Original Research

Evaluation of Diagnostic Value of the Bronchoalveolar Lavage in Cases of Interstitial Lung Diseases at a Tertiary Care Centre

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Abstract

Background: Interstitial lung disease (ILD) and pulmonary fibrosis are a group of lung diseases which consist of a combination of inflammation and fibrosis of the lung parenchyma. However, biopsies may be helpful in the diagnosis of sarcoidosis and organizing pneumonia. Hence; the present study was conducted for assessing the diagnostic value of the bronchoalveolar lavage in interstitial lung diseases.

Materials & methods: A total of 50 patients with Bronchoalveolar lavage (BAL) suspected of ILD were enrolled. Complete demographic and clinical details of all the patients were obtained. Confrontations of clinical, biochemical, and cyto-histological characteristics have provided the basis for the diagnosis of ILD. For total and differential cell counts, collected BAL fluids were cytocentrifuged and stained with Wright-Giemsa, Perls, and PAS stains. BAL cytological analysis has been performed manually by a pathologist specialized in cytology. Diagnostic accuracy of BAL was evaluated. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

Results: A total of 50 patients were analyzed. The mean age of the patients was 48.3 years. Majority proportion of patients were males. Sarcoidosis, Idiopathic pulmonary fibrosis, Connective tissue disease, Vasculitis and Pneumoconiosis were the final diagnosis in 42 percent, 24 percent, 20 percent, 10 percent and 4 percent of the patients respectively. Between these pathologies, there was no statistically significant variation in the BAL cellular count. Furthermore, variations in BAL cellular count did not affect the prevalence of the disorders under investigation.

Conclusion: The BAL cytological examination is not very useful for providing significant information that might help distinguish between the several illnesses that make up ILD. It must thus always be used in conjunction with other diagnostic techniques.

Key words: Bronchoalveolar Lavage, Interstitial Lung Diseases

INTRODUCTION

Interstitial lung disease (ILD) and pulmonary fibrosis are a group of lung diseases which consist of a combination of inflammation and fibrosis of the lung parenchyma. There are many diverse causes of ILD, which usually result from a variety of environmental, avocational, occupational, or medication-related exposures, or alternatively may result from one of the numerous systemic autoimmune or connective tissue diseases (CTD).[1-3] One particular form of ILD is termed IPF, and IPF is often considered one of the most common and important ILDs due to its unknown

etiology, its poor overall prognosis, and its modest response to therapeutic interventions.[4- 6] Therapy for ILD and pulmonary fibrosis may be complex at times, but will almost always be based in principle on the most likely etiology of ILD. Given the role of exposures in ILD and the significance of identifying a precise etiology, the importance of a detailed and comprehensive environmental, avocational, occupational, and medication-use history cannot be overstated, and is likely the most important factor in determining an accurate ILD diagnosis.[7, 8] There is much variation in practice surrounding the use of bronchoalveolar lavage (BAL), particularly between European centres who, in contrast to their North American colleagues, often perform this investigation routinely. Clearly, there is value in excluding infection, which may be a differential diagnosis; however, BAL alone is rarely diagnostic, with perhaps one of the difficulties being a lack of consistency in terms of how samples are taken and processed. Under optimal circumstances, BAL reflects cellular traffic in the alveolar space and the cell differential may provide supplemental information to help refine, rather make a diagnosis. In particular, an excess of lymphocytes should call into question a presumptive IPF diagnosis, with Ohshimo et al describing a BAL lymphocytosis of >30% in 6 of 74 patients with definite UIP features on HRCT. In all six cases, further investigations led to a final diagnosis of chronic hypersensitivity pneumonitis.[7- 10] Transbronchial biopsy (TBB) with standard forceps is a minimally invasive technique but does not always provide adequate lung tissue to establish a final diagnosis. The biopsies are small, subject to crush artefact and may not be representative in spatially heterogeneous disease. However, such biopsies may be helpful in the diagnosis of sarcoidosis and organising pneumonia.[9, 10]Hence; the present study was conducted for assessing the diagnostic value of the bronchoalveolar lavage in interstitial lung diseases.

