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UNVEILING THE PROFILES OF ENDOBRONCHIAL MASS LESIONS: A NINE-YEAR SPAN COMPREHENSIVE ANALYSIS

Pulmonary Medicine

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ABSTRACT

Fibreoptic bronchoscopy techniques play a key role in diagnosing lung malignancies, particularly endobronchial tumours. Endobronchial mass lesions detected on bronchoscopy can either be benign or malignant. The present study was carried out to assess the profile of endobronchial mass lesions diagnosed by bronchoscopic biopsy. Patients with endobronchial mass lesions diagnosed by bronchoscopic biopsy between June 2014 to November 2023 were included in the study. Out of the 4090 flexible bronchoscopies performed during the study period, endobronchial mass lesions were visualised in 415 cases (10.14%). 340 (82%) lesions were malignant, 45 (11%) lesions were benign while reports of 30 cases (7%) lesions were inconclusive. Among the malignant lesions, squamous cell carcinoma (74.11%) was reported to be the most common histopathological type. Bronchoscopy with adequate sampling remains the most efficacious diagnostic modality for diagnosing endobronchial mass lesions.

KEYWORDS

bronchoscopy, endobronchial, squamous cell carcinoma

INTRODUCTION

As per GLOBOCAN 2020, lung cancer (11.4%) is the second most common cancer worldwide. As far as cancer-related mortality is concerned, lung cancer is the leading cause, responsible for 1.8 million deaths (18%).[1] In India, lung cancer age-standardized incidence rates (ASIRs) increased from 6.62/100,000 in 1990 to 7.7/100,00 in 2019. ASIRs increased from 10.36 to 11.16 in males and 2.68 to 4.49 in females.[2] The latest National Cancer Registry programme (NCRP) 2020 has reported the highest age-adjusted incidence rates (AARs) of lung cancer in north-eastern region of India: Aizawl district (38.8 per 100,000 for males and 37.9 per 100,000 for females) followed closely by Imphal West district (17.8/100,000 for males and 16.6/100,000 for females). In Manipur, it has been the most common malignancy affecting males and the second most common among females accounting for relative proportion of 18.2% and 14.3%.[3]

Lung cancer is usually suspected on the basis of an abnormal radiographic imaging study, often in conjunction with symptoms caused either by local or systemic effects of the tumor. Sputum cytology, bronchoscopic techniques, transthoracic needle biopsies and surgical biopsy define the main modalities employed in the diagnosis and staging of lung cancer.[4]

A significant number of patients presenting with an abnormal chest radiograph and/or computer tomography (CT) requires further investigations in the form of bronchoscopy as part of their diagnostic workup. The pulmonary lesions may be visible through the bronchoscope (central) or may lie beyond the visual field (peripheral). For lesions located beyond the visual field, different guidance systems are available to assist in finding the right bronchial branches. Regardless of the use of guidance system, diagnostic yield from a bronchoscopic procedure will seldom be hundred percent, neither in visible lesions nor in lesions beyond the visual field. The diagnostic yield could also depend on the interpretation of the pathological results.[5]

In addition to visualization of the endobronchial tree, biopsy material obtained through the fiberoptic bronchoscope also provides valuable cytopathologic, bacteriologic and immunologic information. Some of the advantages over rigid bronchoscopy include increased visual range, minimal discomfort to the patient, biopsy of previously inaccessible tumors, and the detection of early lung cancer.[6]

Flexible bronchoscopy is an extremely safe procedure provided some basic precautions are taken with a very low mortality rate (0.013%) and complication rate (0.739%).[11] Mechanical complications of fiberoptic bronchoscopy include oro- or naso- pharyngeal, vocal cord and airway trauma as well as bronchospasm, laryngospasm, pulmonary derecruitment/atelectasis, pneumothorax, airway haemorrhage and introduction or exacerbation of infection. In general, the rates of mechanical complications are quite low. The most consistently reported mechanical complications are related to airway manipulation/trauma and bleeding.[7]

While selecting a diagnostic modality, one should consider the yield of the selected procedure for diagnosis. An effective approach will not only be cost effective but will also reduce unnecessary invasive tests and waiting time for the patient. For endoscopically visible lung lesions, bronchoscopic biopsies are the most common method of specimen collection with a high diagnostic yield. Although various sampling methods can be applied for diagnosing endobronchial lesions, biopsy remains the main method with regards to central lesions. Bronchoscopic biopsy will not only help with the early

detection of lung cancer but also differentiate benign lesions from malignant ones, which in turn can potentially alter the prognosis and outcome of those patients in the future.

