

“A Correlational Study of Bronchial Brushing With Bronchoscopic Biopsy in Diagnosis of Malignant Lung Neoplasms”

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Abstract

Lung cancer is one of the commonest cancer and cause of cancer related deaths all over the world . According to recent studies the incidence is on the rise in women. Several studies however have demonstrated that early detection, localisation and aggressive treatment of lung cancer results in five year survival rate of 70 to 80%. Fiberoptic bronchoscopy has an excellent result in diagnosis of lung cancer when combined with brushing cytology & biopsy . A total of 51 cases, clinically & radiologically suspected of lung cancer, undergoing brush cytology and bronchial biopsy done, were included in this study. Suspected lung cancer biopsies were included in this prospective and retrospective study on whom bronchoscopy was performed specimens were collected over the period of 6 year. Bronchial brushing, biopsy specimens were collected & processed accordingly. Out of 51 suspected lung cancer cases, the most common was the squamous cell carcinoma (68.62%), followed by adenocarcinoma (17.64%), small cell carcinoma (11.76%) and negative for malignancy 1(1.51%). Thus, cytohistological correlation was done in 51 suspected lung cancer cases. Bronchial biopsy has better detection rate than brushing cytology in this study. Bronchial brushing cytology is an inexpensive, less invasive, quick and effective diagnostic tool in detection of lung cancer. However combination of these modalities gives higher detection rate for bronchoscopically visible tumor. Therefore, bronchial brush cytology should be performed whenever possible in all suspected cases of lung cancer.

Key words- Bronchial brushing cytology; bronchial biopsy, lung cancer.

Intoduction

Lung cancer is one of the commonest cancer and cause of cancer related deaths all over the world. It is the commonest cancer and cause of cancer related mortality in men[1].It is most frequent malignancy in the industrialized nations. According to recent studies the incidence is on the rise in women[8].

The overall therapeutic results have changed very little in past in the face of an increasing incidence of this disease throughout the world. Most patients are found to have advanced disease at the time of diagnosis and thus treatment of this population is disappointing and very often only palliative.

Several studies however have demonstrated that early detection, localisation and aggressive treatment of lung cancer results in five year survival rate of 70 to 80% [3].

To combat the disease successfully, it should be diagnosed at earliest possible stage. For early diagnosis different diagnostic modalities are available which include; radiology, bronchoscopy, bronchial biopsy, exfoliative cytology, brushing, washing, sputum cytology and fine needle aspiration cytology. It is not possible to perform all techniques in each patient because each has specific advantages and disadvantages. However their combined use yields the best results[4,5,6]. Some combinations of techniques like

transbronchial biopsy and cytological examination procedures such as bronchial washing, brushing and needle aspiration have been reported to increase the diagnostic sensitivity for lung cancer compared with that of transbronchial biopsy alone[2].

Although histopathological examination remains the mainstay of the diagnosis. But the bronchial biopsies cannot be performed in more peripheral sites or in patients at risk of haemorrhage. So alternative methods for obtaining diagnosis are sometimes required. As an alternative method Brushing cytology is considered as an effective tool to diagnose this condition as it covers wider area (2 cm) compared to less than 5 mm by forceps & it is easy to obtain brushing cytology sample[9]. When biopsy is difficult in certain anatomical location of the lesions.

There is still disagreement as to the value and reliability of brush cytology in comparison with histology for the diagnosis of malignancy. The aim of this study to determine the sensitivity, specificity and diagnostic accuracy of bronchial brushing with histopathological examination of bronchial tissue biopsy.