MATERIALS & METHODS

The present study was conducted for assessing the diagnostic value of the bronchoalveolar lavage in interstitial lung diseases. A total of 50 patients with Bronchoalveolar lavage (BAL) suspected of ILD were enrolled. Complete demographic and clinical details of all the patients were obtained. Confrontations of clinical, biochemical, and cyto-histological characteristics have provided the basis for the diagnosis of ILD. For total and differential cell counts, collected BAL fluids were cytocentrifuged and stained with Wright-Giemsa, Perls, and PAS stains. BAL cytological analysis has been performed manually by a pathologist specialized in cytology. Diagnostic accuracy of BAL was evaluated. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

RESULTS

A total of 50 patients were analyzed. The mean age of the patients was 48.3 years. Majority proportion of patients were males. Sarcoidosis, Idiopathic pulmonary fibrosis, Connective tissue disease, Vasculitis and Pneumoconiosis were the final diagnosis in 42 percent, 24 percent, 20 percent, 10 percent and 4 percent of the patients respectively. Between these pathologies, there was no statistically significant variation in the BAL cellular count. Furthermore, variations in BAL cellular count did not affect the prevalence of the disorders under investigation.

Table 1: Final diagnosis

Final diagnosis	Number	Percentage
Sarcoidosis	21	42
Idiopathic pulmonary fibrosis	12	24
Connective tissue disease	10	20
Vasculitis	5	10
Pneumoconiosis	2	4
Total	50	100

Table 2: Diagnostics value of BAL

Diagnostic value of BAL	r-value	p-value
BAL cellular count VS Sarcoidosis	0.845	0.232
BAL cellular count VS Idiopathic pulmonary fibrosis	1.212	0.245
BAL cellular count VS Connective tissue disease	0.351	0.185
BAL cellular count VS Vasculitis	0.965	0.658
BAL cellular count VS Pneumoconiosis	0.725	0.462

