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Fiber-optic bronchoscopy for diagnosing hilar masses of the lung: a study from a tertiary care cardiothoracic and vascular centre in northeastern India

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Abstract

Introduction: Fiberoptic Bronchoscopy is an important tool at a clinician's disposal for managing various pulmonary pathologies both benign and malignant. Its sensitivity and specificity highly depend on the site of the pulmonary lesion with central lesions providing better results than peripheral ones. The procedure is usually well tolerated if done properly with most complications being amendable to conservative management. Specially for hilar masses of the lung bronchoscopy not only allows for obtaining biopsy tissue but also evaluation of the anatomy for operative planning.

Materials and methods: Herein we review the findings and complications of Bronchoscopy done for Hilar masses at our institute from 01/05/23 to 01/12/23. In our study we included patients who had hilar lung masses on imaging and patients who did not have prior biopsy/FNAC. Patients with peripheral lung lesions and patients who had a performance status of Eastern Cooperative Oncology Group more than 2 were excluded from the study.

Results: The results for the 20 cases taken up for bronchoscopy were as follows: A definite lesion could be identified for biopsy in 14 cases, and samples biopsied and sent for HPE (Histopathological evaluation) and IHC (immunohistochemistry) were mostly adequate. The sensitivity of bronchoscopy was found to be 70%. The procedure was well tolerated and of the total number of patients taken up for bronchoscopic biopsy only two patients had complications and these complications were managed conservatively without the need for further procedure.

Conclusion: In this study bronchoscopy and biopsy were found to be a safe and effective tool in the management of hilar masses of lung. The study is not without limitations though which include the short study duration, limited sample size, and absence of bronchoscopic ultrasound technology at our institute.

Keywords: CTVS, Cancer, Lung cancer

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Introduction

With the advent of the the first bronchoscopy which was performed in 1887 by Gustav Killian of Freiburg, Germany the scope and techniques of the procedure have come a long way from then (1). Fiberoptic Bronchoscopy is quite frequently being used in the diagnosis of various pulmonary pathologies including lung cancer. The diagnostic yield of bronchoscopy highly depends on the site of the lesion with better results for central than peripheral.

Central tumours can present as exophytic mass lesions, as peribronchialtumours or with submucosal infiltration of the bronchial tree. The changes in case of peribronchialtumours or tumors with submucosal infiltration are subtle and may present with features such as erythema, loss of bronchial markings and nodularity of the mucosal surface. Central lesions are usually sampled with a combination of bronchial washes, bronchial brushings and endobronchial biopsies. The yield of endobronchial biopsies is highest for exophytic lesions, with a diagnostic yield of ~90% (2-4).

Peripheral lesions are usually sampled with a combination of bronchial wash, brushes, transbronchial biopsy and TBNA. The diagnostic yield of bronchoscopy for peripheral lesions depends lesion size, the distance of the lesion from the hilum and on the relationship between the lesion and bronchus. The yield of bronchoscopy for lesions <3 cm varies from 14–50% compared with a diagnostic yield of 46–80% when the lesion is >3 cm (5-7).

As observed in the study by Stahl etal the mechanical complications of bronchoscopy are primarily related to airway manipulations or bleeding while the systemic complications arise from the procedure itself, medication administered, or patient comorbidities; but still mortality rates remain low at < 0.1%. Thus fiber-optic bronchoscopy offers an effective and safe diagnostic modality for hilar mass of the lung, with good diagnostic yield and low mortality rate(8).

Histopathological Evaluation with Immunohistochemistry and location of the tumor with respect to the hilum is of utmost importance when planning treatment modality when it comes to carcinoma of lung. Bronchoscopy can help provide both. Thus bronchoscopy is routinely done at out centre for hilar masses of lung and thus this retrospective study was done to evaluate its efficacy and safety.

Material and methods

In this retrospective study we review the findings and post procedure complications of Bronchoscopy done for Hilar masses in a dedicated Oncology centre from 01/05/23 to 01/12/23.

It is a retrospective study where data was collected from records.The total number of cases included in the study from 01/05/23 to 01/12/23 is 20.

Inclusion criteria

1) Patients who had hilar lung masses on imaging were included in the study.
2) Patients who did not have prior biopsy/FNAC done were included in the study.