Material & methods

The study was carried out in the department of Pathology, Sardar Patel medical college and associated group of hospitals, Bikaner over the period of 6 years. This study was hospital based prospective and retrospective study. With prior consent and after detail clinical examination, routine laboratory investigations and chest X-ray; under local anaesthesia, all the cases, clinically & radiologically suspected of lung cancer, undergoing brush cytology and bronchial biopsy done, were included in this study. Bronchoscopy was performed with flexible bronchoscope by the chest physician at department of Chest & Tuberculosis, S.P. Medical College and P.B.M. hospital, Bikaner. Patients with normal bronchoscopic findings were excluded from study at this stage. Brushing cytology specimens were collected. The brush along with adhered cells was

smear on glass slides & fixed immediately in 95% propanolol and stained with Papanicolaou stain after fixation. Bronchial biopsy specimens were collected by the bronchoscope. The specimens were fixed with 10% formal saline for 1 day & processed in automated tissue processor and sections were prepared and stained with haematoxylin & eosin stain.

Results

The present study, out of 51 suspected malignant cases, in the histopathological diagnosis, the most common was the squamous cell carcinoma (Fig.1) 35(68.62%)

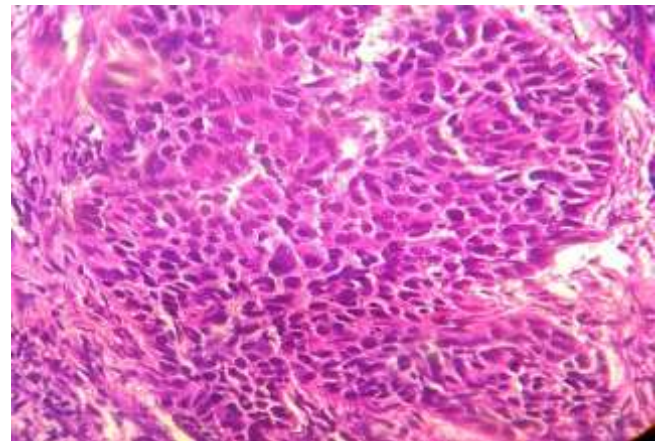


Fig.1-Squamous cell carcinoma-section shows malignant squamous cells with abundant eosinophilic cytoplasm with pleomorphic nuclei (H&E,40X)

followed by adenocarcinoma (Fig.2) 9(17.64%)

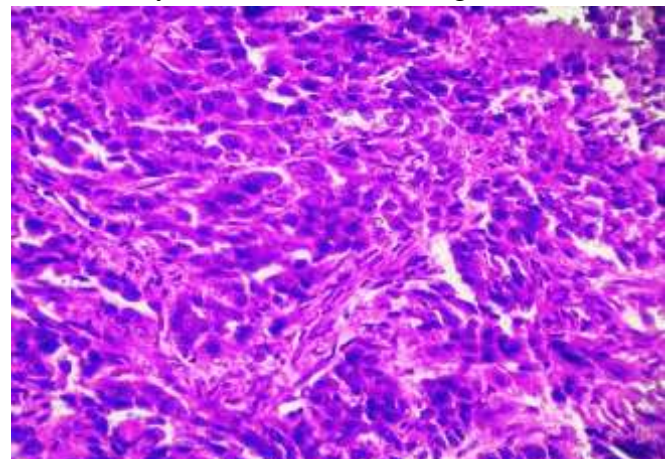


Fig.2-Adenocarcinoma-section shows glandular differentiation.(H&E,40X)

Small cell carcinoma (Fig.3) 4(11.76%)

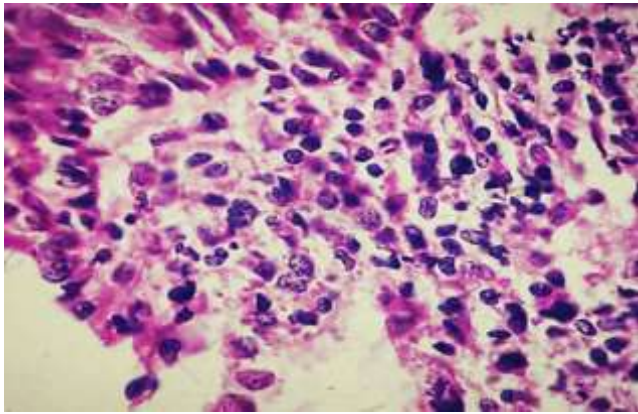


Fig.3-Small cell carcinoma-section showing cells with scanty cytoplasm and salt pepper chromatin(H&E,100X)

