

GUIDELINES FOR PERCUTANEOUS TRANSTHORACIC NEEDLE BIOPSY

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Introduction

Many intrathoracic lesions can be diagnosed only by examining a sample of tissue. Percutaneous biopsy by means of a needle directed into the lesion under fluoroscopic or computer tomographic guidance yields sufficient material for cytology, microbiology, and sometimes histology, thereby sparing the patient from more invasive and uncomfortable procedures. At present, in well-trained and experienced hands, needle biopsy is an accepted, safe, and productive technique. While experience and sound clinical judgment will determine its use in individual cases, the following are broad guidelines that are generally agreed upon. They have been prepared for the purpose of educating health professionals and enhancing the quality of patient care.

Indications

1. To determine the etiology of solitary or multiple lung nodules, particularly when infection or cancer is suspected.
2. To identify and classify histologically a pulmonary cancer that is clearly nonresectable (e.g., a right apical mass with SVC syndrome).
3. To diagnose metastatic spread to lung or pleura of previously identified cancer (e.g., pulmonary nodule in patient with past history of malignant melanoma).
4. To identify malignant origin and cell type of a pulmonary tumor noted in association with obvious metastatic lesions (e.g., seizures, multiple brain metastases, pulmonary tumor).
5. To diagnose cancer in a patient who, because of personal or clinical reasons, is not a candidate for resection of the lesion unless it is definitely malignant (e.g., solitary lung nodule in a patient with advanced chronic obstructive pulmonary disease).
6. To obtain material for microbiologic staining and culture from lesions and areas of parenchymal infiltration suspected to be of infectious origin.
7. To obtain diagnostic material from lymph nodes and other lesions in the mediastinum.

Conditions Involving Increased Risk

As in all clinical situations, the risk of percutaneous needle biopsy must be weighed against the potential benefit for the patient.

Sound clinical judgment and careful assessment of each patient must predominate, especially in decisions regarding the need for hospitalization. Increased risk situations include the following.

1. Presence of lung disease sufficiently advanced that a pneumothorax would cause severe respiratory distress.
2. Bullous emphysema or cysts within or adjacent to area to be biopsied.
3. Respiratory insufficiency associated with moderate to severe hypoxemia or any degree of hypercarbia.
4. Uremia, pulmonary hypertension, and coagulation disorders (possible hemorrhage after biopsy).
5. Lesion located away from pleural surface, in hilar areas, or adjacent to or within mediastinum.
6. Recent myocardial infarction, unstable angina, cardiac decompensation, or uncontrolled cardiac arrhythmia.
7. Debility, advanced age, or malnutrition.
8. Superior vena cava obstruction.
9. Patient lives alone or at a distance from facility where biopsy is performed.
10. Lack of patient cooperation.

In most situations involving increased risk, patient safety requires prolonged or overnight observation after the procedure.

Contraindications

1. Absence of consent from the patient or his/her representative.
2. Biopsy by an inexperienced person without direct supervision.
3. Lack of adequate facilities and personnel to provide emergency care for pneumothorax, hemorrhage, or cardiopulmonary arrest.
4. Inability to adequately oxygenate the patient during the procedure.
5. Uncorrectable abnormalities of coagulation.
6. Severe pulmonary hypertension.
7. Uncooperative patient who is unable or unwilling to remain still and control breathing and coughing on command.
8. Unavailability of appropriate imaging equipment.
9. Inability to visualize the lesion at the time of biopsy.
10. Lesion suspected to be vascular.
11. Patient requiring or anticipated to require mechanical ventilation.
12. Situations in which biopsy results, whether negative or positive, would have no effect on the patient's management or prognosis.

Additional Comments

1. Percutaneous needle biopsy is seldom an isolated procedure in the management of a patient. Usually it is but a single component of a more extensive evaluation and treatment program.

2. In general, the technique has proved to be most dependable in the diagnosis of carcinomas and infectious lesions. It is considerably less dependable in other conditions, especially those characterized by pleomorphic morphology where a small sample may be misleading, such as in lymphoma, thymoma, or mesothelioma.

3. The handling of specimens varies from one institution to another but is best coordinated between the physician performing the procedure and the pathology department. It is often useful to have a cytopathologist present at the procedure to examine the aspirate and determine whether or not sufficient material is available for diagnosis, as this may save the patient a repeat procedure. Cultures, when appropriate, are handled in the usual fashion.

4. Percutaneous needle biopsy should be performed by a physician trained and experienced in pulmonary and mediastinal diseases and the safe and effective operation of imaging equipment. Moreover, the physician should have been specifically trained in this technique, including having performed biopsies under the direct supervision of a physician experienced in percutaneous needle biopsy.

5. Patients who have a symptomatic pneumothorax of any extent should be kept under prolonged observation, usually as hospital inpatients. A chest tube may be required if the pneumothorax becomes clinically significant.

6. Cutting needles should not be used to biopsy diffuse infiltrative lung diseases or lesions in or adjacent to the mediastinum or hilar areas.

This paper was prepared by the Practice Committee of the ATS Council of Chapter Representatives. Members of the Committee are:

JOSEPH W. SOKOLOWSKI, JR., M.D., *Chairman*
LOUIS W. BURGHER, M.D.
FREDERICK L. JONES, JR., M.D.
JAMES R. PATTERSON, M.D.
PAUL A. SELECKY, M.D.

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