The Role of Open Lung Biopsy in the Diagnosis of Diffuse Interstitial Lung Disease

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Abstract

Objectives: Presently open lung biopsy (OLB) is the gold standard for the diagnosis of diffuse interstitial lung disease (DILD). The aim of this study was to reevaluate the role of OLB in the management, outcome and the survival rate of patients with DILD.
Design: Retrospective analysis between 1995-2000
Setting: Tertiary care state hospital
Patients: All of the patients had undergone OLB operation and their initial diagnosis was DILD according to their radiologic impressions.
Measurements and Results: We retrospectively evaluated 17 patients, 12 male and 5 female aged between 12-54 (mean 39,5). Postoperatively all patients had the definitive diagnosis histopathologically. The initial diagnosis was made according to the clinical signs, radiologic impressions, and laboratory tests. These results were then compared with the definitive diagnosis. The diagnosis and the therapy of 9 of the 17 patients did not change from the original diagnosis and treatment regimens. But in the rest of the patients, initial diagnosis was not consistent with the definitive diagnosis and in 4 of these the therapy also changed.
Conclusion: We conclude that after following certain procedures and reevaluating the survival rate of patients, OLB should be performed if thought as necessary.

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Key words: *open lung biopsy, diffuse interstitial lung disease, diagnosis*
Abbreviations: *OLB: Open lung biopsy, BAL: Bronchoalveolar lavage, TBB: Transbronchial biopsy, VATS: Video assisted thoracoscopic surgery, DILD: Diffuse interstitial lung disease, HRCT: High-resolution computed tomography, CXR: Chest x-ray, PFT: Pulmonary function test*

Introduction

DILD represents a heterogeneous group of disorders. Because there are more than 150 clinical conditions and/or causes associated with DILD, a definitive diagnosis is essential to determine the prognosis and appropriate therapeutic interventions for a given patient (1). OLB is an invasive method, but is the gold standard diagnostic procedure for DILD (2-3). With current advances in technology (HRCT, bronchoscopy, BAL, TBB, VATS) the need for OLB in every patient with suspected ILD is still a question (4).

We compared OLB and the other diagnostic tools such as history, laboratory tests, HRCT, bronchoscopy in the diagnosis of DILD .We also tried to find out the need for OLB and whether it changed the diagnosis and treatment modality or not.

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Patients and Methods

We retrospectively collected data from the charts of all patients who underwent OLB from 1995 to 2000 at Süreyyapaşa Center for Chest Disease and Thoracic Surgery, İstanbul, Turkey. The patients were radiologically diagnosed as DILD. Clinical complaints, duration of disease, physical examination, occupational status of the patients, laboratory findings, CXR, CT, HRCT, PFT were all searched. PFT results were recorded. 75-65% of predicted was accepted as mildly restrictive, 65-50% of predicted was moderately restrictive, <50 predicted was severely restrictive. We evaluated the OLB method and its results and how it changed the initial diagnosis and treatment.

Results

We retrospectively collected data from the charts of all patients who underwent OLB between 1995 and 2000. 17 had the radiologic diagnosis as DILD. 12 were male, 5 were female with an age range between 18-54 (mean 39,5). 12 patients were smokers. 4 of them had significant specific occupations such as 2 blacksmiths, 1 baker and 1 farmer. The baker and one of the 2 blacksmiths was diagnosed as idiopathic interstitial fibrosis and other two were diagnosed as sarcoidosis. The duration of the disease was less than 6 months in all of the patients except for one patient (6 months and 20 days). Table 1 shows the clinical complaints of the patients. Cough was the most frequent complaint in this series.

Table 1. The clinical complaints of the patients

Clinical complaints	n	%
Cough	14	82
Dyspnea	7	41
Exertional dyspnea	7	41
Sputum production	8	47
Diaphoresis	9	53
Weight loss	5	29
Chest pain	5	29
Malaise	6	35
Fever	2	12

Physical examination findings are shown in Table 2. 35% of the patients had normal physical examinations.

Table 2. Physical examination findings of the cases

Physical Examination Findings	n	%
Crackles	7	41
Normal	6	35
Decreased breath sounds	2	12
Bilateral rhonchi	2	12
Elongation of expirium	1	6
Clubbing	1	6

When we examined the PFT, 5 were severely restrictive, 3 were moderately restrictive, 4 were mildly restrictive and 5 were normal. The laboratory examination was in normal limits except ACE elevation in one sarcoidosis patient.

Table 3 demonstrates CXR findings of the cases. Micronodular and reticular patterns were the most frequent radiologic findings.

Table 3. CXR findings of the cases

CXR Findings	n	%
Bilateral	17	100
Micronodular	16	94
Reticular	15	88
Macronodular	2	12
Hilar enlargement	3	18
Alveolar pattern	4	24
Consolidation	3	18
Volume loss	1	6

11 patients had HRCT and 6 had CT. Bronchoscopic findings are summarized in Table 4. Six patients had normal bronchoscopic appearance. TBB was performed in 17 patients and BAL was examined in 2 of them. Only 1 patient had the definitive diagnosis with TBB (TBB revealed alveolar sections). BAL was performed only to 2 patients because standardisation could not be attained.

