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KEYWORDS: Fibro-optic bronchoscopy; Lung cancer; Cytohistological techniques.

COMPARTIVE ANALYSIS BETWEEN FIBRO-OPTIC BRONCHOSCOPIC CYTOHISTOLOGICAL LUNG BIOPSY TECHNIQUE AND OTHER LESS INVASIVE FIBRO-OPTIC BRONCHOSCOPIC TECHNIQUES IN DIAGNOSIS OF LUNG CANCER

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ABSTRACT

Background: The use of cytological methods in the diagnosis of malignant lesions of the respiratory tract has been generally acclaimed as one of its most successful applications. Flexible fibro-optic bronchoscopy revolutionized respiratory cytology, as bronchial brushings, bronchial wash, broncho-alveolar lavage and bronchial forceps biopsy became more easy, accessible and popular, shifting the emphasis from diagnosis of advanced malignancy in inoperable patients to the use of cytology as a first line diagnostic and management tool. Respiratory tract cytology is well established throughout the world as a diagnostic procedure in the evaluation of patient with suspected lung malignancy.

Aim of the study:

To determine which one has high specificity in final diagnosis of lung cancer, Is it bronchoscopic forceps biopsy(FB) or other less invasive bronchoscopic techniques as bronchial brush(BB), bronchial wash(BW) or broncho-alveolar lavage(BAL). - To determine and confirmed if that the combination of various bronchoscopic cytohistological techniques complements each other and enhances the diagnostic efficacy of neoplastic lung disease (lung cancer) or not i.e. bronchoscopic forceps biopsy(FB) with bronchial brushing (BB), bronchial wash(BW) or/and the broncho-alveolar lavage (BAL). Materials and Methods: A prospective study was conducted on 20 patients divided in two groups who underwent fibro-optic bronchoscopy during the period from August 2021 to June 2022 at the Interventional Bronchoscopy Unit of Chest Department, Faculty Of Medicine, Al-Azhar University Hospital and Assiut University Hospital. Patients were classified into 2 groups; group (I): consisted of 14 cases of Malignant lung cancer, and group (II): consisted of 6 cases of Benign lung cancer.

Results:

This study revealed that the bronchoscopic forceps biopsy is the most bronchoscopic technique which preferred in diagnosis of lung cancer and in the identification of its type. This point reported from this study when we make comparison according to the accuracy ratio of fibro-optic bronchoscope lung techniques in diagnosis of lung cancer and identification of its type among the studied patients and also this study showed that the accuracy ratio of fibro-optic bronchoscopic forceps biopsy in the diagnosis of lung cancer among all the studied patients in this study was 23.5% for benign lung cancer and 76.5% for malignant lung cancer. Also this study revealed that the comparison of accuracy ratio of fibro-optic bronchoscope lung techniques in diagnosis of lung cancer among the studied patients showed that the bronchoscopic forceps biopsy is the most one preferred (85%), then the bronchial brush (20%), after that the bronchial wash (15%), and in the last and the most one not useful in diagnosis of lung cancer was bronco-alveolar lavage (0%), but the combination of all of these techniques with each

Conclusion:

The Bronchoscopic Forceps Biopsy (FB) technique is the most technique from all fibro-optic bronchoscopic lung techniques which has high specificity in final diagnosis of lung cancer and determines its type either benign lung cancer or malignant lung cancer than other less invasive bronchoscopic techniques as bronchial brush(BB), bronchial wash(BW) or broncho-alveolar lavage(BAL); but its accuracy percent in identification the certain final diagnosis of lung cancer come in second place after the Surgical 'Open' Lung Biopsy (OLB) techniqu

The combination of various bronchoscopic lung cytohistological techniques complements each other and enhances the diagnostic efficacy of lung cancer than each technique alone.

