

Research Article

Open Access

Diagnostic Performance of Bronchoscopy in Lung Cancer and/or Pulmonary Metastasis: A Real Aspect of our Country

Saul J Rabadan-Armenta*, Maria Elena Garcia Torres and Mario A Hernandez-Hernandez

Pulmonology Unit, General Hospital of Mexico, Mexico City, Mexico

ABSTRACT

Objective: To evaluate the diagnostic performance of different bronchoscopic sampling techniques in patients with suspected lung cancer and/or pulmonary metastasis at the General Hospital of Mexico, a center without access to endobronchial ultrasound (EBUS).

Methods: A retrospective analysis was conducted on bronchoscopies performed between 2018 and 2023 in patients with suspected lung cancer. Diagnostic results obtained from endobronchial biopsies, bronchial brushing, and bronchoalveolar lavage were analyzed. Histopathological results were used to determine the efficacy of each technique.

Results: A total of 122 bronchoscopies were performed, of which 100 resulted in positive diagnoses of lung cancer via bronchoscopy, and 22 cases were subsequently confirmed by surgical biopsy. The endobronchial biopsy had a success rate of 98.4% in endobronchial tumors, while bronchial brushing and bronchoalveolar lavage showed diagnostic rates of 7.8% and 1.6%, respectively. The most frequent histological types were lung adenocarcinoma (27.0%) and squamous cell carcinoma (23.8%). Postoperative complications occurred in 27.3% of patients undergoing surgery, with a mortality rate of 13.6%.

Conclusions: Bronchoscopy is an essential tool in the diagnosis of lung cancer at the General Hospital of Mexico, especially in the absence of EBUS. Endobronchial biopsy demonstrated high diagnostic efficacy, in contrast to bronchial brushing and bronchoalveolar lavage, which were significantly less effective. These findings underscore the need to improve diagnostic techniques in centers with technological limitations.

*Corresponding author

Saul J Rabadan-Armenta, Pulmonology Unit, General Hospital of Mexico, Mexico City, Mexico.

Received: September 02, 2024; **Accepted:** September 05, 2024, **Published:** September 16, 2024

Keywords: Bronchoscopy, Bronchial Brushing, Endobronchial Biopsy, Bronchoalveolar Lavage

Introduction

Lung cancer is one of the leading causes of mortality worldwide, and our country is no exception [1]. When this pathology is suspected, imaging methods and bronchoscopy are vital diagnostic tools as they can reduce the length of hospital stay and postoperative complications of thoracic surgery [2].

In hospitals without endobronchial ultrasound (EBUS), sampling techniques are limited to endobronchial biopsy, bronchial lavage, bronchial brushing, and bronchoalveolar lavage, which is the case in most centers in our country.

Studies reported in the medical literature show variable results in the diagnostic performance associated with the addition of bronchial brushings to endobronchial biopsies and lavages during bronchoscopy for possible lung cancer. Mak et al. showed that brushings provided the only positive malignancy result in 4.8% and 3.2% of cases with bronchoscopically visible and non-visible tumors, respectively [3]. Therefore, the utility and diagnostic performance of different bronchoscopic sampling methods in lung cancer remain uncertain but may be of particular value in centers where EBUS-guided sampling is unavailable. This is the case at the General Hospital of Mexico, the largest hospital in the country, where bronchial brushing, endobronchial biopsies, and

lavages during bronchoscopy are fundamental pillars of the study protocol in suspected lung cancer.

Materials and Methods

A retrospective analysis was conducted on cases of patients with suspected lung cancer who underwent bronchoscopy at the General Hospital of Mexico from 2018 to 2023. The pathology results of samples obtained by bronchoscopy were reviewed to determine the diagnostic performance of bronchial brushing, endobronchial biopsies, and bronchial lavage.

The diagnostic suspicion of lung cancer was established based on medical history, clinical evaluation, and findings on chest X-ray and tomography. Flexible bronchoscopy and surgical biopsy were used for sampling in patients where a diagnosis was not obtained via flexible bronchoscopy and/or when no lesion was identified for sampling by bronchoscopy.

The histological diagnosis by bronchoscopy was confirmed by biopsy of the identified lesion, in addition to bronchial brushing and bronchoalveolar lavage. Simple descriptive analyses were performed, and numbers and proportions were reported.