Table 4. Bronchoscopic findings of the cases

Bronchoscopic Findings	n	%
Enlargement in carena	4	24
Increased capillary formation in mucosa	3	18
Pale mucosa	2	12
Mucosa with secretion	1	6
Mucosal irregularity	1	6
Normal	8	47
TBB (diagnosis)	1	6

The initial diagnosis was based on radiologic evaluation. HRCT played an important role. The consistency of initial diagnosis with the definitive diagnosis, the effect of OLB on treatment and the effect of laboratory and PFT findings on diagnosis are shown on Table 5. As shown in this table, the initial diagnosis of these 9 patients were consistent with the definitive diagnosis. In 5 of these patients with sarcoidosis who had TBB, the results were negative. Also laboratory tests such as PPD, ACE, Ca, urinary calcium level were examined. In only one patient ACE was elevated.

Table 5. Comparison of presumptive diagnosis and definitive diagnosis

	Previous diagnosis	Treatment	Biopsy Diagnosis	Treatment	Accordance in diagnosis	Accordance in treatment	Radiology	Laboratory	PFT
1	Sarcoidosis	Steroid	Idiopathic interstitial fibrosis	Steroid	(-)	(+)	HRCT	ACE-N	Severe
2	Sarcoidosis	Steroid	Miliary Tuberculosis	HRZE	(-)	(-)	CT	ACE-N	Moderate
3	Sarcoidosis	Steroid	Sarcoidosis	Steroid	(+)	(+)	CT	ACE-N Ca*-N RF(-)	Normal
4	Idiopathic interstitial fibrosis	Steroid	Desquamatif interstitial pnemonia	Steroid	(+)	(+)	HRCT	ACE-N BAL	Moderate
5	Histiositosis x	Steroid	Histiositosis x	Steroid	(+)	(+)	HRCT	ACE-N	Mild
6	Idiopathic interstitial fibrosis	Steroid	Idiopathic interstitial fibrosis	Steroid	(+)	(+)	HRCT	ACE-N Ca-N RF(-)	Mild
7	Sarcoidosis	Steroid	Sarcoidosis	Steroid	(+)	(+)	CT	ACE-N Ca-N	Normal
8	Eosinophilic Granuloma	Steroid	Idiopathic interstitial fibrosis	Steroid	(-)	(+)	CT	ARB(-)	Mild
9	Sarcoidosis	Steroid	Alveolar proteinosis	Lavage	(-)	(-)	HRCT	ACE-N BAL Ca-N	Normal
10	Histiositosis x	Steroid	Histiositosis x	Steroid	(+)	(+)	HRCT	Ca-N	Normal
11	Histiositosis x	Steroid	Interstitial pnemonia	Nonspesific	(-)	(-)	HRCT	RF(-)	Normal
12	Sarcoidosis	Steroid	Idiopathic interstitial fibrosis	Steroid	(-)	(+)	HRCT	ACE-N	Moderate
13	Idiopathic interstitial fibrosis	Steroid	Idiopathic interstitial fibrosis	Steroid	(+)	(+)	HRCT	TBB: Fibrosis	Severe
14	Sarcoidosis	Steroid	Sarcoidosis	Steroid	(+)	(+)	CT	ACE-N	Severe
15	Sarcoidosis	Steroid	Sarcoidosis	Steroid	(+)	(+)	CT	ACE-N	Severe
16	Idiopathic interstitial fibrosis	Steroid	İnterstitial pnemonia	Nonspesific	(-)	(-)	CT	ACE-N	Mild
17	Sarcoidosis	Steroid	Idiopathic interstitial fibrosis	Steroid	(-)	(+)	HRCT	ACE-N	Severe

*Ca: Calcium

The initial diagnosis and the definitive diagnosis were different in 8 of the patients and in 4 of them the treatment protocol was also changed. There was no postoperative mortality. Wedge resection was performed to 16 patients and segmentectomy was performed in one patient. Morbidity was seen in 4 patients, because of long- term air-leakage and infection. The duration of hospital stay was 7-30 days (mean 15 days). In these 4 complicated patients, PFT results were as follows: 2 were normal, 1 was moderately restrictive, 1 was severely restrictive. One patient died 1 year after the diagnosis and one died 3 years after the diagnosis.

Discussion

OLB is the gold standard method in DILD (2-5-6-7). 30% of patients with DILD need OLB (8). Many studies have revealed that in 90% of the cases a definitive diagnosis is obtained with OLB (9). In the present study, all of our patients had definitive diagnoses. According to history, physical examination, CXR, sputum cytology and culture the diagnostic rate was only %30 (10).

