Lung Cancer Biomarker Testing ECHO
Case Presentation Form

Instructions

This case presentation form is intended to be completed and submitted electronically. Please email completed forms along with any optional supplemental information to korey.hofmann@cancer.org and carbon copy your regional ACS lead. We request that you submit your case presentation form **two weeks** prior to your scheduled case presentation. Please do NOT submit a scan of a printed version of this form.

This form includes four sections: **Section 1: Presenter Information & Case Presentation Summary**, **Section 2: System-Level Case Presentation**, **Section 3: Patient-Level Case Presentation** and **Section 4: Subject Matter Expert (SME) and Hub Team Recommendations**. You need to complete Section 1 and then, choose **either** Section 2 or Section 3. We recommend that each case presentation will range from **three minutes to five minutes**. Please do not include patient identifiers on this form or use any identifiers during the presentation. Please note, for patient-level case presentations, the SMEs and Hub Team will provide guidance that should NOT be interpreted as direct medical advice.

Project ECHO Data Usage Statement

Project ECHO® collects registration, participation, questions/answers, chat comments, and poll responses for some teleECHO® programs. Your individual data will be kept confidential. These data may be used for reports, maps, communications, surveys, quality assurance, evaluation, research, and to inform new initiatives.

Section 1: Presenter Information and Case Presentation Summary

1. **Presentation Date:** February 9, 2024
2. **Presenter Name(s):** Jose Galeas, MD
3. **Presenter Title(s):** Medical Oncologist
4. **Organization/Health System:** Infirmary Health Cancer Center, Mobile, Alabama
5. **Please summarize the case you are presenting to the group:**

(2016) Patient is a 71-year-old female with a 2-centimeter left upper lobe mass. Electromagnetic navigational bronchoscopy using radial endobronchial ultrasound (EBUS) was utilized in conjunction with CT guided biopsy, but both were non-diagnostic. MRI showed spiculations, so the patient was referred for PT1bPN0 (14/14 lymph nodes negative) surgical resection. Surgical pathology was positive for primary lung adenocarcinoma. PET scan revealed two hypermetabolic areas in the lungs and an abnormal lesion in T9. CT guided biopsy of T9 lesion revealed metastatic lung adenocarcinoma. Palliative radiation, chemotherapy and immunotherapy was started. CT chest (2022) revealed innumerable miliary nodular densities.

The ION was employed to evaluate whether these densities represented disease progression. A 4.5 mm nodule was successfully targeted using the ION in conjunction with EBUS and fluoroscopy (2023). Pathology of the biopsy confirmed non-small cell carcinoma consistent with pulmonary adenocarcinoma, and immunohistochemistry revealed an EGFR L858R mutation. The patient was started on Osimetinib.

6. **Which specific questions are you asking the Hub Team and the other participant learning sites?**

- Is tissue for NGS still king?
- What is the value of bone tissue for NGS?

<table>
<tr><td colspan="5">DEMOGRAPHIC INFORMATION</td></tr>
<tr><td>1. Age</td><td>2. Gender (Choose One)</td><td colspan="3">3. Race/Ethnicity (Choose All that Apply)</td></tr>
<tr><td>78</td><td>Female X
Male☐
Non-Binary/Third gender☐
Transgender female☐
Transgender male ☐</td><td>American Indian/Alaska Native ☐
Asian ☐
Black/African American ☐</td><td colspan="2">Hispanic/Latino ☐
White ☐
More than One Race ☐
Other ☐</td></tr>
<tr><td colspan="5">NON-SMALL CELL LUNG CANCER (NSCLC) HISTOLOGY & STAGE</td></tr>
<tr><td>4. Diagnosis</td><td>5. Histology</td><td colspan="3">6. Stage</td></tr>
<tr><td>Initial Diagnosis ☐
Recurred and or Progressed X</td><td>Adenocarcinoma X
Squamous Cell ☐
Large Cell ☐</td><td colspan="3"></td></tr>
<tr><td colspan="5">BIOMARKER TESTING</td></tr>
<tr><td colspan="2">7. Has biomarker testing been ordered for this patient (or will it be ordered)?</td><td colspan="3">8. If biomarker testing was not ordered, please elaborate on the factors that precluded it:</td></tr>
<tr><td colspan="2">Yes X
No ☐
Will be ordered ☐</td><td colspan="3">Click or tap here to enter text.</td></tr>
<tr><td colspan="5">The next section is ONLY for those patients who HAVE received or WILL receive biomarker testing</td></tr>
<tr><td colspan="5">9. Which technique was used (or will be used) to obtain specimen for pathologic diagnosis? (Choose One)</td></tr>
<tr><td colspan="2">Bronchoscopic biopsy ☐
Endobronchial ultrasound-guided transbronchial lymph node aspiration (EBUS-TBNA) ☐
Image-guided percutaneous biopsy ☐
Liquid biopsy ☐</td><td colspan="3">Mediastinoscopy ☐
Surgical specimen ☐
Thoracentesis/pericardiocentesis ☐
Unsure ☐
robotic assisted endoluminal navigational bronchoscopy system (ION)</td></tr>
<tr><td colspan="2">10. Which platform was/will be used for lung biomarker testing? (Choose One)</td><td colspan="3">11. If single-gene test or short-cluster panel, please identify which genes were tested:</td></tr>
<tr><td colspan="2">Single-Gene Test ☐
Short-Cluster Panel ☐
Multi-Gene Panel (next generation sequencing (NGS)X</td><td>ALK ☐
BRAF ☐
EGFR ☐</td><td>HER2 ☐
KRAS ☐
NTRK ☐
MET ☐</td><td>PD-L1 ☐
ROS1 ☐
RET ☐</td></tr>
</table>