Exclusion criteria

1) Patients with peripheral lung lesions were excluded from the study.
2) Patients who had a performance status of Eastern Cooperative Oncology Group more than 2 were excluded from the study.

The main aim of the study was to review fiber-optic bronchoscopy as a safe and effective tool for diagnosis and evaluation of hilar mass of the lung.

Results

Age distribution

In our study, nine of the patients were aged 50 to 59, nine were between 60 and 69, and only two were above 70. The mean age of the patients was 61.25 (Table 1 and Figure 1).

Table 1. Showing the age distribution of the patients presenting with hilar mass of the lung.

Age distribution	Number of patients
<50	0
50- 59	9
60- 69	9
>70	2

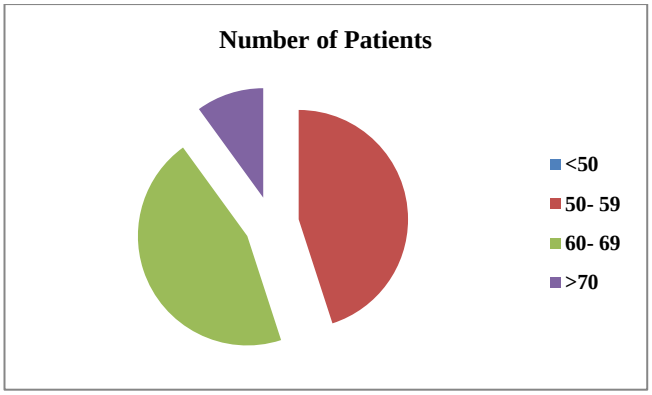


Figure 1. Showing the age distribution of the patients presenting with hilar mass of the lung.

Sex distribution

Sixteen of the patients were male and four were female resulting in the M:F ratio of 4:1 (Table 2 and Figure 2).

Table 2. Showing the sex distribution in the patients taken up for the study.

Sex Distribution	Number of patients
Male	16
Female	4

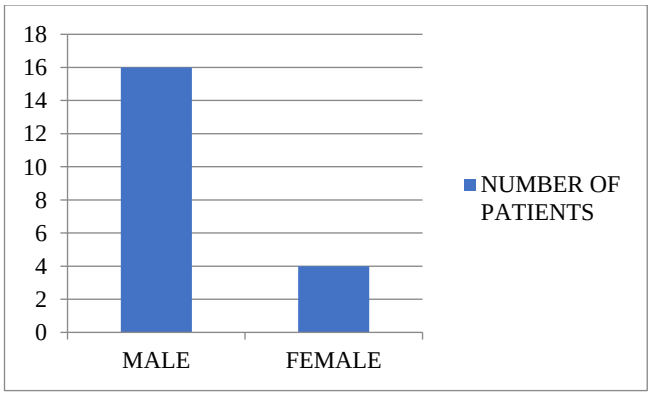


Figure 2. Showing the sex distribution in the patients taken up for the study.

Site of lesion

In our study 14 patients (70%) had right sided lesions and 6 patients(30%) had left sided lesions (Table 3 and Figure 3 and Figure 4).

Table 3. Showing the side of the hilar mass in the study patients.

