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Role of Bronchoscopy in Pleural Effusion

Medicine

KEYWORDS : Bronchoscopy, xray, Pleural effusion and Malignancy

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ABSTRACT

Aim: The aim of this study was to assess the role of Bronchoscopy in plural effusion. Pleural effusion is one of the commonest problems with which patients present to the hospital. Around a million patients worldwide develop pleural effusion each year. Design/Methods: This is a Prospective and Observational Study. All patients diagnosed to have pleural effusion by xray, clinical examination and ultrasound examination of pleura if needed will undergo informed. Results: Eighty patients were enrolled including 60 males (75%) and 20 females (25%) presenting with undiagnosed exudative pleural effusion. The mean age of our patients was 53 years (range 26–72). The main complaint at presentation was dyspnoea in the majority of the patients (92.5%).Conclusions: We conclude that bronchoscopy has a definite role in the etiological undiagnosed of pleural effusion.

Introduction

The accurate diagnosis of pleural disease can present a considerable challenge . Conservative estimates suggest that 25% of patients seen in a general pulmonologist's practice involve the pleura. Of these cases, 25% are unable to be attributed to a specific diagnosis, even after thoracentesis and closed pleural biopsy. As many as 50% of the patients in this undiagnosed group will eventually be diagnosed with a malignancy .

Pleural effusion is one of the commonest problems with which patients present to the hospital. Aetiologies of these effusions may be diverse and it depends on the incidence of tuberculosis in the region where the study is conducted. In developing countries like India with a high incidence of tuberculosis, the commonest causes of pleural effusion include tuberculosis, neoplasia, congestive cardiac failure and pneumonia[2] . Many studies have reported that relatively large numbers of patients with pleural effusion in whom a definite diagnosis could not be made, despite extensive investigations[3,4] .

There is no doubt that malignancy causes more persistent undiagnosed exudative pleural effusions than any other cause. It should be emphasized that there is no huge hurry to establish this diagnosis, however, because the presence of the effusion indicates that the patient has metastases to the pleura and the malignancy cannot be cured surgically, most malignant pleural effusions are attributable to tumors that cannot be cured with chemotherapy, and there is no evidence that attempts to create a pleurodesis early improve the quality of the patient's life.

Flexible bronchoscopy is an invasive procedure that is utilized to visualize the nasal passages, pharynx, larynx, vocal cords, and tracheal bronchial tree. It is utilized for both the diagnosis and treatment of lung disorder [1].

Flexible bronchoscopy is a safe procedure with reported complication rates ranging from 0.08 to 1.08 percent[5] . The most common complications include transient hypotension related to sedation, bronchospasm, hypoxemia, epistaxis due to the trauma of the nasal approach, nausea, vomiting, bleeding, pneumothorax, cardiac arrhythmias, infection, vasovagal syncope, laryngospasm, seizure, bacteremia, methemoglobinemia, laryngeal edema, and laryngeal injury.Bleeding and pneumothorax are most likely in thecontext of brushing, endobronchial biopsy, transbronchialbiopsy, or needle aspiration.Procedure-related mortality is extremely rare (0.013percent in one study) and associated with organic heart disease or severe airway obstruction76. The likelihood of a complication is minimized by appropriate patient selection, careful evaluation of the risk - benefit ratio in high risk patients, and adherence to patient safety protocols.

When patients with pleural effusions attributable to the most common types of tumors are analyzed, some interesting observations can be made. The tumor that causes the highest number of pleural effusions is lung cancer[6]. When patients with lung cancer are first evaluated, approximately 15% have a pleural effusion[7] , but 50% of patients with disseminated lung cancer develop a pleural effusion[5] . The tumor that causes the second highest number of pleural effusions is breast cancer[5] . Patients with breast carcinoma rarely present with a pleural effusion. The mean interval between the diagnosis of the primary tumor and the appearance of a pleural effusion is 2years[7] . Hematologic malignancies (lymphomas and leukemias) cause the third highest number of malignant pleural effusions[5] . Approximately 10% of patients with Hodgkin's lymphoma and 25% of patients with non-Hodgkin's lymphoma have pleural effusions at presentation.

In the present study we used bronchoscope to find out the undiagnosed pleural effusion cancer and TB patients.

MATERIALS AND METHODS

I. Experimental Design

Eighty patients in the age group of 20-70 admitted in the unit of T.B and Pulmonary Medicine, Sri Ramachandra University, Porur, Chennai, Tamil Nadu for the study. The conducted study was a Prospective, Observational Study. This includes 60 were males and 20 were females. Patients demographic data, including sex, age, and mild to moderate effusion were recorded.

II. Statistical Analysis

Data were analyzed using the SPSS software package, version 17.0 (SPSS Inc., Chicago, Illinois, USA).

Quantitative data were expressed using range, mean, SD, and median, whereas qualitative data were expressed as frequency and percentage. P value was assumed to be statistically significant at 0.05.