Non neoplastic 1(1.96%). Showing in (Table 1)

Table 1. Types of carcinomas diagnosed by bronchial biopsy

Histological types of carcinoma	Number of cases	Percentage (%)
Squamous cell carcinoma	35	68.62
Adenocarcinoma	9	17.64
Small cell carcinoma	6	11.76
Negative for malignancy	1	1.51
Total	51	100

Specimens were collected over the period of 6 years. Cytohistological correlation was done in 51 suspected malignant cases. Different types of carcinomas diagnosed by brush cytology are tabulated (Table 2).

Table 2. Types of carcinomas diagnosed by bronchial brush cytology

Types of carcinomas	Number of cases	Percentage (%)
Squamous cell carcinoma	29	56.86%
Adenocarcinoma	6	11.76%
Small cell carcinoma	4	7.84%
Negative for malignancy	12	23.52%
Total	51	100%

Among them, squamous cell carcinoma

comprised (fig.4) 29(56.86%)

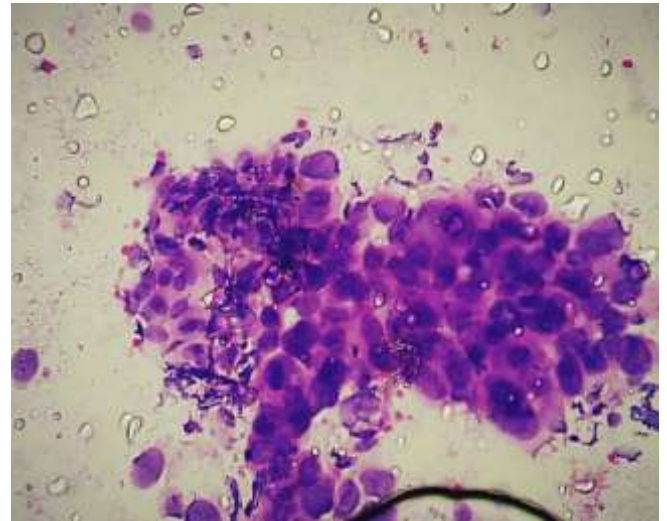


Fig.4 Squamous cell carcinoma- irregular clumps of relatively cohesive non keratinizing cells; variation in chromatin density(H&E,40X)

Adenocarcinoma (Fig.5) 6(11.76%)

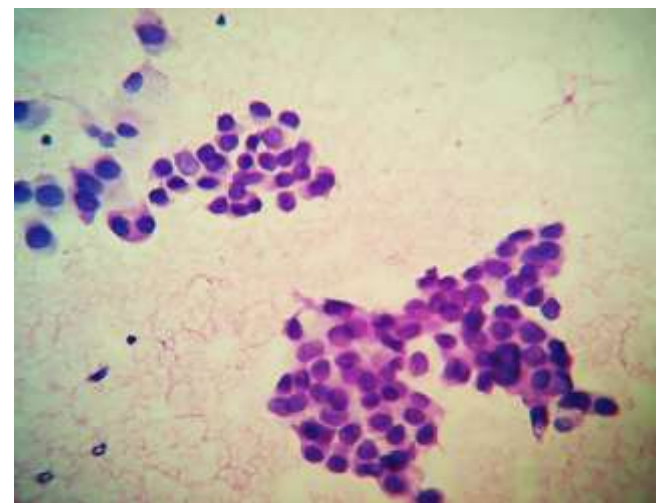


Fig.5 Adenocarcinoma- monolayered sheet of glandular cells showing enlarged hyperchromatic nuclei with irregular outlines(H&E,40X)

Small cell carcinoma 4(7.84%) and non neoplastic 12(23.52%).

