed solid nodule with GGO features, lung cancer probability of 16%. PET scan SUV was 1.19, lung cancer probability 3.5% under Herder model.



12 mm GGO LUL

PET SUV 1.19

Missed 2 follow-up appointments; next LDCT scans were 5/25/23 and 10/18/2023 without significant changes. But 7/18/24 LDCT showed growth and less GGO characteristics. By 3/10/25 LDCT nodule had grown to 14mm with cystic changes.



No significant change

More solid, less GGO

Enlarged to 14mm, solid with cystic changes

### Additional Findings/Next Steps

- **Brock model risk:** 16%/3.5% (Herder model with PET)
- **Nodify:** first blood serum marker test returned "reduced risk" result; second Nodify test came back as "indeterminate" with no circulating antibodies
- Patient refused invasive bronchoscopic biopsy
- **Follow-up PET:** denied by insurance in July 2024
- **Outcome with CyPath® Lung**
- **CyPath® Lung:** 3/7/25 test result: 0.56, likely malignancy
- **Wedge resection:** Successful surgery on 6/11/25 with good margins, negative nodes
- **Diagnosis:** Stage 1A lung mucinous adenocarcinoma
- Patient quit smoking March 2025 and has returned to baseline pulmonary function
- **CyPath® Lung:** detected pulmonary mucinous adenocarcinoma in a high-risk individual whose previous tests and follow-up scans suggested a low probability of cancer

COPD=chronic obstructive pulmonary disease; LDCT=low-dose computed tomography; PET=positron emission tomography; LUL=left lower lobe; GGO=ground-glass opacity.

## Case Study Paula: Complex low-metabolic nodule detected at Stage 1A in low-risk patient

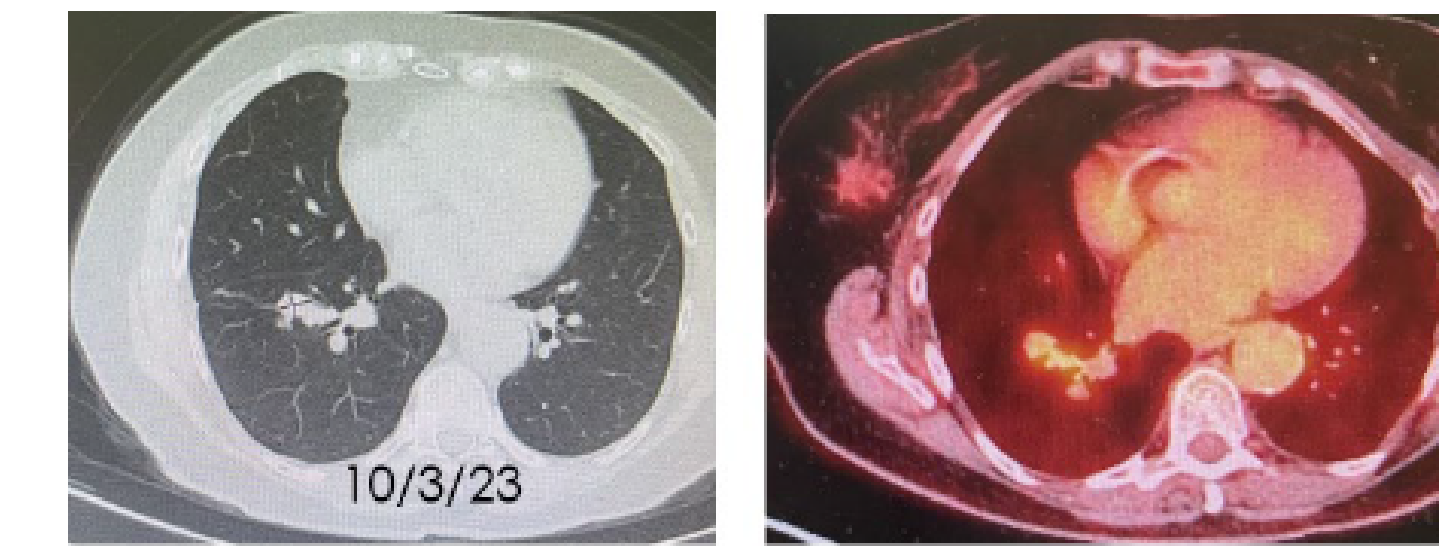
### Patient Information and Initial Workup

- **Age:** 80 years old
- **Sex:** Female
- **Smoking status:** Quit in 1999
- **Medical history:** Hypertension, stroke, COVID-19 infection in 2021
- **Status:** Low risk
- **Presentation:** Asthma symptoms post-COVID, including cough, dyspnea, wheezing. Patient placed on Augmentin, asthma inhalers
- **Chest x-ray** showed lobulated opacity in RLL
- **Surveillance:** 6-month follow-up LDCT recommended

NOTE: Actual patient case, but name has been changed to ensure privacy.

