ORIGINAL RESEARCH

Diagnostic accuracy of bronchoalveolar lavage fluid in diagnosis of lung cancers

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ABSTRACT

Background: Globally, lung cancer is the most prevalent type of cancer. High incidence and a high case fatality rate are linked to it. The present study was assessed the diagnostic accuracy of Bronchoalveolar lavage fluid in diagnosis of lung cancers. **Materials & Methods:**BAL fluid obtained from 102 patients by lavage of respiratory tract in clinically and radiologically suspected lung lesions were selected. The results of the BAL were linked with the lung biopsy, and the biopsies were stained with Hematoxylin and Eosin. **Results:** Out of 102 samples, 60 were males and 42 were females.BAL fluid revealed SCC in 65, AC in 20, SmCC in 12, PDCC in 5 cases and severe dysplasia in 2 cases. Biopsy revealed SCC in 74, AC in 11, SmCC in 5, PDCC in 2 cases and severe dysplasia in 4 cases. The difference was significant (P< 0.05).BAL positive showed lung cancer in 35 cases and BAL negative in 30. The sensitivity was 63.7%, specificity in 82.4%, positive predictive value in 87.3% and negative predictive value in 61.5% cases. **Conclusion:** BAL fluid analysis offers a quick and accurate method for identifying and classifying lower respiratory tract cancers.

Key words: Bronchoalveolar lavage, H&E stain, Lung cancer

INTRODUCTION

Globally, lung cancer is the most prevalent type of cancer. High incidence and a high case fatality rate are linked to it. About 15% of newly discovered malignancies in India are thought to be lung cancers, which are more common in men and are mostly caused by smoking. Lung adenocarcinomas have become more common in the past few years.[1] Because lung cancer medication is based on subtyping, bronchoalveolar lavage (BAL) fluid analysis aids in the early identification, quick diagnosis, and effective treatment of the disease.[2] When BAL was first created, it was intended to be used as a clinical technique for investigating interstitial lung disease (ILD). It was also intended to be used as a means of sampling respiratory secretions in animal models of lung illness when it was perceived as holding considerable promise for the diagnosis and management of various forms of ILD, such as sarcoidosis, idiopathic pulmonary fibrosis (IPF) and hypersensitivity pneumonitis (HP).[3]

These days, BAL is frequently utilized to assess patients for acute respiratory failure or evidence of diffuse parenchymal lung disorders, diagnose respiratory infections, and check on the condition of lung allografts that have been transplanted. BAL fluids can be used to identify prognostic and diagnostic markers, which can expedite diagnosis.[4] Moreover, molecular analysis using BAL material might be performed to look for prognostic or diagnostic markers. BAL's sensitivity is comparable to that of transbronchial FNAC. Thus, BAL analysis has a high diagnostic value and minimal morbidity.[5]The present study was assessed the diagnostic accuracy of Bronchoalveolar lavage fluid in diagnosis oflung cancers.

MATERIALS & METHODS

The present study involved analysis of BAL fluid obtained from 102 patients by lavage of respiratory tract in clinically and radiologically suspected lung lesions. The written consent was obtained from all patients.

Data such as name, age, gender etc. was recorded. For fifteen minutes, the BAL fluid was centrifuged at 3000 rpm. The sediment was used to make four smears. Leishman stain was used on two smears and Pap stain on the other two. The results of the BAL were linked with the lung biopsy, and the biopsies were stained with Hematoxylin and Eosin. Data thus

obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 102		
Gender	**Males**	**Females**
Number	60	42

Table I shows that out of 102 samples, 60 were males and 42 were females.

Table II Diagnosis of lung cancer by BAL fluid and biopsy

Lung cancer	BAL fluid	Biopsy	P value
SCC	65	74	0.05
AC	20	11	0.04
SmCC	12	5	0.02
PDCC	5	2	0.04
Severe dysplasia	2	4	0.05

Table II shows that BAL fluid revealed SCC in 65, AC in 20, SmCC in 12, PDCC in 5 cases and severe dysplasia in 2 cases. Biopsy revealed SCC in 74, AC in 11, SmCC in 5, PDCC in 2 cases and severe dysplasia in 4 cases. The difference was significant ($P< 0.05$).

Table III Analysis of BAL fluid

Outcome	Lung cancer present	Lung cancer absent	Total
BAL positive	35	0	35
BAL negative	30	37	67
Total	65	37	102

Table III shows BAL positive showed lung cancer in 35 cases and BAL negative in 30.

