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COMPARISON OF SAFETY, EFFICACY AND DIAGNOSTIC VALUE OF BRONCHOALVEOLAR LAVAGE CYTOLOGY VS CT GUIDED LUNG BIOPSY IN LUNG MASSES

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ABSTRACT
Introduction: Bronchoscopic and Transthoracic needle biopsy techniques are widely used in diagnostic evaluation of lung masses. Fiberoptic bronchoscopy (FOB) and CT guided lung biopsy are two of the most important modalities. **Objective**: To study sensitivity, specificity, safety and efficacy of bronchoalveoler lavage cytology vs CT guided lung biopsy. **Materials and Methods**: This prospective intervention based Cross sectional study was conducted among patients attending respiratory OPD at Sir Sunder Lal Hospital, BHU, Varanasi, with suspicion of lung Mass (70 cases). **Results**: Combined study of BAL cytology and CT guided lung biopsy in same patients is effective for diagnosing lung masses into malignant and non-malignant.

KEYWORDS: BAL(Broncho alveolar lavage), CT guided biopsy, Fibreoptic bronchoscopy.

1. INTRODUCTION
Bronchoscopic and Transthoracic needle biopsy techniques are utilized in diagnostic evaluation of lung masses. Fiberoptic bronchoscopy (FOB) and CT guided lung biopsy are two of the foremost important modalities that participate in the diagnostic algorithm of lung masses. Both are simple and safe procedures. Bronchoscopic materials are commonly subjected to cytological evaluation in which BAL cytology plays a crucial role whenever there is a suspicion of malignancy. While the bronchoscopic techniques are more pivotal in diagnosis of visible and central tumors CT guided biopsy is more preferred modality in peripheral lung masses. A solitary pulmonary nodule is defined as single discrete pulmonary opacity, surrounded by normal lung tissue, that is not associated with adenopathy or atelectasis. Lesion >3 cm are almost always malignant. So current convention is that solitary pulmonary nodule must be 3 cm or less in diameter. If lesion are >3 cm it refers to as Lung mass and should be managed with the understanding that they are most likely malignant; Prompt diagnosis ad resection is usually advisable.[1]

2. MATERIALS AND METHODS
This Prospective intervention based Cross sectional study was conducted among patients attending respiratory OPD at Sir Sunder Lal Hospital, BHU, Varanasi, with suspicion of lung Mass(70 cases) which were chosen on the basis of history, physical examination, Chest X-Ray and Computed Tomography of chest, from July 2019 – September 2021. Adults more than 20 year without any sex specifications with suspected Lung mass were included in the study.

Inclusion criteria
1. Pt. with Undiagnosed lung mass on the basis of history, examination, chest Xray and CT scan of chest.
2. Undiagnosed Lung mass Patient of Indian population.

Exclusion Criteria
1. Hemodynamically Unstable patients.
2. Uncontrolled cardiac arrhythmia
3. Severe pulmonary hypertension

The instrument used was fibre optic bronchoscope, OLYMPUS BF TYPE 1T150. The lavage fluid is collected by connecting a collector between the scope & the suction & then irrigating with saline while the scope is in a segmental bronchiole. The lavage samples for malignant cytology are sent in heparin. For CT guided biopsy a multidetector CT scan was used. Clotting studies were performed before the procedure. The operator then decided which needle to use for the procedure, either a spinal needle of 20 or 22 gauge (Becton Dickinson Spinal Needle), to obtain a fine-needle aspirate, or an 18 or 20 gauge core biopsy needle (Gallini Medical Devices biopsy needle) to obtain a core

of tissue. 5-6 core tissue biopsy were obtained and were sent in formalin for histopathological examination.

3. OBSERVATIONS AND RESULTS

The study group consisted of 70 cases, in which all are diagnosed as Lung mass on CT scan, over a study period of 3 years. All two techniques (Bronchoalveoler lavage, Computed Tomography guided biopsy) were used simultaneously in all patients under study.

Most of patients with lung mass, 29 (41.4%) in this study were in 50-70 age group. Mean age of patients having lung mass was 60.28 in the study. Among all lung mass cases male sex predominance seen by 1.69:1. In my study 44 (62.8%) males and 26 (37.6%) were females.