Site	Number of patients
Right hilar mass	14
Left hilar mass	6

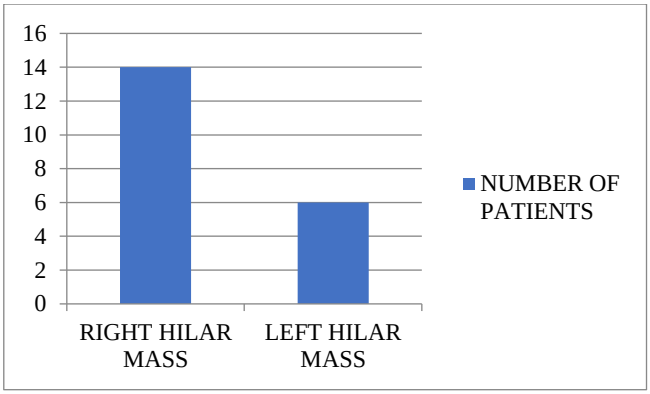
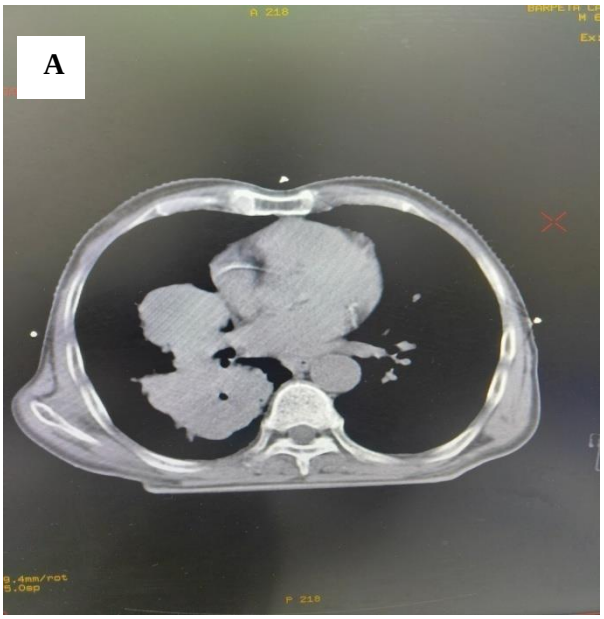
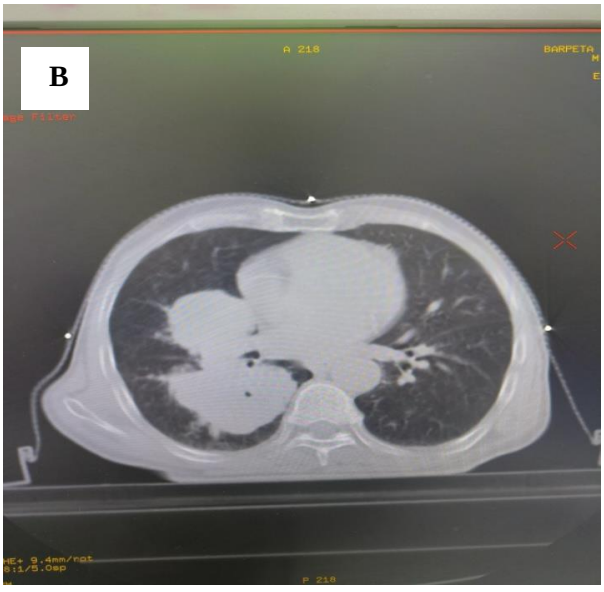
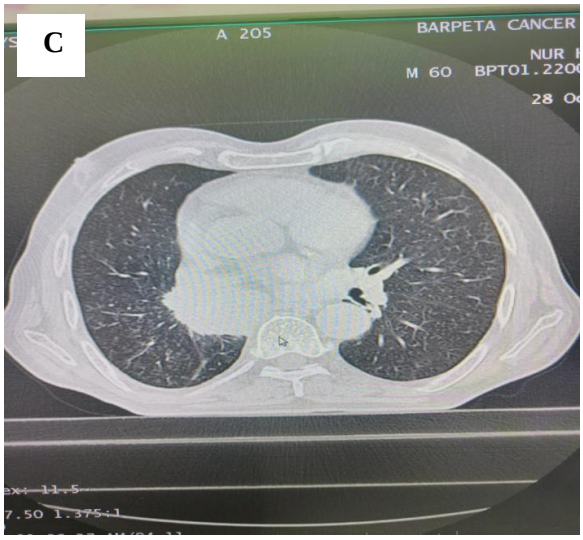


Figure 3. Showing the side of the hilar mass in the study patients.







