Allina Health

Allina Lung Program Consensus Guidelines

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

Adequacy of Sample for Biopsies in Lung Cancer Diagnosis

Approved By: Allina Lung Program Committee
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INTRODUCTION:

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 driver mutations" The goal is to identify the biopsy site of highest stage to provide diagnosis and staging information and minimize number of procedures performed in work-up.

RECOMMENDATIONS:

The following guidelines have been proposed for sampling:

1.) CT guided lung biopsy
   a. No FNA except for cavitary lesion
   b. Minimum 2-3 core needle biopsy 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. 4-8 (dependent on cellularity) passes 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

SCOPE:

Sites, Facilities, Business Units	Departments, Divisions, Operational Areas	People applicable to (MD, NP, Administration, Contractors etc.)
Allina – All Facilities	Radiology	MD
Allina – All Facilities	Pathology	MD
Allina – All Facilities	Thoracic Surgery	MD
Allina – All Facilities	Pulmonology	MD

OVERVIEW AND SUPPORTING EVIDENCE:

Paradigm shifts in the diagnosis and treatment of lung cancer require that enough biopsy tissue is obtained to not only distinguish between small call and non-small cell carcinoma, but also to try and determine a histologic subtype and provide enough material for molecular analysis of EGFR mutation status and ALK rearrangements (in the appropriate clinical setting). 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. Furthermore, some poorly differentiated non-small cell lung carcinomas cannot be classified even after immunohistochemical staining. Such cases account for approximately 23–27% of poorly differentiated non-small cell lung carcinomas, which equates to approximately 7% of all non-small cell carcinomas

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 should not be used for EGFR 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.

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