With this background in mind, the present study was conducted to evaluate the profile of visible endobronchial lesions diagnosed by bronchoscopic biopsy in RIMS, Imphal, Manipur, North-East India.

AIMS AND OBJECTIVES

1. To determine the diagnostic efficacy of bronchoscopic biopsy in the diagnosis of endoscopically visible lung lesions.
2. To assess the profile of different lung lesions diagnosed by bronchoscopic biopsy.

MATERIALS AND METHODS

The present study was a cross sectional study, conducted in the Department of Respiratory Medicine, Regional Institute of Medical Sciences (RIMS), Imphal, after getting the approval of the Institutional Ethics Committee. The study was carried out between June 2014 and November 2023. 4090 consecutive patients who presented with radiological evidence of lung mass and endobronchial lesions were included in the study. Uncooperative patients, patients with recent myocardial infarction and blood dyscrasias were excluded from the study. All flexible bronchoscopies were carried out or supervised by the same bronchoscopist using the Olympus BF-1T 150, Olympus BF-1T 190 and FUJIFILM EB 530 T fibreoptic bronchoscopes. The patients were made to stay nil per orally for at least 6 hours before the procedure. Written informed consent was obtained from each patient. Topical anaesthesia was achieved with 15% lignocaine spray to the oropharynx and 2% lignocaine solution infused through the scope during the procedure. Once the endobronchial lesion was localised, biopsy was taken using the reusable round cup biopsy forceps FB-20C-1 and biopsy without spike (D-B-07100SWO). Whenever possible, at least four biopsies were obtained from the centre of the most abnormal area and the specimens were immediately fixed in formalin and sent for histopathological examination. All patients received supplemental oxygen and were monitored throughout the procedure.

Data was analysed using SPSS V21 for windows. A p-value of less than 0.05 was considered statistically significant.

RESULTS

During the study period, 4090 bronchoscopies were performed, out of which 415 (10.14%) patients had visible endobronchial mass lesions.

Table 1: Gender Wise Distribution Of The Cases

GENDER	NUMBER	PERCENTAGE
Male	257	61.92%
Female	158	38.07%

Table 1 shows the distribution of the cases according to gender. 61.92 % were males and 38.07 % were females.

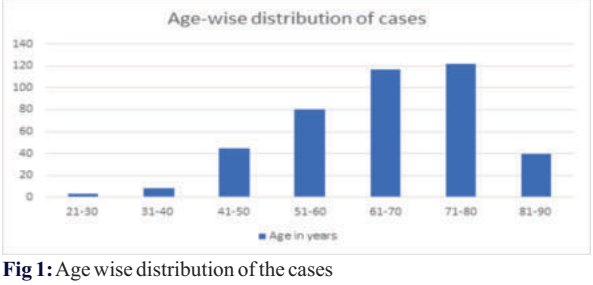

Fig 1: Age wise distribution of the cases

The age of the patients ranged from 25 to 86 years (mean age = 64.35 years). Majority of the patients were in the age group of 71 to 80 years (Figure1).

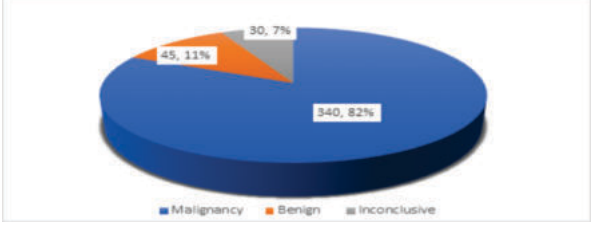

Fig 2: Distribution of endobronchial lesions diagnosed by bronchoscopic biopsy

Out of the total 415 cases, 340 (82%) of them turned out to be malignant lesions, 11% of the lesions were benign and no conclusive diagnosis could be made in 7% of the cases. (Figure 2)