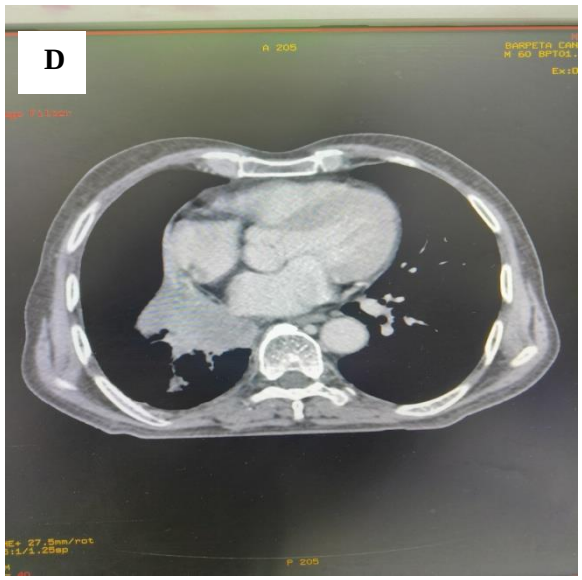


Figure 4. A,B,C, and D show the right hilar mass on contrast-enhanced computerized tomography thorax.

Final histopathology

Ten of the biopsy specimens showed squamous cell carcinoma, one showed adenocarcinoma and three showed poorly differentiated carcinoma or other cellular variants. In six of the patients no endobronchial lesion could be seen for biopsy (Table 4 and Figures 5 and 6).

Table 4. Showing the final histopathology of the biopsy specimen obtained during the study.

Histopathology	Number of patients
Squamous cell carcinoma	10
Adeno carcinoma	1
Poorly differentiated carcinoma/others	3

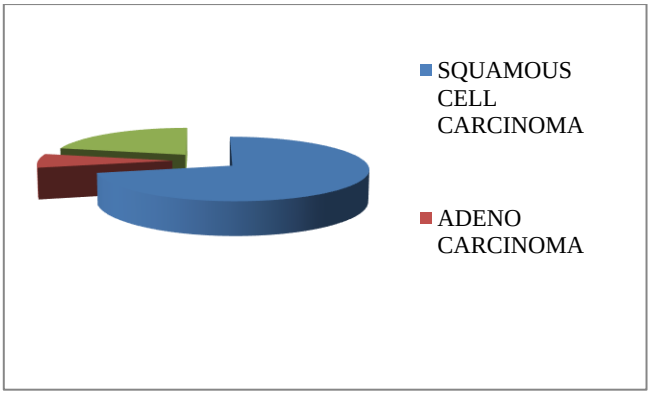
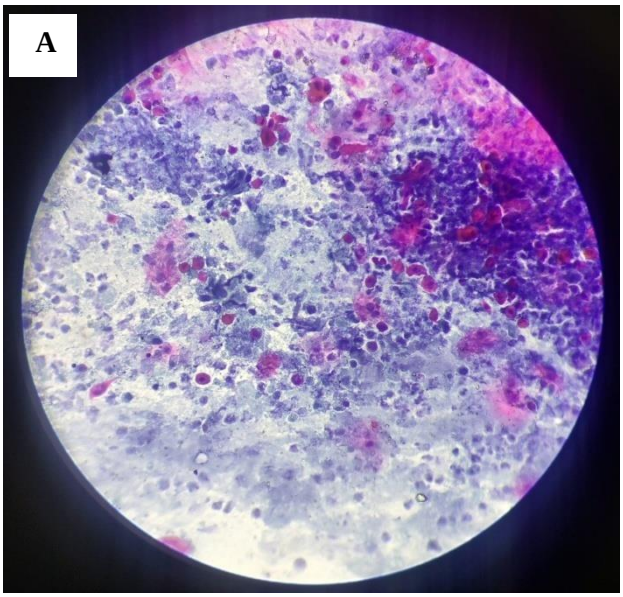
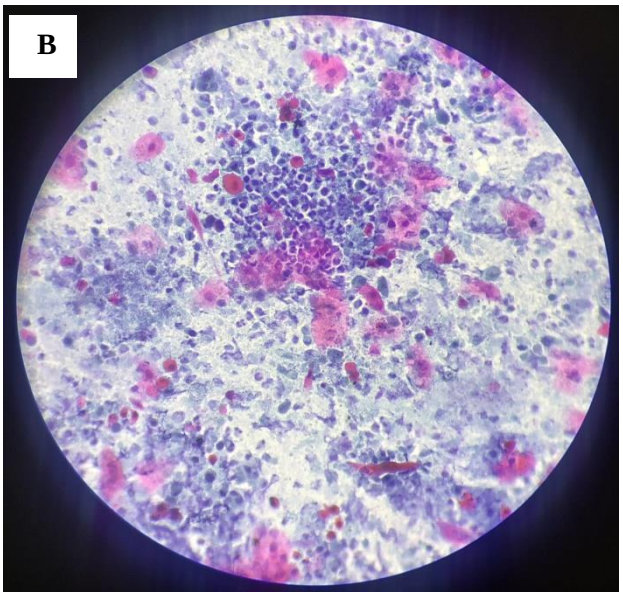
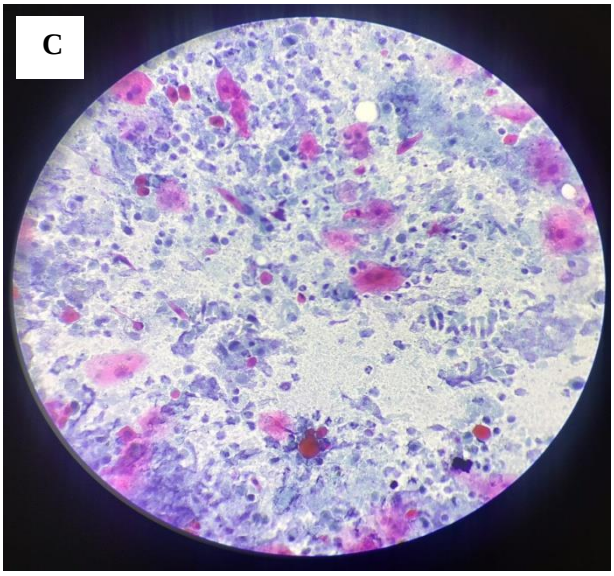


