CORRELATION OF BRONCHOALVEOLAR LAVAGE WITH TRANSBRONCHIAL LUNG BIOPSY

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ABSTRACT **Background:** Lung cancer is the leading cause of cancer related deaths in men and in women it has surpassed even breast cancer. Pulmonary cytology and histopathology are valuable tools in the diagnosis of lung malignancies. **Methods:** This was one-year prospective study between February 2021 to February 2022.. Bronchoalveolar lavage was done in 120 patients presenting with significant complains. Histopathology correlation was done for same. **Results:** Adenocarcinoma were most common lesions. Malignancy was reported in 82 cases. Pulmonary cytology and histopathology are valuable tools in the diagnosis of lung malignancies. **Conclusion:** Pulmonary diseases especially malignancies have shown a male predilection and this trend seems to be due to a higher rate of tobacco consumption amongst the males.

INTRODUCTION

The bronchopulmonary area being in direct and continuous exposure to the external environment may exhibit diverse spectrum of nonneoplastic and neoplastic pathologies.1 Today, respiratory tract cytology is well established throughout the world as a vital diagnostic tool in the evaluation of lung pathology. In the presence of obvious lung disease, the least invasive diagnostic approach should be used to make the diagnosis.3 Assuming that disease is isolated to the chest and a diagnosis needed, bronchoscopy is often the first test of choice.2 Based on this background, we aimed to study the various cytological modalities, correlation between their diagnostic efficacies with that of Bronchial biopsy (considered as gold standard), and analysis of their diagnostic values .

Our objectives in the present study is to evaluate the diagnostic accuracy of Bronchoalveolar lavage in diagnosing pulmonary diseases, to correlate Bronchoalveolar lavage with histopathological diagnosis by Transbronchial lung biopsy. The study includes samples received in the department of pathology from indoor and outdoor patients collected by clinicians after procedure description .We as researcher had obtained a verbal permission from the clinicians for the study; hence, ethical issues and informed consent from patients were not applicable.

Accurate and early diagnoses of these pathologies promise to change the outcome in future. There are two effective ways for diagnosing the lung lesions – radiological and cytological. Major utility of these procedures is in the diagnosis of lung malignancies followed by infective pathology. These techniques have minimal patient discomfort and complications. The complications are usually rare and include laryngospasm,bronchospasm, hypoxia, sepsis, hemorrhage, aspiration, and cardiac arrhythmias.

MATERIALAND METHOD

This study was carried out in a GCS Medical College Hospital & Research Centre, Ahmedabad, Gujarat. This was a prospective study between February 2021 to February 2022. The study included 120 cases of radiologically suspected lung pathologies. The study was approved by institution ethics committee. In the prospective study all histopathologic slides of bronchial biopsies and cytology slides of bronchoalveolar lavage fluid (BAL) received in the department were followed.

Bronchoalveolar Lavage fluid was received within half an hour along with relevant clinical details. It was immediately centrifuged for 5 minutes at 1500 revolutions per minute. The slides were fixed in absolute alcohol and stained. These slides were studied in detail microscopically and diagnosis confirmed. The smears were grouped into malignant, suspicious/atypical and negative for malignant cells.

The bronchial biopsies were examined, size and number of bits counted. The tissues were processed as per standard procedure. 4-5m thick sections were cut on microtome and stained by hematoxylin and eosin stain. The stained slides were studied in detail microscopically. For both cytology and histology only specimen with unequivocal malignant features, were considered to be positive. The malignant cells were further typed as squamous cell carcinoma and small cell carcinoma, adenocarcinoma and non small cell carcinoma etc.

INCLUSION CRITERIA:

Adult cases having radiologically diagnosed pulmonary pathologies such as,
- homogeneous or heterogeneous opacities
- cavitary lesions
- patchy areas
- areas of consolidation
- endobronchial lesions
- parenchymal lesions
- lung malignancies

Those cases which will be subjected to the Bronchoalveolar Lavage and Bronchial Biopsy both will be included in the study.

EXCLUSION CRITERIA:

Pediatric cases and patients with lung pathologies which do not undergo bronchioalveolar lavage and/or Bronchial biopsy.

RESULTS

Total 120 cases were evaluated. The overall male to female ratio was found to be 3:1 while for neoplastic lung lesions, it was 5:1. Most common age-group at presentation of pulmonary diseases was between 51-70 years. Same age presentation was also seen with neoplastic pulmonary diseases.[Table 1] The common presenting symptoms in patients undergoing bronchoscopy was cough (55 cases) followed by fever (36 cases), dyspnoea (12 cases), weight loss (12 cases) and hemoptysis (05 cases). On BAL cytology, out of the 120 cases, 75 cases were non-neoplastic,15 cases were suspicious for malignancy and 30 cases were malignant.

On histopathology, out of the 120 cases, 35 cases were non-neoplastic, 82 cases were malignant and 3 cases were negative for any pathological lesion.