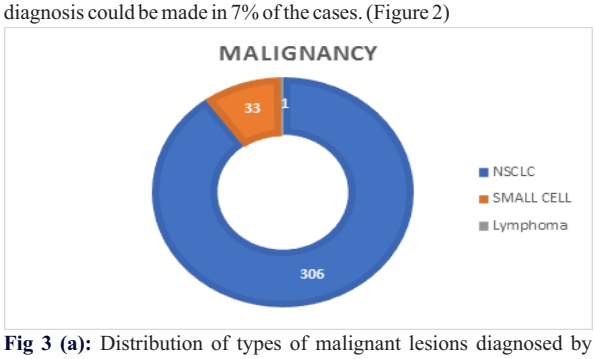

Fig 3 (a): Distribution of types of malignant lesions diagnosed by bronchoscopic biopsy (n=340)

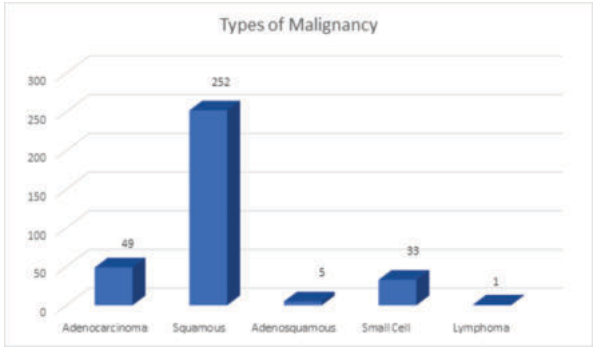

Fig 3 (b): Distribution of the types of malignant lesions

Fig. 3 (a) and (b) shows that Squamous cell carcinoma was the most common histological type accounting for 74.11% of all the malignant lesions. Adenocarcinoma was found in 14.41% cases, small cell carcinoma in 9.7% cases, adenosquamous in 1.47% cases and Lymphoma (Primary Pulmonary Non-Hodgkin's Lymphoma) in 0.29% case.

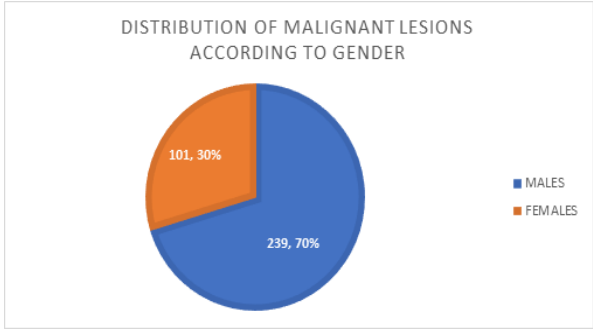

Figure 4: Distribution of malignant lesions according to gender

Malignant lesions were found more common among males (70%) when compared to females (30%).

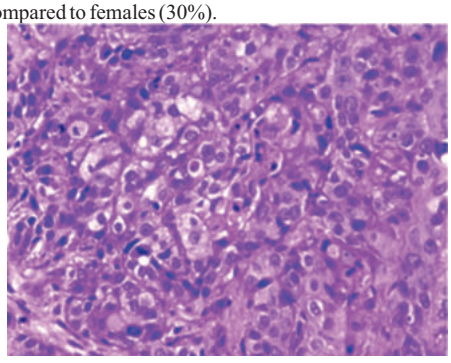

Fig. 5: Tumour cells in diffuse sheet. Individual cells are round to polygonal and have centrally placed cytoplasm with pleomorphic nuclei (Squamous cell carcinoma - moderately differentiated).

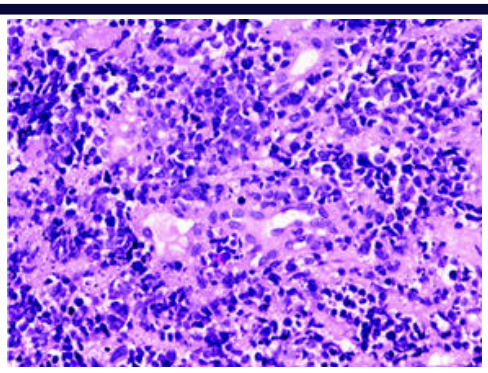

Fig. 6: Malignant cells having scanty cytoplasm and hyperchromatic nuclei. Nuclear moulding is noted (Small cell carcinoma).