INTRODUCTION:

Lung cancer is currently the most frequently diagnosed and the most common cause of cancer mortality worldwide. [1]

Worldwide in 2012, lung cancer occurred in 1.8 million people and resulted in 1.6 million deaths. This makes it the most common cause of cancer-related death in men and second most common in women after breast cancer. [2]

Statistics from the American Cancer Society estimated that in 2018 there will be about 244,000 new cases of lung cancer in the U.S. occurred and over 154,000 deaths were due to the disease. According to the U.S. National Cancer Institute, approximately 6.5% of men and women in the U.S. will be diagnosed with cancer of the lung at some point in their lifetime based on data from 2011-13.[3]

The increasing incidence could be due to increase in smoking habit, change in life styles of the people, increased environmental pollution and also the availability of different modern diagnostic modalities to detect lung cancer.[4]

The vast majority (85%) of cases of lung cancer are due to long-term tobacco smoking either cigarette smoking or passive smoking. [5]

About 10–15% of cases occur in people who have never smoked. These cases are often caused by a combination of genetic factors and exposure to radon gas, asbestos, second-hand smoke, or other forms of air pollution.[6]

An attempt has been made to determine which cytological method is the most effective one in diagnosis of lung cancer and in determination of its type whatever it is benign or malignant lung cancer and to determine whether a combination of various cytological methods is more effective than a single procedure in diagnosis of benign and malignant lung cancer or not.

MATERIALS AND METHODS:

This study was done and conducted on 20 patients (including 16 males and 4 females) with lung cancer (including 6 cases of benign lung cancer and 14 cases of malignant lung cancer).

The patients were selected from Chest department of Al-Azhar University Hospital and Assiut University Hospital, from August 2021 to June 2022. An informed written consent was obtained from all the patients. The study was approved by the Faculty of Medicine Ethics Committee, Al-Azhar University.

Patients were classified into 2 groups; group (I): Malignant lung cancer, and group (II): Benign lung cancer .

This study was a prospective observational study and it was occurred in Interventional Bronchoscopy Unit of Chest Department, Faculty Of Medicine at Al-Azhar University Hospital and also at Interventional Bronchoscopy Unit of Chest Department, Faculty Of Medicine at Assiut University Hospital.

Various bronchoscopic cytohistological lung biopsy techniques had been applied to diagnose lung cancer like bronchial brush (BB), bronchial wash (BW), broncho-alveolar lavage (BAL) and fibro-optic biopsy (FOB).

The details of the procedure must be explained to the patient and be provided in written form. Written informed consent was obtained from all subjects before inclusion into this study.

Collected data was analyzed using SPSS13 and Microsoft Excel software version 2010.

RESULTS:

The mean age of the patients with both benign and malignant groups was found to be 53.70 ± 11.48 (39.0-71.0) years. There was a male preponderance in both benign and malignant groups among studied patients with M: F ratio was (4:1).

In the current study as regards history suggestive of lung cancer patients among this study, according to their clinical symptoms; Unexplained cough (95%) was more than shortness of breath (dyspnea) (70%) and hemoptysis (60%), which are recorded in the history of studied patients followed by fatigue (55%) and then the chest pain in the last (40%); and as regards clinical findings among these patients shows the dullness to percussion was (90%), cachexia (70%), cervical lymphadenopathy (60%), wheeze on auscultation (45%), finger clubbing (35%).

Furthermore, the present study reported that the fibro-optic bronchoscopy (FOB) shows more accurate ratio in diagnosis of lung cancer among the studied patients than the radiological findings which using in diagnosis of the disease such as the chest x-ray an the chest CT because the fibro-optic bronchoscopy had been 90% accuracy, but the chest CT had been 80% and the chest x-ray had beenjust not more than 30% accuracy in diagnosis of the lung cancer.

Also, this study revealed the accuracy ratio in diagnosis of lung cancer among the studied patients according to fibro-optic bronchoscope lung techniques which showed that the bronchoscopic forceps biopsy is the most one preferred 17 (85%), then the bronchial brush 4 (20%), after that the bronchial wash 3 (15%), and in the last and the most one not useful in diagnosis of lung cancer was bronco-alveolar lavage 0 (0%), but the combination of all of these techniques with each other enhance the ratio of diagnosis of lung cancer to 90% (18) as showed in (table 1).

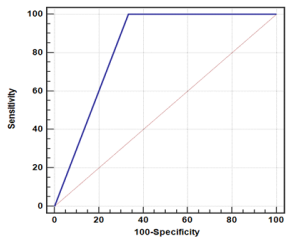
Also this study revealed that the bronchoscopic forceps biopsy is the most bronchoscopic technique which preferred in diagnosis of lung cancer and in the identification of its type. This point reported from this study when we make comparison according to the accuracy ratio of fibro-optic bronchoscope lung techniques in diagnosis of lung cancer and identification of its type among the studied patients and also this study showed that the accuracy ratio of fibro-optic bronchoscopic forceps biopsy in the diagnosis of lung cancer among all the studied patients in this study was 23.5% for benign lung cancer and 76.5% for malignant lung cancer (table 2).