Table IV Accuracy of BAL

Accuracy	Percentage
Sensitivity	63.7%
Specificity	82.4%
Positive predictive value	87.3%
Negative predictive value	61.5%

Table IV shows that sensitivity was 63.7%, specificity in 82.4%, positive predictive value in 87.3% and negative predictive valuein 61.5% cases.

DISCUSSION

In order to securely obtain respiratory secretions for the evaluation of cellular and acellular components for both diagnostic and research objectives, bronchoalveolar lavage, or BAL, has become widely accepted.[6] When bronchoscopy with BAL was first used in clinical settings, it was thought to have enormous potential for the diagnosis and treatment of ILD.[7,8] Though BAL nucleated immune cell patterns frequently exhibited traits that were highly consistent with different forms of ILD, such as sarcoidosis, it eventually became evident that BAL cell counts and differentials, lymphocyte subsets, or soluble components could not be depended upon to make a sure diagnosis for many specific forms of ILD if used as a stand-alone diagnostic test.[9]The present study assessed the diagnostic accuracy of Bronchoalveolar lavage fluid in diagnosis oflung cancers.

We found that out of 102 samples, 60 were males and 42 were females. Wongsurakiat et al[10]evaluated the value of bronchoalveolar lavage (BAL) and post-bronchoscopic sputum cytology in diagnosing peripheral lung cancer. The sequence of procedures in all cases was BAL and transbronchial forceps biopsy. The final diagnosis of these patients were primary lung cancer in 30 patients, metatastic lung cancer in five and benign diseases in 20. In the primary lung cancer group, BAL was positive for malignant cells in 14 of the 30 patients (46.7%). In seven (50%) of these patients, the cell type diagnosed by BAL agreed with the final diagnosis. The diagnostic yield of BAL was influenced by the size and segmental location of the lesion. Bronchoalveolar lavage provided a higher diagnostic yield (46.7%) than transbronchial biopsy (16.7%). In five patients with metastatic lung cancer and 20 patients with benign disease, BAL gave negative results in all. Post-bronchoscopic sputum cytology was positive in only two of the 26 patients (7.7%) from whom samples could be obtained. Bronchoalveolar lavage cytology proved to be a valuable diagnostic tool in detecting peripheral, primary lung cancer. Post-bronchoscopic sputum cytology provided no significant additional information.Twenty patients had benign illness and five had metastatic lung cancer; all of these patients had negative BAL findings. Out of the 26 patients (or

7.7%), only two had positive results from post-bronchoscopic sputum cytology. It has been shown that bronchoalveolar lavage cytology is a useful diagnostic technique for identifying primary, peripheral lung cancer. Post-bronchoscopic sputum cytology did not yield any noteworthy further insights.

We observed that BAL fluid revealed SCC in 65, AC in 20, SmCC in 12, PDCC in 5 cases and severe dysplasia in 2 cases. Biopsy revealed SCC in 74, AC in 11, SmCC in 5, PDCC in 2 cases and severe dysplasia in 4 cases. The difference was significant ($P< 0.05$). BAL positive showed lung cancer in 35 cases and BAL negative in 30. The sensitivity was 63.7%, specificity in 82.4%, positive predictive value in 87.3% and negative predictive value in 61.5% cases.In order to evaluate the effectiveness of bronchoalveolar lavage as a method for identifying lung cancer, Linder et al[11] examined 850 lavages from 421 individuals. Thirty-five instances had lung cancer that was confirmed by biopsy. Of these, 24 (68.6%) had cytologic preparations of the bronchoalveolar lavage fluid that showed cells indicative of malignancy. The percentage of agreement between the cancer subtypes identified by tissue biopsy and lavage was 79.1%; differences were more common in large cell undifferentiated carcinoma and adenocarcinoma than in small cell anaplastic carcinoma. The best way to identify the subtype of tumors was to examine slides stained with Papanicolaou. Although reactive bronchial epithelium frequently resembled cancer, it could be distinguished from the latter by its distinctive cytomorphology. 386 patients had no false-positive lung cancer diagnosis. Bronchoalveolar lavage has a sensitivity for lung cancer diagnosis that is comparable to Wang needle biopsy and transbronchial biopsy. Bronchoalveolar lavage is a valuable diagnostic technique for patients with pulmonary infiltrates because it can identify low-morbidity cancer cells, interstitial lung disorders, and opportunistic infections.

The limitation the study is small sample size.

CONCLUSION

Authors found that BAL fluid analysis offers a quick and accurate method for identifying and classifying lower respiratory tract cancers.

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