In Comparision between Bronchoalveoler Lavage Cytology findings and Histopathologocal diagnosis showed that, 7(10%) Positive, 8(11.4%) Suspicious/Atypical, and 55(78.54%) negative for malignancy diagnosed. I had included both (positive and Suspicious/Atypical) as Malignancy, because it came as malignant in CT guided Biopsy of the mass. So, out of 70 Lung mass cases 14(20%) malignant and 80(56%) nonmalignant. Among all 70 cases of Lung mass, both techniques were done in all cases, in which via CT Guided Biopsy 48(68.57%) cases malignant, 20(28.5%) Non malignant, and 2(2.8%) Inconclusive. on contrary, BAL cytology showed, 15(21.42%) malignant, and, 55(78.57%) as non malignant as shown in Table 1.

In study group, via BAL cytology, 9(12.85%) Squamous cell carcinoma, 6(8.57%) Adenocarcinoma, 55(78.57%) Non malignant. On other hand, CT guided biopsy showed, 33(47.14%) Squamous cell carcinoma, 10(14.28%) Adenocarcinoma, 5(7.2%) Small cell carcinoma, 20(28.57%) non malignant, and 2(2.85%) Inconclusive. In both procedures Squmous cell carcinoma is more common than others, and False negative value of BAL cytology minimised by CT guided biopsy as shown in Table 2. On applying chi square test the difference were statistically significant with "p" value of <0.03 and <0.01 respectively.

4. DISCUSSION

In all Lung mass cases, we have done all above procedures in every pateints. Then diffrentiated into Malignant lesion 48 (68.6%), Non malignant 20 (28.57%), and Inconclusive 2 (2.85%). The sensitivity of BAL in various other studies from literature varies from 21% to 78%.[2] The results of my study falls within this range. There is a huge discrepancy in results in variou studies as BAL sensitivity and its accuracy heavily depends on site, multiple attempts by which it has taken and the expertise of the operator. For malignancies originating in the bronchial tree, this may represent material with the highest diagnostic yield. Although the sensitivity of BAL was low 28.6% compared to other techniques, but it is still very useful technique as it is least invasive and with multiple sampling the yield can be improved.[2]

In our study, the sensitivity, specificity and accuracy of BAL samples were 28.6%, 76.47%, and 76% respectively (Table 3). Gaur DS et al[3], reported sensitivity of 39.40%; while Sareen R et al[4], reported a sensitivity as high as 72.69% for BAL. Multiple attempts at obtaining BAL sampling can improve its sensitivity, specificity and accuracy. Lung masses were diagnosed by CT Guided Biopsy into malignancy, and further into its histological types. Vijay et al[5] reported the sensitivity and specificity of CT guided lung biopsy to be 88.88% and 100% respectively while Reddy et al[6] reported the sensitivity and specificity to be 97.19% and 100% respectively. In our study the sensitivity, specificity and accuracy of CT guided lung biopsy was reported to be 93.82%, 96.62% and 89.86% respectively (Table 3). It was very much reletable with various studies.

Table 1: Efficacy of BAL cytology and CT Guided Biopsy in lung mass cases.

Method	Number of malignant cases (Percentage)	Number of Non-Malignant Cases (Percentage)	Inconclusive (Percentage)	Total
CTguided biopsy	48 (68.57)	20 (28.5)	2 (2.8)	70 (100)
BAL Cytology	15 (21.42)	55 (78.57)	0 (0.0)	70 (100)

Table 2: Comparison of histopathological type in BAL cytology and CT Guided Biopsy in Lung Masses.

Histopathological Type	BAL Cytology (Percentage)	CT guided Biopsy (Percentage)
Squamous cell carcinoma	9 (12.85)	33 (47.14)
Adenocarcinoma	6 (8.57)	10 (14.28)
Small cell carcinoma	0 (0)	5 (7.2)
Negative	55 (78.57)	20 (28.57)
Inconclusive	0 (18.5)	2 (2.85)
Total Cases	70 (100)	70 (100)

Table 3: Comparison of indices of BAL and CT Guided Biopsy.

Indices	BAL	CT Guided Biopsy
Sensitivity	28.6%	93.82%
Specificity	76.47%	97.62%
Positive Predictive Value	86.48%	98.64%
Negative Predictive Value	34.45%	90.24%
Accuracy	76%	89.86%
Efficacy	43.57%	92.47%

5. CONCLUSION

Due to an outsized burden of TB in our country, there's an excellent risk of missing the diagnosis of cancer. So, it's prudent to use BAL cytology which is affordable, quick, and reliable for the screening of suspected cases. during this study it had been found that BAL fluid cytology and CT guided lung biopsy are effective in diagnosing lung malignancy and non malignancy in pulmonary masses. It also proved efficient in identifying the cytological pattern of assorted lung carcinomas in bronchial brush cytology and bronchial biopsy.

6. Source of Funding

None.

7. Conflict of Interest

The authors declare that there is no conflict of interest.

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