Results

In the Pulmonology service of the General Hospital of Mexico, 122 bronchoscopies were performed on patients with suspected primary lung cancer or pulmonary metastasis. The diagnosis

of primary cancer was later confirmed by histopathology. Of these patients, 100 were diagnosed via bronchoscopy, with biopsy, brushing, and bronchoalveolar lavage samples taken for

cytological studies. The remaining 22 patients were subsequently diagnosed through surgical biopsy (Table I).

Table 1: Demographic, Histopathological, and Diagnostic Characteristics According to Identified Lesions.

Characteristic	Total	T. Endobronchial (N= 64)	Mucosal Infiltration (N=21)	Extrinsic Compression (N=15)	P-value
	N = 122	N = 64	N = 21	N = 15	
Mean Age (MA)	62	61.5	63.1	62.8	0.915*
Gender					
Male (%)	57.4	56.2	61.9	53.3	
Female (%)	42.3	43.8	38.1	46.7	0.832*
Histopathology %					
Squamous Cell Carcinoma	23.8	38.1	35.3	0	0.078**
Adenocarcinoma	27.0	30.2	76.5	100	<0.001**
Small Cell Carcinoma	6.3	12.7	0.0	0.0	0.221**
C. ductal infiltrante	4.0	7.9	0.0	0.0	0.342**
Tumor germinal	3.2	6.3	0.0	0.0	0.511**
C. renal cel. claras	2.4	4.8	0.0	0.0	0.615**
Positive Diagnostic Technique (%)					
Endobronchial Biopsy (%)	82	98.4	81.0	13.3	<0.001**
Bronchial Brushing (%)	5	7.8	4.8	0.0	0.398**
Bronchoalveolar Lavage (%)	1	1.6	0.0	0.0	0.812**

* Prueba U de Mann-Whitney. ** Prueba Chi cuadrada

Demographics

Among the cases diagnosed by bronchoscopy, 42.6% were women and 57.4% were men, with a mean age of 62 years, ranging from 46 to 82 years. Sixty-five percent were current or former smokers; of these, 42% had a history of more than 20 pack-years, 12% had smoked more than 15 pack-years, and the rest had never smoked.

Bronchoscopy

During the bronchoscopies, 64 cases of endobronchial tumors were identified (Figure 1). In these cases, biopsies, brushing, and bronchoalveolar lavage were performed. The histopathological result of the biopsies was positive in 98.4% of cases (63 patients). Brushing provided a diagnosis in 7.8% of cases (5 patients), and bronchoalveolar lavage detected cells compatible with malignancy in 1.6% of cases (1 patient).



Figure 1: Endobronchial Tumor

Regarding mucosal infiltrating lesions with increased vascularization, 21 patients were observed. All of them underwent biopsies, brushing, and bronchoalveolar lavage (Figure 2). The histopathological analysis of the biopsies was positive in 81% of cases (17 patients). Brushing provided a diagnosis in 4.8% of cases (1 patient), and bronchoalveolar lavage did not identify malignant cells in any patient.



Figure 2: Bronchial Mucosal Infiltration

In cases of extrinsic compression of the bronchial wall, identified in 15 patients, biopsies, brushing, and bronchoalveolar lavage were performed. The biopsy was positive in 13.3% of cases (2 patients), while brushing and bronchoalveolar lavage did not provide a diagnosis of malignancy in any patient.

Surgical

Of the 22 surgically treated patients, a posterolateral thoracotomy was performed to obtain biopsies. Mild complications occurred in 6 patients, such as blood loss requiring transfusion. Five patients required intensive respiratory care, of whom 3 died. Twelve patients continued to have pain at the thoracotomy site one month after surgery. All samples provided a histopathological diagnosis.

Histopathology

The results obtained from the bronchoscopy samples were as follows:

Of the 63 endobronchial tumor samples, 24 corresponded to squamous cell carcinoma (38.1%), 19 to adenocarcinoma (30.2%), 8 to small cell lung cancer (12.7%), 5 to infiltrating ductal carcinoma (7.9%), 4 to germ cell tumor (6.3%), and 3 to clear cell renal carcinoma (4.8%).