Figure 5. Showing the final histopathology of the biopsy specimen obtained during the study.







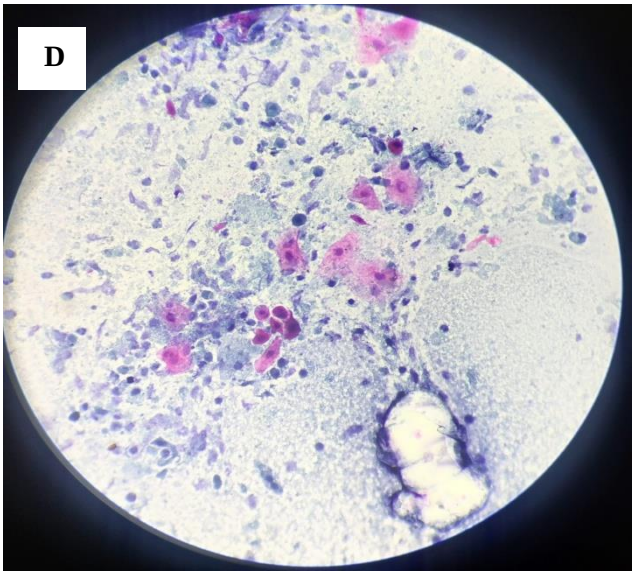


Figure 6. A, B, C and D show bronchoalveolar lavage cytology with the presence of malignant cells.

Lesion on bronchoscopy

14 of the cases showed a definitive lesion, and in all of these instances, a biopsy was taken. Thus, the sensitivity of bronchoscopy was found to be 70 percent (True positive/true positive + false negative) (Table 5 and Figures 7 and 8).

Table 5. Showing the total number of cases wherein definite lesion could be seen on bronchoscopy.

