Allina Health

Virginia Piper Cancer Institute Clinical Service Line System-wide Consensus Guidelines: **Establishing the Diagnosis of Lung Cancer and Adequate Tissue Samples**

These guidelines apply to clinical interventions that have well-documented outcomes, but whose outcomes are not clearly desirable for all patients

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System-wide Ownership Group: Allina Health Lung Cancer Program Committee
System-wide Information Resource: Lung Cancer Clinical Program Leader

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SCOPE:

Sites, Facilities, Business Units	**Departments, Divisions, Operational Areas**	**People applicable to**
Allina Health – All Facilities that either perform or are responsible for obtaining lung biopsy specimens or performing molecular testing on these specimens: Abbott Northwestern Hospital, Buffalo Hospital, Cambridge Medical Center, District One Hospital, Mercy Hospital, New Ulm Medical Center, River Falls Area Hospital, Regina Hospital, St. Francis Regional Medical Center, and United Hospital	Radiology Pathology Thoracic Surgery Pulmonology	Physicians, Advanced Practice Providers

PICO(TS) Framework:
Population Patients suspected of having lung cancer
Intervention CT guided biopsy, Ultrasound guided biopsy, EBUS/EUS fine needle aspirations, Bone biopsies, Endobronchial/Transbronchial biopsies and ENB biopsies
Comparison n/a
Outcomes Recurrence Ensure adequate tissue is collected for histologic diagnosis and for ancillary testing
Timing At time of diagnosis
Setting Locations where procedures are performed: Hospitals

CLINICAL PRACTICE GUIDELINES:
When the clinical and radiographic findings suggest lung cancer, PET/CT should be considered prior to biopsy in order to define an optimal strategy for making the diagnosis of lung cancer. As noted in recent ACCP guidelines: The physician evaluating the patient with suspected lung cancer must understand that obtaining adequate amounts of tissue at the time of diagnosis is essential if accurate histologic differentiation (squamous cell vs. adenocarcinoma) is to be achieved and, when applicable, the tissue can then be evaluated for theranostic molecular alterations or biomarkers. The goal is to identify the biopsy site of highest stage to provide tissue for diagnosis, ancillary testing, and staging information and to minimize the number of procedures performed in work-up.

The following guidelines have been proposed for sampling:
Prior to collecting tissue, the purpose of tissue collection (histologic diagnosis, ancillary testing only, or histologic diagnosis and ancillary testing) should be communicated to the proceduralist. We recommend that the proceduralist procure enough tissue to facilitate ancillary testing. Tissue cores and/or cell blocks should be collected since they provide the largest amount of material for assessment and facilitate both immunohistochemical analysis and molecular testing. Although there is no data that mandate rapid on-site evaluation (ROSE) at the time of the biopsy procedure; it is recommended that a cytotechnologist or pathologist provide adequacy assessment when feasible.

1.) CT guided lung biopsy
    a. Minimum 2-3 core needle tissue cores with minimum 20/21g needle
2.) Ultrasound guided biopsy
    a. Core biopsy if possible as first choice, minimum 2-3 core needle biopsy
    b. FNA acceptable at discretion of radiologist if core biopsy felt to be risk prohibitive. Four - eight (dependent on cellularity) passes are suggested.
3.) EBUS/EUS
    a. 21 or 22g needle for EBUS; 25g and/or core needle may be used on trial basis with additional recommendations to follow clinical experience.
    b. 25g needle for EUS; a larger gauge needle may be used at the discretion of the gastroenterologist or as clinical circumstances dictate.
    c. 4-8 (dependent on cellularity) passes suggested for diagnosis, cell block material and ancillary testing

4.) Bone
   a. Choose safest site with largest volume
   b. Should be lytic lesion for best yield
   c. Volume standards: Minimum 2-3 core needle biopsy with minimum 20/21g needle or 4-8 (dependent on cellularity) passes suggested for diagnosis, cell block material and ancillary testing
5.) Endobronchial/Transbronchial Biopsy
   a. 4-6 biopsies
6.) ENB (Electronavigational bronchoscopy)
   a. Guidelines to follow clinical experience

SUPPORTING EVIDENCE:

The diagnosis and treatment of lung cancer requires enough tissue for histologic diagnosis and for potential ancillary studies. The minimum amount of tissue necessary for this analysis has not been definitively established. Overall tumor content (i.e. percentage of tumor) and tumor viability significantly affects the success of this analysis.

It is estimated that a minimum of 200-400 tumor cells is necessary for molecular analysis. Molecular analysis may require less tissue than that which necessary for histologic subtyping. The amount of tissue obtained by biopsy sampling techniques varies significantly and partly determines the number of samples necessary to accurately classify and analyze a lung cancer biopsy sample.

Biopsy Technique and Volume of Diagnostic Material[a]				
	21-g Needle Aspiration	19-g Needle Aspiration	Transbronchial Biopsy	CT-Guided Needle Biopsy
No. of cells per biopsy/ aspiration	≥100	≥150	≥300	≥500
No. of biopsies	4	4	4	2–3

CT-guided Needle Biopsies

The pooled sensitivity of transthoracic needle biopsy for a diagnosis of lung cancer is 90% from several large studies. There is a trend towards lower sensitivity for lesions < 2 cm in diameter. It is recommended that core needle biopsies be performed when feasible.

Endobronchial/Transbronchial Biopsies

The overall yield for a diagnosis of malignancy from four biopsy samples varies from 70-90%. There are approximately 300 cells per biopsy and the mean tumor percentage area of tumor is 33%. In addition, on average less than ½ of the samples obtained at the time of biopsy contain tumor. Therefore, consideration should be given to obtaining up to 6 endobronchial/transbronchial biopsies.

EBUS/EUS Samples

Several studies have reported high feasibility (range, 67%-100%) of performing immunohistochemical and molecular analysis on specimens obtained via EBUS-NA. The optimal number of needle punctures/passes required to provide sufficient material for

both molecular analysis and diagnosis has yet to be defined. In general, 3–4 needle punctures/passes optimizes for the diagnosis of malignancy. Although it has been reported that both molecular analysis and diagnosis of malignancy can be performed on as little as 2–3 passes, it seems prudent to obtain more material to ensure sufficiency for both analyses. Some studies report that the optimal number of passes to establish a diagnosis of malignancy is 4.4. Therefore, we recommend that at least 3–4 passes are performed to establish a diagnosis of malignancy and additional samples should be collected for cell block preparation.

Bone Biopsies/Curetting's

Bone-decalcifying solutions fragment DNA extensively. Tissues treated with acidic solutions cannot be used for lung cancer ancillary testing. This is particularly problematic for analysis of bone metastases, which are usually decalcified in acidic solutions. Therefore, we recommend that special consideration be given to the selection of bony sites to biopsy. Lytic lesions that yield soft tissue are the most amenable to molecular analysis. It may be possible to prepare cell blocks from aspirate material that are suitable for molecular analysis. If bony curettings are obtained, some of the tissue material should be segregated in neutral buffered formalin without decalcifying solutions.

DEFINITIONS: N/A
SPECIAL ENTITIES: N/A
FORMS: N/A
ALGORITHM:

ADDENDUM:

Plan for Monitoring and Adherence – At this time, we are unable to easily monitor for adherence. In 2017, these guidelines will be updated based on new data being published. At that time, we will update this consensus guideline and determine if it is feasible to monitor adherence.

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Alternate Search Terms: N/A

Related Guidelines/Documents

Name	Content ID	Business Unit where Originated
N/A		