Table – 1 Gender And Age Details

Age group	Males	Females	Total	Percentage
10-20	01	00	01	0.83%
21-30	02	01	03	2.50%
31-40	07	02	09	7.50%

41-50	17	05	22	18.33%
51-60	21	10	31	25.83%
61-70	33	12	45	37.50%
71-80	03	05	08	6.68%
>81	01	00	01	0.83%
Total	85	35	120	100%

Amongst 35 non-neoplastic lesions reported on histopathology most common were Inflammatory changes 23(65.9%) followed by Tuberculous inflammation 07(20.0%), Fungal infection 03(8.57%) and Non-specific interstitial pneumonia 02(5.71%).

Out of 82 malignant cases on histopathology, Adenocarcinoma 55(67.07%) was most common, followed by Squamous cell carcinoma 12(14.63%), Small cell carcinoma 07(8.53%), Non-small cell carcinoma - not otherwise specified 05(6.09%) & Adenosquamous carcinoma, Spindle cell tumour and High grade poorly differentiated carcinoma equal in frequency 01(1.2% each). 45 out of total 82 cases of lung cancer were identified by BAL cytology. Thus the sensitivity of BAL in detecting malignancy was 56.5%. There was was no false positive case on BAL cytology and hence its specificity was 100%.

Table 2: Bal And Biopsy Findings In Peripheral Pulmonary Lesions

Biopsy findings	No.	BAL findings	No.
Adenocarcinoma	55	Adenocarcinoma	21
		Suspicious for malignancy	04
		Inflammation	25
Squamous cell carcinoma	12	Squamous cell carcinoma	09
		Suspicious for malignancy	02
		Inflammation	01
Small cell carcinoma	07	Suspicious for malignancy	05
Non Small cell lung carcinoma,NOS	05	Suspicious for malignancy	03
Adenosquamous carcinoma	01	Inflammation	01
High grade tumour	01	Suspicious for malignancy	01
Spindle cell tumour	01	Inflammation	01
Non-specific inflammation	23	Inflammation	23
Nonspecific interstitial pneumonia	02	Inflammation	02
Tuberculous inflammation	07	Tuberculous	05
		Inflammatory changes	02
Fungal infection	03	Fungal infection	02
		Inflammatory changes	01
No pathology	03	No pathology	03
TOTAL		120	

Table- 3 Gold Standard Test- Lung Biopsy

INDEX TEST-BRONCHOALVEOLAR LAVAGE		Neoplastic lesions	Others	Total
	Test positive	45 (a)	00 (b)	45
	Test negative	37(c)	38 (d)	82
	Total	82	38	120

DISCUSSION

In the present study, BAL showed a sensitivity of 56.5%. Various studies done, report sensitivity of BAL in detecting neoplastic lesions ranging from 27% to 70%.[Table-4] Studies done by Farida Binesh et al.3, Lam et al.2 and Pradeep et al.4 found the sensitivity of BAL in detecting neoplastic pulmonary lesions to be 46.9%, 69% and 69.6% respectively which is comparable to the present study. Whereas Debeljak et al. reported a lower sensitivity of 27.9% in detecting neoplastic pulmonary lesions which in their opinion was due to poor exfoliation.[3]

The diagnostic accuracy of BAL in detecting peripheral neoplastic lesions in this study i.e. 57.1% was comparable to the studies done by Pirozynski et al.3 and Wongsurakiat P. et al.4 who found the diagnostic accuracy to be 58.3% and 46.7% respectively.

Table 4: Comparison of Sensitivity and Diagnostic accuracy of various studies

Study	Year	No. of patients	Sensitivity	Diagnostic accuracy
Present study	2021	120	56.50%	70%
Binesh F et al.[3]	2015	388	46.90%	70.50%
Lam et al[2]	2000	100	NA	69%
Pradeep et al.	2014	97	69.60%	93.50%

CONCLUSIONS

Pulmonary diseases especially malignancies have shown a male predilection and this trend seems to be due to a higher rate of tobacco consumption amongst the males. Although BAL cytology shows a moderate sensitivity in diagnosing pulmonary diseases, it might prove to be an important early, minimally invasive screening tool for pulmonary diseases.1 It does provide a very good specificity and thus patients with conclusive BAL reports could reliably be started with appropriate interventions at an early stage of disease. BAL cytology provides a wider sampling as it can reach distal bronchioles and thus have better chances to sample peripheral lung lesions as compared to endobronchial biopsy. Yielding very rare false positive cases, corresponding biopsies of cases where BAL showed suspicious cells usually prove to be malignant on histopathological examination. Thus, in this era of molecular pathology, even those BAL fluids that are suspicious for malignancy can be further utilized to confirm malignancy using molecular techniques. Apart from neoplastic lesions, BAL is also useful in detection of tuberculosis and fungal infections when appropriately used alongside ancillary techniques like Gene Xpert and culture for tuberculosis, and special staining for fungal infections.

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