### Imaging Results

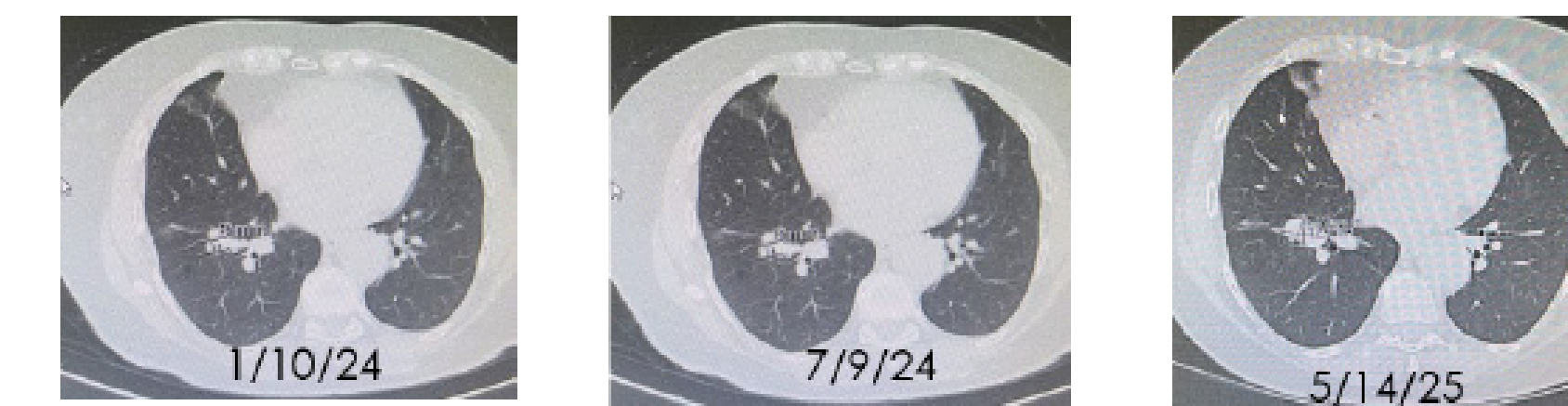
LDCT on 10/3/23 revealed 13mm lobulated nodule in RLL. 10/5/23 PET scan SUV was 2.5, lung cancer probability 15.9%



13mm LOBULATED NODULE

PET SUV 2.5, 10/5/23

LDCT scans on 1/10/24 and 7/9/24 no significant changes in the RLL nodule. LDCT on 5/14/2025 revealed a change in the distal component of the lobulated RLL process, with growth and a more nodular appearance.



1/10/24

7/9/24

5/14/25

### Additional Findings/Next Steps

- **Brock model risk:** 15.9%/16.5% (Herder model with PET)
- **Nodify** blood serum marker test returned "reduced risk" result
- **Bronchoscopy** on 10/9/23 negative for suspicious cells but found S. Viridans consistent with active infection
- **Second bronchoscopy** on 3/17/25 again revealed inflammation markers but no suspicious cells
- **Outcome with CyPath® Lung**
- **CyPath® Lung:** 3/4/25 test result: 0.72, likely malignancy
- **Shared decision-making:** CyPath® Lung result convinced patient to undergo surgery despite conflicting information from other indicators
- **Robotic wedge resection:** Patient referred for surgery in June 2025
- **Diagnosis:** Stage 1A neuroendocrine tumor
- **CyPath® Lung:** Detected lung cancer in low-risk patient when PET, bronchoscopy and serum marker test suggested it was benign inflammation

LDCT=low-dose computed tomography; PET=positron emission tomography; RLL=right lower lobe.