Lesion on bronchoscopy	Number of patients
Seen	14
Not seen	6

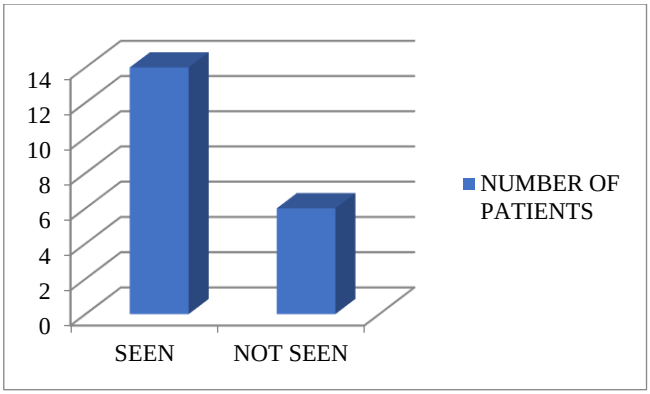
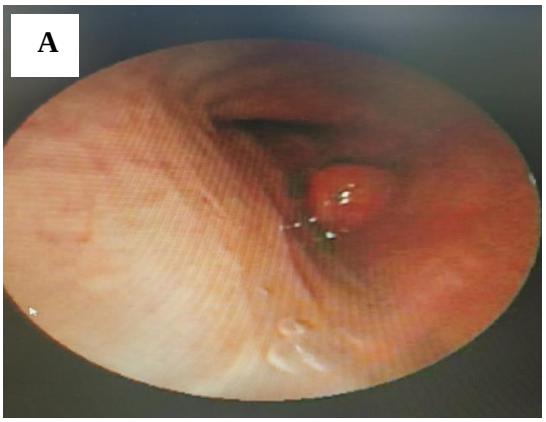
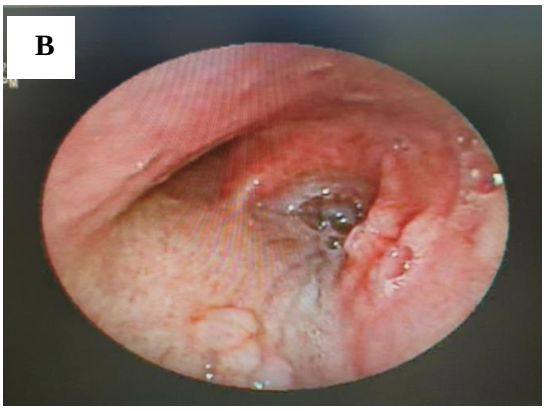
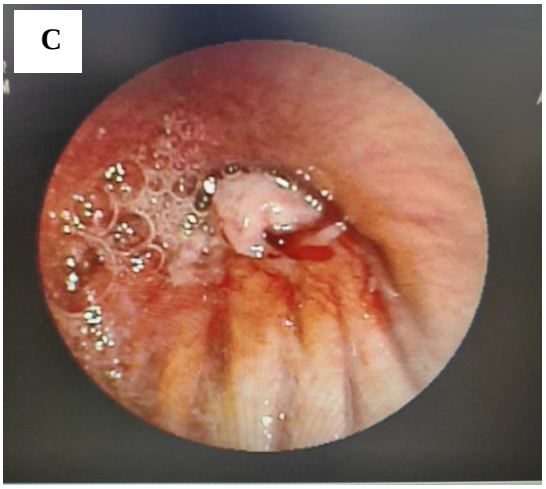


Figure 7. Showing the total number of cases wherein definite lesion could be seen on bronchoscopy.







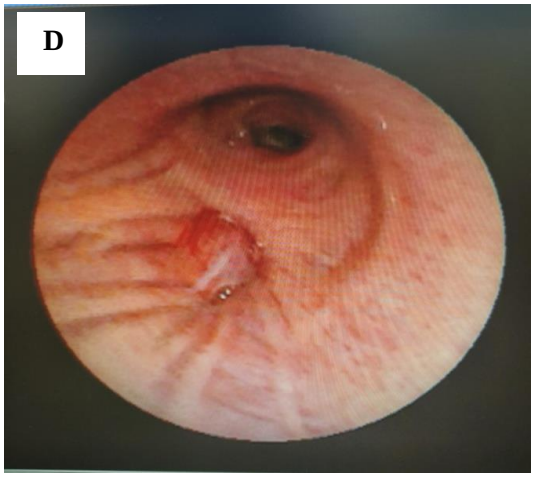


Figure 8. A, B, C and D show growth encountered during bronchoscopy.

Complications

Only two of the patients developed intra procedure complications a) haemorrharage from biopsy site and b) transient respiratory distress both of which were managed conservatively (Table 6 and Figure 9).

Table 6. shows the complication spectrum post procedure.