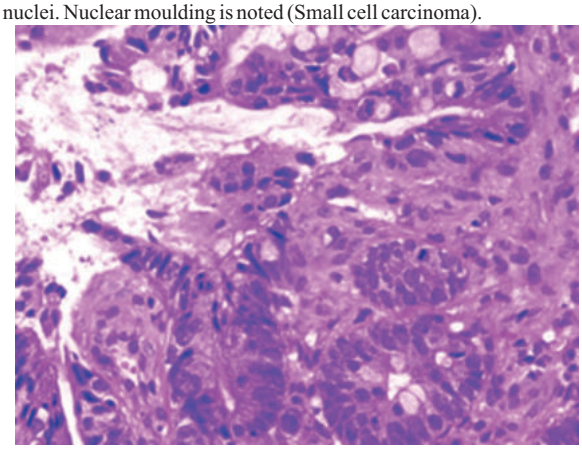

Fig. 7: Tumour cells with extracellular mucin. Occasional signet ring cells are also seen (Adenocarcinoma).

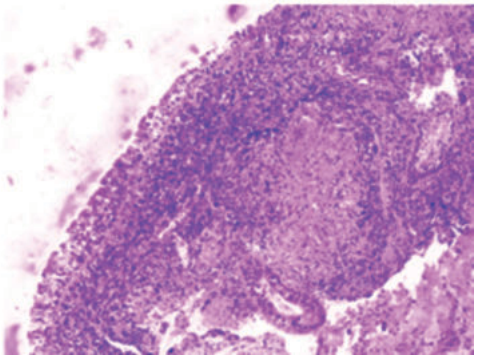

Fig. 8: Bronchial mucosa lined by benign respiratory epithelium. The subepithelial stroma shows well-formed coalescent epithelioid granuloma (Tubercular lesion).

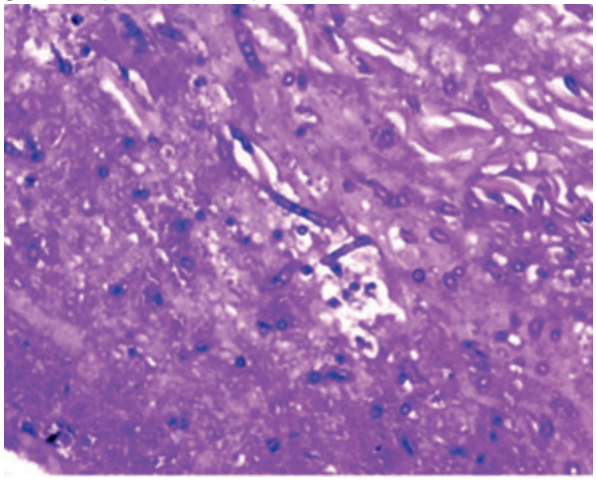

Fig. 9: Narrow septate fungal hyphae with acute angle branching (Aspergillus species).

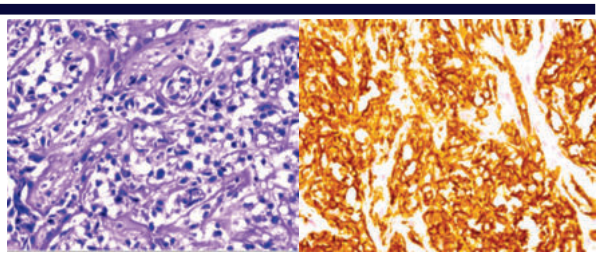

Fig. 10 (a) *Fig. 10 (b)*

Fig. 10 (a) & (b): Nest of tumour cells having watery clear cytoplasm, irregular nuclear membrane and hyperchromatic nuclei. Tumour cell nests are compartmentalized by collagenous septae. They are positive for CD 20 (Primary mediastinal B cell lymphoma).