Table (1): Fibro-optic bronchoscopic techniques in diagnosis of lung cancer among the studied patients

Fibro-optic bronchoscopic techniques	No. (20)	%
Bronchoscopic forceps biopsy(FB)	17	85.0%
Bronchial brush (BB)	4	20.0%
Bronchial wash (BW)	3	15.0%
Bronco-alveolar lavage (BAL)	0	0.0%
Combination of all of them with each other	18	90.0%

Table (2): Identification type of lung cancer by bronchoscopic forceps biopsy among all the studied patients.

Bronchoscopic biopsy	No. (17)	%
Benign	4	23.5%
Malignant	13	76.5%



ROC curve which shows that the sensitivity and specificity of fibro-optic bronchoscopic forceps Biopsy in diagnosis of lung cancer and its type among all the studied patients were 90%.

DISCUSSION:

This study included 20 patients with with clinical history and radiological finding of Lung cancer. The patients were selected from Chest department of Al-Azhar University Hospital and Assiut University Hospital. They are 16 males and 4 females i.e. (4:1), with mean age [53.70 ± 11.48, range 39.0-71.0 years old]; 65% aged above 70 years old. The smoking status among the studied patients shows that the majority of included patients (60%) are heavy smoker.

As regards history suggestive of lung cancer patients, according to their clinical symptoms; Unexplained cough (95%) was more than shortness of breath (dyspnea) (70%) and hemoptysis (60%), which are recorded in the history of studied patients followed by fatigue (55%) and then the chest pain in the last (40%); and as regards clinical findings among these patients shows the dullness to percussion was (90%), cachexia (70%), cervical lymphadenopathy (60%), wheeze on auscultation (45%), finger clubbing (35%).

The fibro-optic bronchoscopy (FOB) shows the accuracy ratio in

diagnosis of lung cancer among the studied patients more accurate than the radiological findings which using in diagnosis of the disease because fibro-optic bronchoscopy was (90%), but the chest CT was (80%) and the chest x-ray was (30%).

This study revealed that the comparison of accuracy ratio of fibro-optic bronchoscope lung techniques in diagnosis of lung cancer among the studied patients showed that the bronchoscopic forceps biopsy is the most one preferred (85%), then the bronchial brush (20%), after that the bronchial wash (15%), and in the last and the most one not useful in diagnosis of lung cancer was bronco-alveolar lavage (0%), but the combination of all of these techniques with each other enhance the ratio of diagnosis of lung cancer to 90%; and also this study showed that the accuracy ratio of fibro-optic bronchoscopic forceps biopsy in the identification type of lung cancer among all the studied patients was 23.5% for benign lung cancer and 76.5% for malignant lung cancer.

Finally, this study revealed that the accuracy ratio of the sensitivity and specificity of Open (surgical) lung biopsy in diagnosis of lung cancer and its type among all the studied patients were 100% but the accuracy of sensitivity and specificity of fibro-optic bronchoscopic forceps biopsy in diagnosis of lung cancer and its type among those same patients were 90%, so that the fibro-optic bronchoscopic forceps biopsy accuracy percent in identification the certain final diagnosis of lung cancer come in second place after the Surgical 'Open' Lung Biopsy (OLB) technique.

CONCLUSION:

The Bronchoscopic Forceps Biopsy (FB) technique is the most technique from all fibro-optic bronchoscopic lung techniques which has high specificity in final diagnosis of lung cancer and determines its type either benign lung cancer or malignant lung cancer than other less invasive bronchoscopic techniques as bronchial brush(BB), bronchial wash(BW) or broncho-alveolar lavage(BAL); but its accuracy percent in identification the certain final diagnosis of lung cancer come in second place after the Surgical 'Open' Lung Biopsy (OLB) technique.

The combination of various bronchoscopic lung cytohistological techniques complements each other and enhances the diagnostic efficacy of lung cancer than each technique alone.

RECOMMENDTIONS:

More studies on large scale of patients are recommended for further confirmation of our results.

Further studies on different bronchoscopic cytohisological lung techniques in diagnosis of various neoplastic and non-neoplastic lung diseases.

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