ORIGINAL RESEARCH PAPER

Respiratory Medicine

# DIAGNOSTIC SPECTRUM OF BRONCHOSCOPIC BIOPSY SPECIMENS: A SINGLE- CENTRE OBSERVATIONAL STUDY OF 50 BRONCHOSCOPIES

**KEY WORDS:** bronchoscopy; lung cancer; NSCLC; SCLC; granulomatous inflammation; age; sex; histopathology

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**ABSTRACT**

**Background:** Bronchoscopy is an important diagnostic procedure for suspected pulmonary malignancy and selected granulomatous lung diseases. Objective: To evaluate the age- and sex-wise distribution of diagnoses among 50 bronchoscopies. **Methods:** Aggregate data from 50 cases were analyzed using three age groups (<40, 40–60, >60 years) and four diagnostic categories: granulomatous inflammation, small cell carcinoma (SCLC), non-small cell carcinoma (NSCLC), and inconclusive. **Results:** There were 39 males (78.0%) and 11 females (22.0%). Granulomatous inflammation occurred in 5 cases, SCLC in 11, NSCLC in 21, and 11 were inconclusive. All 3 patients below 40 years had granulomatous disease. In the 40–60-year group, 6/15 had NSCLC and 2/15 had SCLC. In the >60-year group, 15 males had NSCLC and 8 patients had SCLC. **Conclusion:** Malignant diagnoses were concentrated in older patients, particularly those >60 years, whereas all patients below 40 years had granulomatous disease. These findings are descriptive and should not be interpreted as population-level risk estimates.

## 1. INTRODUCTION

Flexible bronchoscopy is an established diagnostic and therapeutic tool in respiratory medicine. It permits direct visualization and acquisition of bronchial washings, brushings, endobronchial biopsy, transbronchial biopsy, bronchoalveolar lavage and needle-based specimens. Indian guidelines provide evidence-based recommendations for diagnostic flexible bronchoscopy and emphasize selection of appropriate sampling techniques according to lesion characteristics. citeturn search turn search1

Lung cancer is predominantly diagnosed in older adults. Modern thoracic tumour classification distinguishes SCLC from the broad NSCLC group and increasingly integrates morphology, immunohistochemistry and molecular pathology. The WHO Classification of Tumours, 5th edition, provides the contemporary international framework for thoracic tumour diagnosis. cite turn0search3

The present study describes the diagnostic spectrum of 50 bronchoscopic specimens with particular emphasis on age and sex distribution, providing an institutional baseline for future prospective bronchoscopy audits.

## 2. AIM AND OBJECTIVES

- To determine the age distribution of patients undergoing bronchoscopy.
- To describe the sex-wise distribution of granulomatous inflammation, SCLC, NSCLC and inconclusive specimens.
- To assess the distribution of each diagnosis across <40, 40–60 and >60 year age groups.
- To generate clinically relevant descriptive inferences from the observed age–sex–diagnosis pattern.

## 3. MATERIALS AND METHODS

### 3.1 Study Design

This was a retrospective/descriptive observational analysis of 50 bronchoscopies. The exact institution and study period were not supplied and should be inserted before journal submission.

### 3.2 Study Population and Variables

The dataset contained 50 cases: 39 males and 11 females. Diagnoses were categorized as granulomatous inflammation, SCLC, NSCLC or inconclusive. Age was grouped as <40, 40–60 and >60 years.

### 3.3 Statistical Analysis

Categorical variables were summarized using frequencies and percentages. Because only aggregate counts were supplied, no patient-level inferential statistical test was performed. The findings therefore describe observed patterns rather than causation or population risk.

### 3.4 Ethical Considerations

Institutional ethics approval/waiver, anonymization and consent requirements should be documented according to local policy before submission.

## 4. RESULTS

The dataset comprised 39 males (78.0%) and 11 females (22.0%). Overall diagnostic counts were 5 granulomatous inflammation, 11 SCLC, 21 NSCLC and 11 inconclusive. Thus, 32/50 cases (64.0%) were malignant in the supplied dataset.

**Table 1. Overall Diagnostic Distribution by Sex**

| Diagnosis | Male | Female | Total (%) |
|---|---|---|---|
| Granulomatous | 3 | 5 | 8 (16.0%) |
| SCLC | 8 | 2 | 10 (20.0%) |
| NSCLC | 20 | 1 | 21 (42.0%) |
| Inconclusive | 8 | 3 | 11 (22.0%) |
| Total | 39 (78.0%) | 11 (22.0%) | 50 (100%) |

**Table 2. Age-group Distribution**

| Age group | Male | Female | Total (%) |
|---|---|---|---|
| <40 | 1 | 2 | 3 (6.0%) |
| 40–60 | 10 | 5 | 15 (30.0%) |
| >60 | 28 | 4 | 32 (64.0%) |
| Total | 39 | 11 | 50 (100%) |

**Table 3. Age and Sex-wise Diagnostic Distribution**

| Age | Sex | Granulomatous | SCLC | NSCLC | Inconclusive | Total |
|---|---|---|---|---|---|---|
| <40 | Male | 1 | 0 | 0 | 0 | 1 |
| <40 | Female | 2 | 0 | 0 | 0 | 2 |
| 40–60 | Male | 1 | 2 | 5 | 2 | 10 |
| 40–60 | Female | 2 | 0 | 1 | 2 | 5 |
| >60 | Male | 1 | 6 | 15 | 6 | 28 |
| >60 | Female | 1 | 2 | 0 | 1 | 4 |

**Table 4. Diagnosis Distributed Across age Groups**

| Diagnosis | <40 | 40–60 | >60 | Total |
|---|---|---|---|---|
| Granulomatous | 3 | 3 | 2 | 8 |
| SCLC | 0 | 2 | 8 | 10 |
| NSCLC | 0 | 6 | 15 | 21 |
| Inconclusive | 0 | 4 | 7 | 11 |

All three patients younger than 40 years had granulomatous

disease (1 male and 2 females). In the 40–60-year group, there were 10 males and 5 females; male diagnoses were 1 granulomatous, 2 SCLC, 5 NSCLC and 2 inconclusive, while female diagnoses were 2 granulomatous, 0 SCLC, 1 NSCLC and 2 inconclusive. In the >60- year group, there were 28 males and 4 females; male diagnoses were 1 granulomatous, 6 SCLC, 15 NSCLC and 6 inconclusive, while female diagnoses were 1 granulomatous, 2 SCLC, 0 NSCLC and 1 inconclusive.

