Pulmonary Amyloidoma
Histologic Proof Yielded by Transthoracic Coaxial Fine Needle Biopsy

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Nodular pulmonary amyloidosis was diagnosed by percutaneous transthoracic fine needle biopsy specimen in an 88-year-old woman. Congo red staining should be performed whenever band-like hyalinized material is obtained on aspiration of a solitary nodule. Dense calcifications can occur in pulmonary amyloidomas. In selected cases, fine needle biopsy appears to be preferable to transbronchial forceps biopsy since the risk of a possibly life-threatening pulmonary hemorrhage may be lower.

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Pulmonary amyloidosis predisposes to bronchial hemorrhage due to invasion of the blood vessel walls. Transbronchial forceps biopsy has been reported to cause fatal hemorrhage. We describe a case in which histologic proof was obtained using a coaxial fine needle puncture technique.

CASE REPORT

An 88-year-old woman was admitted to the hospital for evaluation of a single episode of hemoptysis. She had coughed up blood to the amount of a teacup. There were no other complaints. The patient had never experienced hemoptysis before and was a nonsmoker. Her medical history was unremarkable except for a calcified nodule in the left lung. This nodule had been detected 12 years before during a routine checkup and had been asymptomatic. No histologic diagnosis was made at the time of detection. It was supposed to be a hamartoma since it contained coarse calcifications and did not increase in size during follow-up checks for five years (Fig 1).

On physical examination some coarse rales were heard postero-basally in the right lung. Laboratory data showed no abnormalities in serum and urine. Chest roentgenography revealed a total of three partially calcified nodules in both lower lung fields (not shown). At fiberoptic bronchoscopy, some bloody streaks were seen in the right bronchial tree, but neither an active bleeding site nor an endobronchial lesion was found. Endobronchial washings and sputum examination did not yield a diagnosis. Hemoptysis did not recur.

For percutaneous biopsy, the coaxial down-the-beam puncture technique was used. The coaxial needle set consisted of a 15-cm 19.5G (1.0 mm) outer needle, and a 20-cm 21G (0.8 mm) inner needle (Angiomed, Karlsruhe, Germany; US: EZ-E-M, Westbury, NY). The inner needle fits snugly into the outer needle. The right-sided lesion was punctured percutaneously, and several samples were taken with the inner needle, using the outer needle as a sheath. The biopsy procedure was uneventful: no hemoptysis or pulmonary hemorrhage occurred. Histologic and cytologic evaluation of the aspirated material demonstrated massive homogeneous eosinophilic material that stained for amyloid with Congo red, and contained finely dispersed granules of calcification (Fig 2).

Since no clinical or laboratory evidence was found for this amyloid to be systemic or secondary, a clinical diagnosis of primary nodular pulmonary amyloidosis was established, although no exten-

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FIGURE 1. Anteroposterior tomogram of the single nodule in the left lower lung field 12 years before. Note popcorn calcifications and well-defined margins. Diameter of lesion: 2 cm. On chest roentgenography prior to needle biopsy the lesion had slightly increased in size, but was otherwise unchanged. Two additional similar nodules were then seen in the right lower lung field (not shown).

sive biopsies of possible amyloid target sites were carried out.

As the patient was of an advanced age and the prognosis of this affliction is usually good, we elected not to perform thoracotomy and treat the patient conservatively. Up to now (20 months later) the patient is in good condition and asymptomatic. In case severe hemoptysis recurs, bronchial artery embolization will be considered as a therapeutic option.

DISCUSSION

Pulmonary infiltration occurs frequently in patients with systemic amyloidosis, particularly in those with cardiac involvement. Amyloidosis limited to the lower respiratory tract is a rare disorder.

Three types of pulmonary amyloidosis have been described: (1) focal deposits of amyloid within the mucosa and adventitia of the major airways; (2) single or multiple parenchymal nodules; and (3) diffuse parenchymal infiltrates involving the alveolar septa and the walls of small blood vessels.

The second type was found in our patient. Radiologically, the appearance cannot be distinguished from malignant or benign neoplasms and chronic inflammatory or granulomatous lesions. The nodules vary in size and may be single or multiple. Calcification, bone formation, and cavitation can occur. Clinical presentation is usually asymptomatic during routine checkup. Hemoptysis, cough, and dyspnea are uncommon. The prognosis in nodular pulmonary amyloidosis is usually good, contrary to the other types of pulmonary amyloidosis. Other authors agree that thoracotomy need not be performed, when the diagnosis is made by transthoracic needle biopsy specimen.
Prolonged and/or intractable bleeding from the amyloidoma due to amyloid infiltration of the muscular layers of the small blood vessels has been observed.\textsuperscript{1,2} Amyloid infiltration may prevent the muscular walls from contracting sufficiently to prevent further bleeding. It seems likely that the risk of such bleeding increases with the degree of trauma that is being inflicted on the tissues by transbronchial or percutaneous biopsy. Fatal bleeding after transbronchial biopsy in a case of nodular pulmonary amyloidosis has been reported.\textsuperscript{3} During transbronchial forceps biopsy, lesions are made varying in size from 1.5 to 5 mm.\textsuperscript{4} The size of the lesions caused by percutaneous fine needle biopsy is approximately 0.6 to 0.9 mm, depending on the size of the needle (20 to 23 gauge). The numbers of samples taken with forceps and needle biopsy are generally similar: four to six passes.\textsuperscript{5} For these reasons, it is conceivable that the degree of trauma to the area of abnormality, and thereby the risk of clinically significant bleeding, is greater with forceps biopsy than with needle biopsy. However, a larger-scale comparative study would be needed to verify this tentative statement.

The coaxial down-the-beam puncture technique that we employed, originally described by Greene,\textsuperscript{6} ensures a reliable approach to the tumor, with very little need for readjustment of the needle, resulting in minimal additional trauma to the area.

Several conclusions may be drawn from this report. First, Congo red staining should be performed whenever band-like homogeneous eosinophilic material is found in the aspirate to check for possible amyloid deposition. Second, dense coarse calcifications may be found in amyloidomas. Third, based on the present case and the referenced literature, it is conceivable that the degree of trauma caused by fine-needle biopsy is less than by transbronchial forceps biopsy, and that consequently the risk of severe procedural or postprocedural bleeding is also likely to be lower. Therefore, we would recommend performing percutaneous needle biopsy as a first choice, rather than forceps biopsy, in cases of severe hemoptysis (particularly in those relatively infrequent cases in which pulmonary amyloid is a reasonable diagnostic possibility). The latter statement, however, would need a comparative study of a larger patient series for verification.

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