ADDITIONAL INFORMATION
12. **Please include any other information you would like to share with the group:** This particular case is a patient with advanced recurrent disease, but it demonstrates the ability of this technology (robotic bronchoscopy) to target and identify actionable mutations in sub-centimeter nodules. The theoretical benefit being its utility in targeting subcentimeter SPNs and identifying malignancy at a stage amenable to curative therapy.

DISCUSSION SUMMARY:

Questions for consideration:

- Is tissue for NGS still king?
- What is the value of bone tissue for NGS?
- What's the value of robotic bronchoscopy for

Wonder if original primary from 2016 was tested? Didn't have tissue in 2016; unfortunately back in 2016 there wasn't much discussion about testing for early stage malignancies

Do you have details on the variant allele frequency for the Pik3CA from the liquid analysis? Unfortunately do not have the allele frequency

What was the thought of process about biopsy and watching the multiple nodules in 2022? Patient was on immunotherapy; patient started to experience symptoms of shortness of breath. Considered switching her to chemotherapy. Nodules were small, but there was no evidence of disease. Lesions were small but growing; too small to consider biopsy and considered robotic bronchoscopy as an option. **Dr. Sears** – Definitely would have completed bronchoscopy for this patient. **Dr. Tanner** – Benefit of robotic bronchoscopy for smaller lesions. **Dr. Galeas** – Bronchoscopy was completed on the patient, but nothing identified at that time. Symptoms improved and patient continues to be asymptomatic.

What happens when the biomarker testing was done on the original primary at another institution? How does that work at your institution?
Dr. Galeas – Unfortunately, testing on the original primary cancer was done elsewhere and not available. **Dr. Johnson** commented that his organization (DFCI) has staff who will track down prior test results. **Dr. Dy** mentioned having the same at Roswell Park, but depending on the time that's passed from the original test may not be instructive or it may be a separate primary cancer.

Can you talk about the value of using bone for biopsy if there are no other options?
Dr. Tanner – It's not ideal; we will often send blood concurrently; the decalcification makes it tricky but if there's any other option that what we'll got to. **Dr. Sears** – That's where the value of the multidisciplinary discussion comes in; sometimes the radiologist will identify where there's more soft tissue and not just bone, and often those end up being good for testing. **Dr. Merker** – Communication with pathology can be so helpful; we'll try to dissect out the softer portions to create a block for molecular testing. It does have a higher failure rate, but I think it's worth doing.

Dr. Galeas - **Can we talk briefly more about cryotherapy and robotic bronchoscopy as new technologies? Should we be using it everywhere? Dr. Tanner** shared that the combined diagnostic yield for all of these things (interventional pulmonology procedures) is **65-69%.** Higher yields are often institution-specific. One nice thing about robotic bronchoscopy is that we can stage the mediastinum and then go out to primary tumor in the right patient. Cons include cost. It requires anesthesia time and a robotic bronchoscopy unit costs about a half a million dollars. Adding cone beam CT is another half a million dollars. The yield is approximately 70% compared to CT guided biopsy yield of 97% with no OR or anesthesia time. Needs to be a thoughtful decision considering patient impact, time and cost.