III. ETHICAL CONCERN

Ethical clearance was obtained from the Ethical committee meeting conducted at Sri Ramachandra Medical College, Chennai, Tamil Nadu.

IV. Results

Table:1: Presentation according to AGE -Descriptive statistics

Table:1 shows that the study period extended from April 2014 to November 2015. Eighty patients were enrolled including 60 males (75%) and 20 females (25%) presenting with undiagnosed exudative pleural effusion. The mean age of our patients was 53 years (range 26–72). The main complaint at presentation was dyspnoea in the majority of the patients (92.5%).

	N	Minimum	Maximum	Mean	Std. Deviation
Age Valid N (list wise)	80 80	26	72	53.21	13.942

Regarding the gross appearance of pleural fluid, 38 patients presented with hemorrhagic effusion (47.5%), 40 (50%) presented with straw coloured and two (2.5%) presented with green coloured pleural effusion. The majority (79%) of patients with hemorrhagic effusions were finally diagnosed as malignant, other diagnoses were tuberculous and parapneumonic effusions. So the bloody appearance of the pleural fluid narrowed the differential diagnosis predicting the malignant nature of the effusion in most of the patients.

Table: 2. Final definitive diagnosis of malignancy

	Frequency	Percent	Valid Percent	Cumulative percent
Valid Positive Negative Total	 32 48 80	 40.0 60.0 100.0	 40.0 60.0 100.0	 40.0 100.0

Table :2 shows that Out of 80 patients, 32 patients diagnosed as malignancy (40%). Pleural fluid cytology showed positive results for malignancy in eight patients out of 23 patients finally diagnosed as malignant pleural effusion (diagnostic yield 35%) bronchoscope. Although being positive in these eight patients, we still performed bronchoscope as the pathology only described them as positive for malignant cells without mentioning the type of malignancy or its primary. All the drained pleural fluid post bronchoscope was sent again for repeated cytology after centrifugation, another four patients turned positive for malignant cells (diagnostic yield increased to 52%). A third sample of pleural fluid was sent for cytology in only one patient whose bronchoscope pleural biopsy showed histological diagnosis of fibrinous pleurisy by biopsies from both rigid and flexible bronchoscope (false negative for malignancy) and presented 2 months after bronchoscope with recurrent pleural effusion, this aided in the diagnosis of one extra patient (overall positive cytology results after repeated tapping were 13 out of 23 patients) (56.5%).

Table: 3. TYPE OF MALIGNANCY in Pleural effusion Cancer Patients

Table: 3. Shows that Out of 32 patients diagnosed with malignancy, 11 patients had adenocarcinoma (13.8 %), 8 patients had small cell lung cancer (10 %), 2 patients had carcinoid (2.5 %), 6 patients had squamous cell lung cancer (7.5 %), 3 patients had metastatic lung cancer (3.8 %), 2 patients had unclassifiable (2.5 %), 48 patients had non malignant causes. (60 %)

	Frequency	Percent	Valid Percent	Cumulative percent
Valid Adenocarcinoma Small cell Carcinoid Squamous Metastatic Non small cell Unclassifiable Nil Total	 11 8 2 6 3 2 48 80	 13.8 10.0 2.5 7.5 3.8 2.5 60.0 100.0	 13.8 10.0 2.5 7.5 3.8 2.5 60.0 100.0	 13.8 23.8 26.3 33.8 37.5 40.0 100.0

Table: 4. Final definitive diagnosis of Tuberculosis

Table : 4. clearly shows that Out of 80 patients, 16 had tuberculosis, among them 4 patients had no mediastinal shift and12 patients had mediastinal shift to opposite side. P value < 0.001.

	Frequency	Percent	Valid Percent	Cumulative percent
Valid Positive Negative Total	 16 64 80	 20.0 80.0 100.0	 20.0 80.0 100.0	 20.0 100.0

Table: 5. Final definitive diagnosis of Bacterial Growth

Table. 5. Shows that Out of 80 patients, 5 were positive for bacterial growth ,3 patients had no mediastinal shift and 2 patients had mediastinal shift to opposite side in chest xray. P value < 0.000.

	Frequency	Percent	Valid Percent	Cumulative percent
Valid Positive Negative Total	 5 75 80	 6.3 93.8 100.0	 6.3 93.8 100.0	 6.3 100.0

Table: 6. Final definitive diagnosis of Malignancy Vs Tuberculosis

Table:6. Shows that Out of 80 patients, 32 patients diagnosed as malignancy (40%) and 16 patients diagnosed as tuberculosis (20 %). P value < 0.001.