## 5. Inference

### 5.1 Age-related Inference

The >60-year group contained 32 patients, including 23 malignant diagnoses (15 NSCLC and 8 SCLC), giving a malignant proportion of 71.9% within that age group. The 40–60-year group contained 8 malignant diagnoses among 15 patients (53.3%). No malignant diagnosis occurred in the <40-year group.

### 5.2 Sex-related Inference

NSCLC showed a marked male predominance, with 20 of 21 cases (95.2%) occurring in males. SCLC was also male-predominant, with 8 of 11 cases (72.7%) in males. Granulomatous disease was comparatively balanced, with 3 male and 2 female cases.

### 5.3 Clinical Interpretation

The concentration of SCLC and NSCLC in patients >60 years is consistent with the well-established epidemiology of lung cancer. However, the present dataset is a selected bronchoscopy population and cannot establish incidence, relative risk or causality. The very small <40-year subgroup (n=3) requires particular caution in interpretation.

### 5.4 Inconclusive Specimens

Eleven specimens (22.0%) were inconclusive. A nondiagnostic bronchoscopic specimen should not be interpreted as exclusion of malignancy. Diagnostic yield depends on lesion visibility, location, sampling method and specimen adequacy. Indian recommendations describe complementary sampling methods and emphasize appropriate technique selection. cite turn 0search0

## 6. DISCUSSION

The principal finding was an age gradient in the diagnostic spectrum, with malignant diagnoses concentrated in older patients. NSCLC was the most frequent diagnosis overall and occurred predominantly in males. The age distribution in this series is clinically plausible and emphasizes the importance of age when interpreting bronchoscopic pathology.

Bronchoscopy remains central to tissue acquisition in suspected lung malignancy. Published guidance notes that diagnostic yield varies with lesion characteristics and the sampling approach; therefore, an institutional percentage of inconclusive specimens should always be interpreted alongside procedural details. cite turn0search0

The WHO 5th edition emphasizes integrated histological and molecular classification of thoracic tumours. Adequate tissue is therefore increasingly important not only for establishing malignancy but also for subclassification and biomarker/ molecular assessment where clinically indicated. cite turn0 search3

The granulomatous group warrants separate consideration because granulomatous inflammation may represent infectious or noninfectious disease. Correlation with microbiology, imaging and clinical history is essential, particularly in regions where tuberculosis and other granulomatous infections are prevalent.

Future institutional studies should capture exact age, tobacco exposure, clinical indication, radiological lesion characteristics, bronchoscopic appearance, sampling method, number and adequacy of specimens, immunohistochemistry, molecular testing, microbiology, complications and final reference diagnosis. This would permit calculation of procedure-specific diagnostic yield and assessment of factors associated with nondiagnostic sampling.

## 7. Literature Review

Indian consensus guidance recognizes flexible bronchoscopy as an important diagnostic procedure and provides recommendations covering patient preparation, monitoring and diagnostic sampling techniques.

cite turn0search0 turn0search1 The literature indicates that diagnostic yield differs between central and peripheral lesions and is affected by the combination of bronchoscopic modalities used. Modern thoracic pathology has moved toward integrated morphology, immunophenotype and molecular classification, reflected in the WHO 5th edition. cite turn0search3

These principles support the interpretation of the current dataset: a diagnostic category alone is insufficient to assess procedural performance unless the lesion characteristics and sampling strategy are known. The age- related concentration of carcinoma observed here is best regarded as a descriptive institutional pattern.

## 8. Strengths and Limitations

### Strengths

- Age, sex and diagnosis were provided in a mutually consistent aggregate dataset.
- The study identifies an age-related concentration of malignant diagnoses.
- The analysis provides a useful baseline for future prospective bronchoscopy audits.

### LIMITATIONS

- Individual ages were not available; only age bands were supplied.
- Smoking status, clinical indication, imaging findings, lesion location and sampling technique were unavailable.
- The <40-year group contained only 3 cases.
- No independent reference standard was supplied, so sensitivity, specificity and true diagnostic yield cannot be calculated.
- Granulomatous inflammation was not subdivided into infectious and noninfectious causes.

## 9. CONCLUSION

In this 50-case bronchoscopic series, malignant diagnoses were concentrated in older patients, especially those >60 years. NSCLC was the most frequent diagnosis, followed by SCLC. All patients below 40 years had granulomatous disease. The cohort was strongly male-predominant, particularly among NSCLC cases. These findings provide a useful descriptive institutional baseline, but larger prospective studies with patient-level clinical, radiological, procedural, pathological, microbiological and molecular data are required before broader conclusions can be drawn.

### Appendix: Data Verification

**Age totals:** <40 = 3; 40–60 = 15; >60 = 32; total = 50. Diagnostic totals: granulomatous = 5; SCLC = 11; NSCLC = 21; inconclusive = 11; total = 50. Sex totals: male = 39; female = 11; total = 50.

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