## Background

The clinical burden of competent pulmonary nodule identification and definitive diagnosis is increasingly common. This is especially true in complex cases with conflicting results from diagnostic tests and procedures. Clinicians are tasked with in-depth difficult discussions with their patients when risk calculators, imaging, genetic and other adjuvant testing information points definitively either at benign or malignant process. Clinical presentations with unusual risk, imaging, age, functionality or newer adjuvant testing parameters make these discussions nearly impossible. I present three cases employing noninvasive sputum flow cytometry analysis in addition to standard LDCT, PET scans and blood proteomic testing to help address clinical decisions in three "atypical" presentations in our pulmonary nodule clinic. 1,2,3,4

## Case Study Mary: Stage 1A NSCLC Detected in Patient With Low-Risk PET Result and Risk Calculator Score

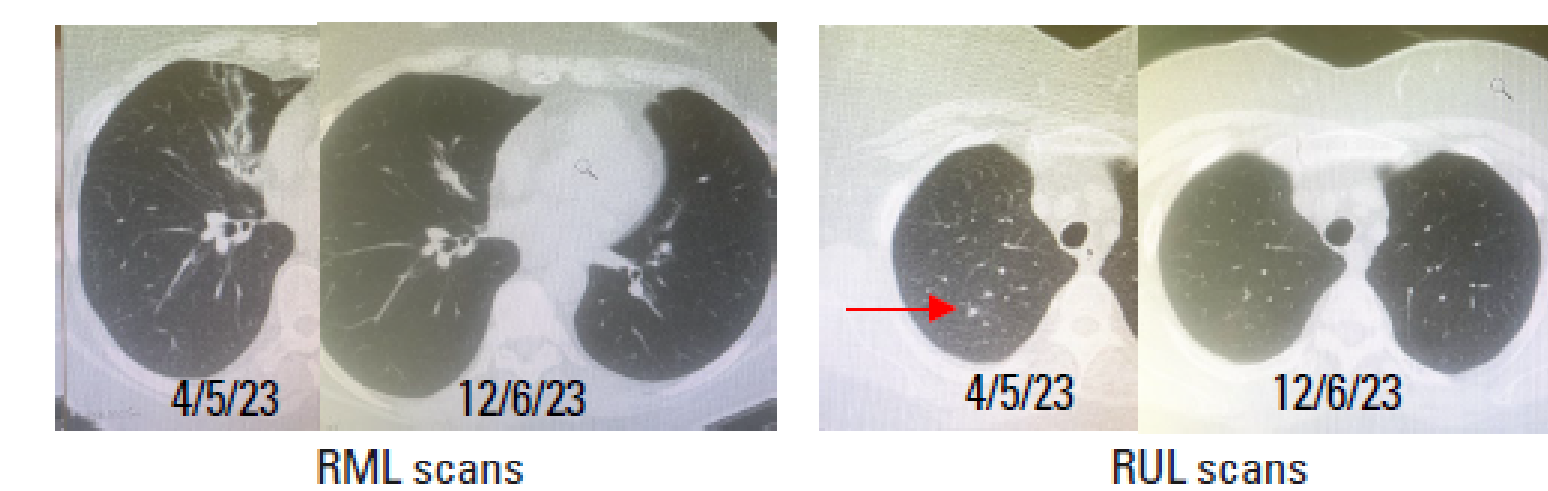
### Patient Information and Initial Workup

- **Age:** 67 years old
- **Sex:** Female
- **Smoking status:** >50 pack-year history; currently smokes ½ PPD
- **Medical history:** Stage 3 COPD with frequent exacerbations; FEV1 = 45%
- **Family history:** Unremarkable
- **Status:** High risk because of smoking history and COPD
- **Presentation:** Symptoms of RML syndrome
- **LDCT scans:** 4/5/23 and 12/6/23
- **Surveillance:** 6-month follow-up recommended, but patient only agreed to 12-month LDCT

NOTE: Actual patient case, but name has been changed to ensure privacy.