CORRELATION OF BRONCHIAL BRUSHING CYTOLOGY AND BIOPSY:

Both bronchial biopsy and brushing cytology were positive for malignancy in 39 cases. Out of 39 cases, 29 cases were of squamous cell carcinoma, which were detected by brushing cytology & were well correlated. 6 out of 9 of adenocarcinoma, 4 out

of 6 of small cell carcinoma, which were detected by brushing cytology and 12 cases out of 51 were given negative for malignancy in which 11 were proved to be malignant by biopsy (Table 3),(Table 4)

Bronchial brushing/biopsy	Biopsy positive	Biopsy negative	Total
Brushing positive	39	0	39
Brushing negative	11	1	12
Total	50	1	51

Table 3. Comparison between brushing & biopsy.

Table 4. Correlation between bronchial brushing with bronchoscopic biopsy

Diagnosis	Bronchial brushing	Bronchial biopsy	Agreement with biopsy		Discrepancies	
			Number of cases	Percentage	Number of cases	Percentage
Squamous cell carcinoma	29	35	29	82.85%	6	17.15%
Adenocarcinoma	6	9	6	66.66%	3	33.33%
Small cell carcinoma	4	6	4	66.66%	2	33.33%
Non neoplastic	12	1	1	100%	0	0%
Total	51	51	40	78.43%	11	21.57%

Discussion

In India, lung cancer accounts for 6.8% of all malignancies and the prevalence shows much variability from one region to the other. In a study published from Jammu by Kapoor et al in 1993, lung was the most common site of Malignancy[7]. Reports of National cancer Registry programme of Indian council of Medical Research from Kolkata, Jaipur, Goa, Hyderabad and Ludhiana also shows lung to be the most common site of malignancy among males. It accounts for 31% of all cancer deaths in men and 25% in women[3].

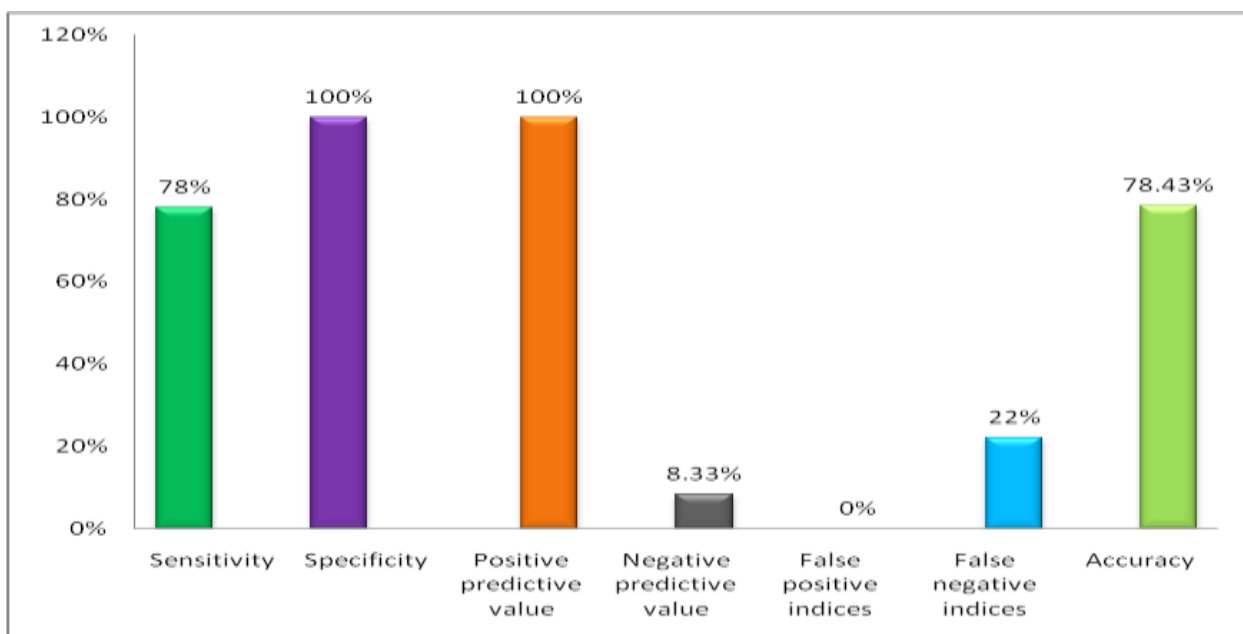
Bronchoscopy is an important diagnostic modality in the early diagnosis of lung carcinoma. In addition to direct visualization of the lesion, brushing and tissue for histopathological examination can be obtained. Thus bronchial brushing has firmly established its role in the early