Regarding mucosal infiltrating lesions with increased vascularization, of the 17 patients, 13 corresponded to adenocarcinoma (76.5%) and 6 to squamous cell carcinoma (35.3%).

Two patients with extrinsic compression had pulmonary adenocarcinoma.

In total, histopathology from bronchoscopy samples diagnosed 30 patients with squamous cell carcinoma (23.8%), 34 with pulmonary adenocarcinoma (27.0%), 8 with small cell lung cancer (6.3%), 5 with infiltrating ductal carcinoma (4.0%), 4 with germ cell tumor (3.2%), and 3 with clear cell renal carcinoma (2.4%).

The surgical intervention results were: 15 cases (68.2%) of pulmonary adenocarcinoma, 6 cases (27.3%) of squamous cell carcinoma, and 1 case of clear cell renal carcinoma (4.5%).

Discussion

Lung cancer remains one of the leading causes of mortality in our country, reflecting a significant problem in our environment. Bronchoscopy is a fundamental tool in diagnosing this pathology, especially in centers that lack advanced technologies such as endobronchial ultrasound (EBUS). This retrospective study from the General Hospital of Mexico highlights the importance and performance of bronchoscopic sampling techniques in diagnosing lung and metastatic cancer.

Our data indicate a slight predominance of male patients (57.4%) over females (42.6%), with a mean age of 62 years. A significant finding is that 65% of the patients were current or former smokers, highlighting the strong link between smoking and the development of lung cancer in the patients at our hospital.

Bronchoscopy proved to be an effective technique for diagnosing lung cancer in 82.0% of the total cases, with a notable difference in efficacy between sampling techniques. When an endobronchial tumor was found, bronchoscopic biopsy had a success rate of

98.4% in endobronchial tumors, confirming biopsies as the most effective method, and no patient experienced complications from the procedure. Some studies report a 5% risk of pneumothorax [3]. In our study, no patient had this complication. However, its efficacy drastically decreased in cases of extrinsic compression, where bronchoalveolar lavage and bronchial brushing were inadequate. This is significant given that extrinsic compression cases were common [3].

Bronchoalveolar lavage was the least effective technique for diagnosis, showing a result only in cases of endobronchial tumors, suggesting it should not be routinely performed unless a significant improvement in the diagnostic rate is confirmed, as highlighted by Piaton et al. [4].

Our results reaffirm the importance of bronchoscopy in the diagnosis of lung cancer, particularly in cases of visible tumors, making it an essential tool in our country, where many medical centers lack advanced imaging technologies like EBUS. However, we recognize the limitations of this study, including the lack of a larger sample size and prospective comparison of the sampling techniques.

Conclusions

The results obtained in this study confirm that bronchoscopy is an essential diagnostic tool in the General Hospital of Mexico, particularly in the absence of EBUS. The high success rate of biopsy in cases of visible endobronchial tumors makes it a critical procedure for diagnosing lung cancer. In contrast, bronchial brushing and bronchoalveolar lavage, with very low diagnostic yields, might be less useful as routine procedures [5].

Further studies are necessary to assess the role of other bronchoscopic techniques and new technologies that may complement bronchoscopy in centers with limited resources.

References

1. Siegel R, Ward E, Brawley O, Jemal (2011) Cancer statistics, 2011: the impact of eliminating socioeconomic and racial disparities on premature cancer deaths. *CA Cancer J Clin* 61: 212-236.
2. Allemani C, Weir HK, Carreira H, Harewoodet R, Spika D, et al. (2015) Global surveillance of cancer survival 1995-2009: analysis of individual data for 25,676,887 patients from 279 population-based registries in 67 countries (CONCORD-2). *Lancet* 385: 977-1010.
3. Lam B, Wong MP, Ooi C, Lam WK, Chan KN, et al. (2000) Diagnostic yield of bronchoscopic sampling methods in bronchial carcinoma. *Respirology* 5: 265-270.
4. Becker H D (2010) Bronchoscopy: the past, the present, and the future. *Med* 31: 1-18.
5. Miller RJ, Casal RF, Lazarus DR, Ost DE, Eapen GA (2018) Flexible Bronchoscopy. *Clinics in Chest Medicine* 39: 1-16.

Copyright: ©2024 Saul J Rabadan-Armenta, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.