### Imaging Results

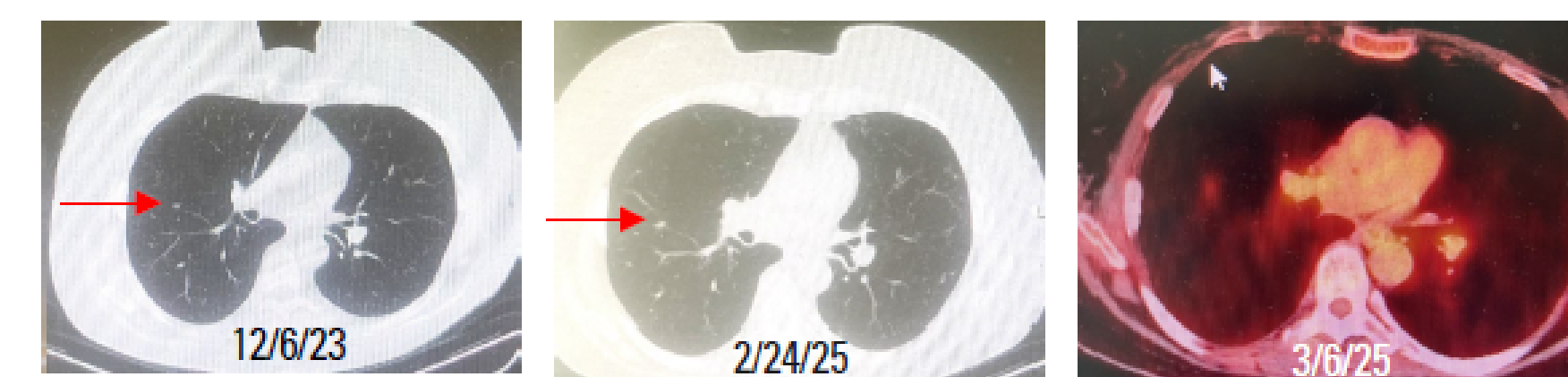
**RML and RUL scans:** RML changes on 4/5/23 LDCT improved on 12/6/23 LDCT, consistent with RML syndrome. 4/5/23 RUL LDCT revealed 5-mm nodule with 1.9% Brock model risk that resolved on 12/6/23 LDCT.



RML scans

RUL scans

**Minor fissure scans:** 12/6/23 LDCT scan revealed 3-mm nodule with 0.2% Brock model risk. 2/24/25 LDCT scan revealed 8-mm nodule with 4.6% Brock model risk. 3/6/25 PET scan with SUV of 1.1.



12/6/23

2/24/25

3/6/25

Changing non-calcified nodule in the minor fissure in the context of waxing and waning images in other parts of the lungs.

COPD=chronic obstructive pulmonary disease; LDCT=low-dose computed tomography; NSCLC=non-small cell lung cancer; PET=positron emission tomography; PPD=pack per day; RML=right middle lobe; RUL=right upper lobe.

### Additional Findings/Next Steps

- **Brock model risk:** 4.6%
- Bronchoscopy high risk and poor yield without robotic augmentation in a low-risk situation
- Risk calculator and PET suggested inflammation and not cancer, consistent with waxing and waning images
- **Outcome with CyPath® Lung**
- **CyPath® Lung:** 3/4/25 test result: 0.83, likely lung cancer (NOTE: CyPath® Lung was not available at the time of the 2023 scans.)
- **Robotic wedge resection:** R0 resection on 6/5/25, but with close margin
- **Diagnosis:** Stage 1A NSCLC; adenocarcinoma histology
- **Radiation oncology referral:** Opinion on close margin and possible need for radiation treatment
- **CyPath® Lung:** Detected lung cancer in high-risk patient with complex nodules when PET and risk models indicated low risk of malignancy

## Conclusions

Presented here are three clinical scenarios that have significant atypical features, but which are becoming more frequent in lung nodule practices. We have found that adding CyPath® Lung testing to our algorithm has accelerated diagnosis, helped guide difficult clinical discussions and prevented unnecessary invasive procedures.

## References

1. Ludmila Guralnik, et al., Journal of Nuclear Medicine April 2015, 56 (4) 518-522; DOI: <https://doi.org/10.2967/jnumed.113.131466>
2. Ambrosini V, et al., PET/CT imaging in different types of lung cancer: an overview. Eur J Radiol. 2012 May;81(5):988-1001. doi: 10.1016/j.ejrad.2011.03.020. Epub 2011 Mar 31. PMID: 21458181.
3. Kavidasan A, et al. (2018) Atypical Presentations of Lung Cancer: A Case Series. J Oncol Res Ther. JONT-143. DOI: 10.29011/2574-710X.000043
4. Gould MK, et al. Evaluation of individuals with pulmonary nodules: when is it lung cancer? Diagnosis and management of lung cancer, 3rd ed: American College of Chest Physicians evidence-based clinical practice guidelines. Chest. 2013 May;143(5 Suppl):e93S-e120S. doi: 10.1378/chest.12-2351. PMID: 23649456; PMID: PMC3749714

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