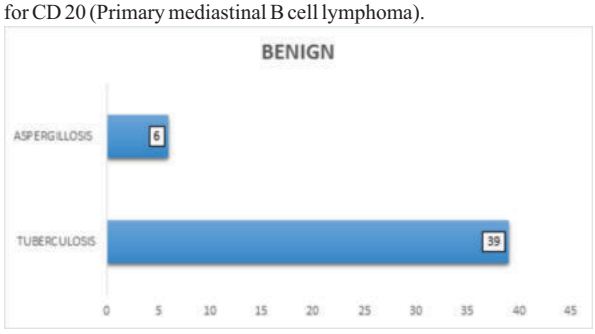

Fig 11: Distribution of types of benign lesions diagnosed by bronchoscopic biopsy (n=45)

Majority of the benign lesions turned out to be tuberculosis (86.6%). 13.3% of the cases was due to Aspergillus.

There were 30 (7%) cases where a definite diagnosis was not made. These inconclusive results were due to:-
1. inadequate or sub optimal biopsy sample,
2. presence of necrotic material,
3. nonspecific findings or
4. normal bronchial mucosa on histopathology.

Of the 415 cases with endobronchial lesions, diagnosis was made in 385 of them. This gives a diagnostic yield of 92.7%.

DISCUSSION

Flexible bronchoscopy is an indispensable diagnostic tool to aid in the diagnosis of various lung lesions. While most endobronchial mass lesions are malignant, some benign lesions can also present as endobronchial mass. 82 % of the cases in our study were confirmed carcinomas on histopathology but 11% of the cases were benign lesions. Malignant lesions were more common among males when compared to females. Squamous cell carcinoma was found to be the most common type of lung cancer in the present study accounting for 74.11% of the malignant cases. These results are contrary to the findings of the more recently published studies which suggest that adenocarcinoma is the most prevalent lung cancer in India.[8-9] The reason for this could be the central location of these tumours which are easier to assess by bronchoscopy when compared to adenocarcinomas which have a predominantly peripheral location which makes them nonvisible endobronchially via bronchoscopy. However similar findings of squamous cell carcinoma as the predominant type were reported in certain studies.[10-12]

Some of the endobronchial mass lesions were caused by benign conditions (11%). These findings emphasize the fact that all endobronchial lesions are not malignant. Out of these benign lesions, tuberculosis was found to be the most common. This reflects the endemic nature of the disease in the region. Definite diagnosis could not be made in 30 patients. 18 of these patients were lost to follow up and the other 12 did not give consent for a repeat biopsy. The diagnostic yield of bronchoscopic biopsy was found to be 92.7% which is similar to the findings of Gupta S et al[10] where the diagnostic yield was 92%. This is also in accordance with the guidelines laid down by the American Thoracic Society / European Respiratory Society (ATS/ERS) according to which the diagnostic yield of bronchoscopy should be more than 90%[13]. The diagnostic yield was reported to be much lower (76.92%) in the study done by Fuladi et al[14], who

recommends adopting all the diagnostic procedures including brushing and washing, in addition to biopsy, in order to increase the diagnostic yield. Similar results were obtained by Dobler et al[15] who concluded that addition of bronchial brushing and washing significantly increased the diagnostic yield when compared to biopsy alone. Likewise, certain studies also found that bronchial wash conferred an additional yield.[16-17]However, certain other studies did not find any improvement in the diagnostic yield with addition of brushing and washing.[18-19] So, they recommended omission of washing in cases of bronchoscopically visible lesions and found that cytological methods were unlikely to produce any additional benefit in terms of diagnosis. Although computed tomography and virtual bronchoscopy are non-invasive modalities to diagnose intrabronchial lesions with good correlation between the CT and bronchoscopic findings, bronchoscopy is needed to obtain samples for tissue diagnosis. Also, CT scan can at times fail to detect endobronchial tumours[20] which later during bronchoscopy may be detected.

CONCLUSION

The findings of our nine-year span study highlight the importance of endobronchial biopsy in contributing to accurate diagnoses and subsequent treatment strategies for a spectrum of respiratory disorders. The procedure's role in early detection, staging and therapeutic decision-making has been underscored, emphasizing its clinical relevance in the evolving landscape of pulmonary medicine. Although endobronchial lesions are mostly malignant, benign conditions can also mimic such lesions. Thus, bronchoscopic biopsy is an essential tool for diagnosing visible endobronchial lesions with a high diagnostic yield.

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