DISCUSSION

The objective of the 2013 American Thoracic Society (ATS)/ERS classification statement is to update the 2002 ATS/ERS classification of idiopathic interstitial pneumonias (IIPs). Major revisions of the previous classification are summarised below. Cryptogenic fibrosing alveolitis has been removed, leaving the term idiopathic pulmonary fibrosis (IPF). Nonspecific interstitial pneumonia (NSIP) is now accepted as a distinct clinical entity. Major IIPs (e.g. IPF, idiopathic NSIP, respiratory bronchiolitis (RB)-ILD, desquamative interstitial pneumonia (DIP), cryptogenic organising pneumonia (COP) and acute interstitial pneumonia) have been retained, but are distinguished from rare IIPs and unclassifiable cases and grouped into chronic fibrosing (IPF and NSIP), smoking-related (RB–ILD and DIP), and acute/subacute IIPs (COP and acute interstitial pneumonia). Lymphoid interstitial pneumonia (LIP) frequently presents in the context of other diseases and rarely in its idiopathic form. Thus, this entity has now been moved from the major IIPs to the rare IIPs.[11- 13] Typically, ILD presents progressive breathlessness, lung crackles, and a diffusely abnormal chest radiograph. At presentation the differential diagnosis includes a number of other diseases such as infective pneumonia, pulmonary oedema, and malignancy (for example, lymphangitis carcinomatosa). The overall context of the disease is important, and the exclusion of other diagnoses may require further investigations (for example, echocardiography) or observing the response to treatments (for example, antibiotics, diuretics). Lung function tests typically show reduced lung volumes, impaired gas transfer, and hypoxaemia. A reduction in the transfer factor for carbon monoxide and transfer coefficient are characteristic of diseases of the lung parenchyma and its blood supply. These parameters are therefore reduced in ILD, but also in emphysema and pulmonary vascular disease.[14- 16]Hence; the present study was conducted for assessing the diagnostic value of the bronchoalveolar lavage in interstitial lung diseases. A total of 50 patients were analyzed. The mean age of the patients was 48.3 years. Majority proportion of patients were males. Sarcoidosis, Idiopathic pulmonary fibrosis, Connective tissue disease, Vasculitis and Pneumoconiosis were the final diagnosis in 42 percent, 24 percent, 20 percent, 10 percent and 4 percent of the patients respectively. Between these pathologies, there was no statistically significant variation in the BAL cellular count. Furthermore, variations in BAL cellular count did not affect the prevalence of the disorders under investigation. Mlika M et al reported a retrospective study about patients hospitalized for an ILD. Thirty-three patients were admitted in the Department of Pulmonology and the BAL analyses were studied. The different cell patterns were compared to the final diagnostics. Results our study contained 4 nonspecific interstitial pneumonia (NSIP), 10 usual interstitial pneumoniae (UIP), 4 organizing pneumoniae (COP), 8 sarcoidosis, 2 hypersensitivity pneumonitis, 3 infectious pneumonitis, 1 lymphoma and a pulmonary adenocarcinoma. We considered positive results those that were compatible with the final diagnosis. The profile lavage was typical in 1 NSIP, 3 UIP, 3 COP, 1 hypersensitivity pneumonitis, 6 sarcoidosis, 3 infectious pneumonitis and 1 adenocarcinoma. Among the 17 cases with an atypical profile lavage, radiological features were diagnostic in 10 cases. This finding highlights the fact that 7 cases/ 33 presented simultaneously an atypical profile lavage and nonspecific radiological findings.[17] Radha S et al assessed the utility of BAL as a diagnostic tool to determine the diagnostic accuracy of the material obtained from BAL in various infections and neoplastic lesions to study the limitations of BAL in certain lung disorders. Ninety-one BALs were analyzed for total and differential count, microbiological examination and cytological evaluation. Cases selected included nonresolving pneumonias, diffuse lung infiltrates, infiltrates in immunosuppressed hosts and ventilator-associated pneumonias. Bronchoalveolar lavage was done in 91 cases over a period of 1½ years. Definite diagnosis was not given in 7 cases. Four cases were inadequate. Tuberculosis was diagnosed in 22 cases, fungal infections in 7 cases. Thirty-eight cases of bacterial pneumonias were diagnosed, Klebsiella was the most common organism. Malignancy was diagnosed in 13 cases. Definite diagnosis can be made in tuberculosis, fungal infections, bacterial pneumonias and in malignancies.[18]Efared B et al assessed the diagnostic value of BAL in the management of ILD, by comparing the cytological findings in BAL fluid among the different diseases of this group. The mean age was 52.78 years; 74.83% were women. The analysis of the following main groups of diseases was performed: sarcoïdosis ($n = 30$), idiopathic pulmonary fibrosis (IPF; $n = 22$), other idiopathic interstitial pneumonia (non-specific interstitial pneumonia, cryptogenic organising pneumonia and respiratory bronchiolitis interstitial lung disease; $n = 20$) and connective tissue disease ($n = 14$).Overall, out of 141 patients, 22% had sarcoïdosis, 15.6% had idiopathic pulmonary fibrosis (IPF), 14.18% had other idiopathic interstitial pneumonia (IIP) and 9.9% had connective tissue disease (CTD). Mixed alveolitis was common in the 4 groups, sarcoïdosis had higher proportion of lymphocytes and IPF had higher neutrophils count. However, there was no significant statistical difference of BAL cellular count among these diseases ($p > 0.05$). Also, the prevalence of studied diseases did not change with

variation of BAL cellular count ($p > 0.05$). Alone, the BAL cytological analysis has a limited value to provide substantial information that could lead to discriminate between diseases that form ILD.[19]

CONCLUSION

The BAL cytological examination is not very useful for providing significant information that might help distinguish between the several illnesses that make up ILD. It must thus always be used in conjunction with other diagnostic techniques.

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