Complications	Number of cases
Haemmohorage	1
Respiratory distress	1
Bronchospasm	0
Pneumothorax	0
Respiratory Failure	0

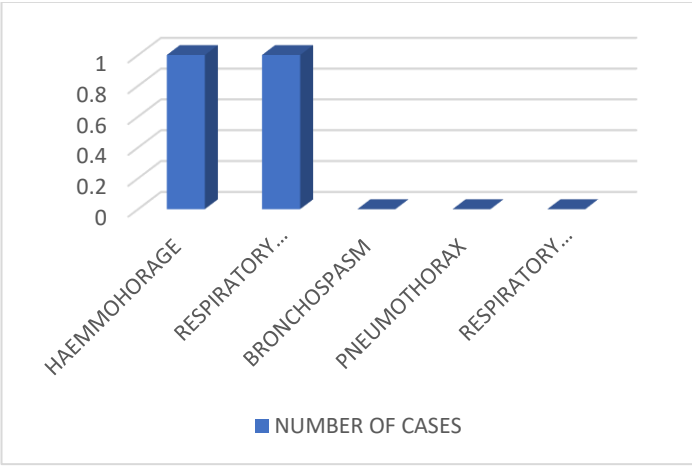


Figure 9. Showing the complication spectrum post procedure.

Discussion

As per Dela Cruz etal 0.2% of lung cancer was diagnosed in patients between age 20 and 34 years; 1.5% between 35 and 44 years; 8.8% between 45 and 54 years; 20.9% between 55 and 64 years; 31.1% between 65 and 74 years; 29% between 75 and 84 years; and 8.3% at 85 years and older, which showed similar trend with our study with 45% patients in the age bracket of 50-59 years and 45% of the patients in the age bracket of 60-69 and 10% of patients in the >70 years age bracket (9). The male-to-female ratio was 3.5:1 in the study by Noronha et al. which was similar to our study at a ratio of 4:1(10). Our findings were a bit different with regard to the study by Noronha et al which showed eight percent of patients had small-cell carcinoma; of the 92% patients with non-small-cell carcinoma (NSCLC), the most common histology was adenocarcinoma (43.8%), followed by squamous cell (26.2%), large cell (2.1%) and other (8.3%), while in our study we found that 50% of patients had squamous cell carcinoma, 5% had adenocarcinoma and 15% had poorly differentiated carcinoma while definite histopathological diagnosis could not be made in 30% of the cases This discrepancy may have arisen due to the high incidence of tobacco smoking in this region. As for the high rate of absence of histopathological diagnosis, it may be due to the absence of transbronchal ultrasonography guided fine needle aspiration cytology along with high prevalence of pulmonary tuberculosis in this region which can mimic lung lesions. For the cases taken up for bronchoscopy a definite lesion could be identified for biopsy in 14 cases which accounts for 70% accuracy which is similar to the findings by acharya et al who found bronchoscopic procedures had a high diagnostic accuracy of 81.25% in confirming lung malignancies in central tumours (11). The samples biopsied and sent for HPE(Histo-pathological evaluation) and IHC(Immuno-histo chemistry) were mostly adequate. The procedure was well tolerated and of the total number of patients taken up for bronchoscopic biopsy only two patients had complications one of whom had minor bleeding and the other had respiratory distress which is similar to the findings by M. Modoni et al who found the most frequent complication in their study to be minor bleeding, which can resolve spontaneously in the majority of the cases or can be treated with ice-cold saline or vasoconstrictive agents (12). The complications encountered in our study were managed conservatively without the need for ICU care or other invasive/surgical modalities.

Conclusion

On reviewing the findings of this retrospective study it was observed that bronchoscopy and biopsy is a safe and effective tool which provides anatomical picture along with tissue for HPE and IHC in case of lung lesions presenting with hilar masses on imaging. The main limitations of the study include the short study duration, small sample size,. and absence of endoscopic ultrasonography.

Author contribution

JT study design and data collection and compiling, **AG**, pictures and tables, **MT** supervisor. All authors reviewed the manuscript.

Conflict of interest

There is no Conflicts of interest/competing interests.

Funding

There is no funding.

Ethical approval

The paper was put before the ethical board but as it was a retrospective study and as the bronchoscopy is a routine investigation done at our centre for lung masses as per our institute protocol it was decided by the board that ethical clearance would not be needed for the study.

Consent

Informed and written consent was taken for all cases included in the study.

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