In our study, all plain CXR films showed bilateral radiologic view of interstitial lung disease. The physical examination revealed bilateral crackles in 7 patients. Occupational profile, sputum cytology and culture did not yield any diagnostic results. The diagnostic rate of the less invasive methods such as bronchoscopic evaluation and TBB were 37-70% (11). This ratio in previously diagnosed interstitial lung disease patient was lower (12). These are the most successful methods in the diagnosis of sarcoidosis and lenfangitis carcinomatose. Adequate tissue sampling is necessary to obtain a definitive diagnosis. The complication rate in TBB is up to 15% (13). TBB was diagnostic in only one patient. This low diagnostic rate may be due to obtaining inadequate material and selection of the patients who had gone through OLB.

Improvement in radiological methods for diagnosis, especially using HRCT, increases the diagnostic rate up to 88% (14-16). HRCT gives highly definitive diagnostic results in progressed disease, but a normal HRCT does not exclude early and clinically significant interstitial lung disease (17). In our study, 5 of the 11 patients to whom HRCT was performed had the definitive diagnosis. This low rate may be the result of not performing it for every patient and all our

patients had OLB. 4 of 6 patients had the definitive diagnosis by CT. All of them were diagnosed as sarcoidosis.

In interstitial lung disease, by using the diagnostic methods as we mentioned above, we may not reach the definitive diagnosis every time. The most important question to be asked here is whether the definitive diagnosis changes the therapy and its effect on survival rate or not. In our study 9 of 17 patients had the definitive diagnosis without OLB. In the other 8 patients, we could not reach the definitive diagnosis without OLB. Therapy had been changed in 4 of the 8 patients receiving corticosteroid. In 3 patients, it was terminated and the therapy was changed to antituberculosis drug regimen in 1 patient. The effect of OLB was 18-50% in various series (3,9). In our study its role was 24%. 16 of 17 had wedge resection, 1 had segmentectomy. We did not observe mortality but morbidity was observed in 4 of them because of either air leakage or infection. Two of these patients had normal PFT results. The mean duration of hospital stay was 15 days. In our hospital, morbidity and mortality of OLB were in narrow range. In the literature very high rates have been reported (18).

As generally accepted, OLB should follow an algorithm (Figure 1). Preoperative methods such as fine needle aspiration biopsy, VATS should be performed before OLB, because various series show the high diagnostic role and low complication rate of these procedures (14,19,20). Steroid trial should also be performed. OLB should follow certain procedures (Table 5). In our study, steroid treatment decreased the need for OLB . There are some studies offering steroid treatment before OLB (3). In our study, we observed no change in the therapy of 13 patients (76%), in 4 patients the therapy was altered as follows: in 3 of the patients receiving corticosteroids the treatment was terminated and in one patient was replaced with antituberculosis treatment.

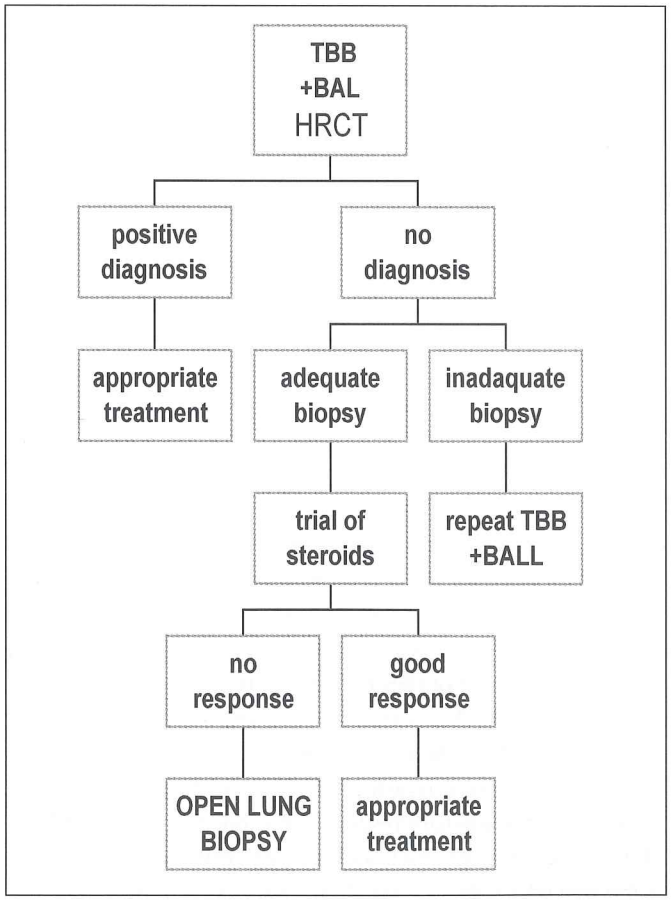

Figure 1. *Algorithm for diagnosis of DILD*

In conclusion, how long the patient will receive steroids therapy is the vital question. We conclude that prospective studies are needed. OLB should be reserved for patients after performing certain procedures such as TBB unless there is a major contraindication.

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