diagnosis of lung carcinoma because it is safe, rapid and cost effective and importantly gives a higher rate of sensitivity and accuracy. However combination of these modalities gives higher detection rate for bronchoscopically visible tumor. Therefore, bronchial brush cytology should be performed whenever possible in all suspected cases of lung cancer. Timely detection of the disease plays a pivotal role in the management & for the long term survival of the patients. Bronchial brushing cytology is considered as an effective diagnostic tool for this condition. Though it is inferior to bronchial biopsy in histological typing, it is quite safe, less invasive, economical & provide quick results as compared to bronchial biopsy[9,10,11]. In this study, the most common tumor was squamous cell carcinoma 68.62%, followed by adenocarcinoma 17.64%, small cell carcinoma 11.76%, non neoplastic was 1.96%. In 39 cases, brushing

cytology were well correlated with biopsy which was taken as a gold standard. There were no cytologically false positive cases. This tallies with the study conducted by eva piya et al. according to which squamous cell carcinoma was the most common one comprising 64.2%, followed by adenocarcinoma 18.8%, small cell carcinoma 7%, large cell carcinoma 1%[2]. Sayami G et al, according to which squamous cell carcinoma was the most common one comprising 64.3%, followed by adenocarcinoma 17.4%, small cell carcinoma 15.4%, large cell carcinoma 2% carcinoid tumor.0.2%, bronchioalveolar carcinoma 0.2% and mucoepidermoid carcinoma 0.2%[12]. Brushing had a good detection rate for all the tumor types in this study. It detected 82.35% of squamous cell carcinoma, 45.45 % of adenocarcinoma, and 57.14% of small cell carcinoma.100% of large cell carcinoma. While biopsy had better detection rate in all cases.

In many studies biopsy had a better detection rate. In one study done in Nepal Medical College, lung cancer detection rate of bronchial biopsy was 92.2%, while brushing could detect only 65.2% of the cases[13]. Similarly another study conducted by KA Gaber et al., biopsy had a better detection rate than brushing cytology ie. 79.4% versus 74.5%[10]. However in many studies brushing had a better detection for the tumor types according to some study M Matsuda et al. observed that bronchial brushing had better detection rate (90.3%) than biopsy(64.8%).Combination of both modalities yielded highest incidence of positive diagnosis((93.7%). It is because brushing covers the wide area than biopsy and a significant amount of material can be obtained[11]. According to Ashok K et al, also brushing had better detection rate than biopsy 72% versus 69%[14].

INDICES OF THE BRONCHIAL BRUSHING



Summary and conclusion

In the present study the bronchial brushings had a sensitivity of 78% and specificity of 100% and diagnostic accuracy of 78.43% .

Bronchial brushing cytology is an inexpensive, less invasive, quick and effective

diagnostic tool in detection of lung cancer and it can diagnose lung cancers where bronchoscopic biopsy is technically not feasible or not interpretable. It is highly sensitive procedure. It has insignificant false positive or negative results, so at advanced

stage it can be the only important & time saving preoperative diagnostic tool in our contest. Though biopsy had better detection rate than brushing (because here in this study different biopsy method are available for comparison, so that several technical difficulties e.g. stenosis, bleeding, peripheral location of tumor are overwhelmed and biopsy give better result. However combination of these modalities gives higher detection rate for bronchoscopically visible tumor. It is concluded that for the maximum diagnostic yield of fiber-optic bronchoscopy in diagnosis of lung cancer should be combined with cytology using brushing. Bronchial brushing and biopsy are complementary procedure in diagnosing bronchogenic carcinoma.

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