Crosstab

			FINAL DEFINITIVE DIAGNOSIS - MALIGNINCY		
			POSITIVE	NEGATIVE	Total
FINAL DEFINITIVE DIAGNOSIS - TB	POSITIVE	Count	0	16	16
		% of Total	0%	20.0%	20.0%
	NEGATIVE	Count	32	32	64
		% of Total	40.0%	40.0%	80.0%
Total		Count	32	48	80
		% of Total	40.0%	60.0%	100.0%

Figure.1. Final definitive diagnosis of Malignancy Vs Bacterial growth

Table.1. shows that out of 80 patients, 32 patients diagnosed as malignancy (40%)and 5 patients were diagnosed positive for bacterial growth.

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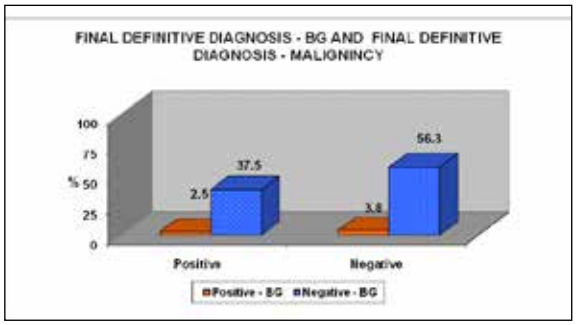

Discussion

In our prospective study totally 80 patients were included of whom 60 (70%) were males and 20 (30 %) were females. Intrestingly All the male patients were smokers and female patients non-smokers. Right sided pleural effusion was present in 50 patients and left sided effusion was present in 30 patients.

Out of 80 patients, 74 had evidence of exudative effusion and remaining 6 had transudative effusion. History of hemoptysis was present in 9 patients. In 35 patient there was no mediastinal shift in chest xray. Out of 80 patients, 32 patients diagnosed as malignancy (40%) and 16 patients diagnosed as tuberculosis (20 %) and 5 patients are having bacterial growth (6.3 %) Shi-Chuan chang et al [59] found that patients with unknown pleural effusion, fibreoptic bronchoscopy was more likely to yield a diagnosis than thoracocentesis with closed pleural biopsy in those who had hemoptysis or pulmonary abnormality in chest xray films.

MALIGNANCY

In this study, all 80 patients underwent bronchoscopy procedure, 30 patients had endobronchial mass and biopsy was done which was positive for malignancy and 2 patients had bronchial wash cytology positive for malignancy. Therefore totally 32 patients were proved to have malignancy and all of them had exudative effusion.

The results of this study coincides with article ,which also highlights malignancy as main cause. In a retrospective study Steven H.Feinsilver et al[8] found that the yield of diagnosing malignancies by FOB in patients with malignant pleural effusion is slightly higher. Hence it is helpful in searching the primary tumour.

Arnab maji et al[9] have included total of 568 patients, carcinoma of lung was the most commonest cause of malignant pleural effusion and bronchoscopy guided

biopsy was given the highest yield of histolgical diagnosis (84.6%).

Out of 32 patients diagnosed of malignancy in my study, 21 were males and 11 were females, all male patients were smokers. Out of 32 patients, only 9 patients had history of hemoptysis .Chest xray revealed no mediastinal shift in 28

patients and only 4 had mediastinal shift to opposite side. The following are the histological types of malignancy noted in 32 patients.

The following are the histological types of malignancy noted in 32 patients **PRIMARY:** Adenocarcinoma - 11 patients (34.4 %) Squamous cell lung cancer - 6 patients (18.8 %)

Small cell lung cancer - 8 patients (25 %) Carcinoid - 2 patients (6.3). **SECONDARY:** Metastatic lung cancer -3 patients (9.4 %).**UNCLASSIFIABLE:** 2 patients (6.3 %)

This study illustrates among 32 patients, 27 patient are diagnosed to have primary bronchial malignancy and these results were similar to R.W.Heaton et al[10]

discussed, they included totally 32 patients, 14 patients proved malignancy primary bronchial : 9; seconday 2, unknown primary were 3.

TUBERCULOSIS

Out of 80 patients in my study, 16 patients were proved to be positive for tuberculosis (20%) by: Pleural fluid AFB and Bronchial Biopsy - 2 patients.

Pleural fluid AFB and culture (GENE XPERT) – 10 patients Only Culture (GENE XPERT) - 6 patients Out of 16 patients who were diagnosed of tuberculous origin, 10 were males and 6 were females;10 had right side effusion and 6 had left side effusion ;all 10 male patients were smokers.

There was no history of hemoptysis among 16 tuberculous patients. Radiologically only 4 patients had no mediastinal shift and 12 patient had mediastinal shift to the opposite side.

Out of 80 patients, 25 were Lymphocytic predominance, (TB): 12/16. According to the present study lymphocytic predominance for tuberculosis was found to be high that is 12 among 16 TB patients had lymphocytic predominance which was proven similar to Gupta etal[11], which illustrates that in smear negative tubercular pleural effusion bronchoscopy leads to increased bacteriological yield and they recommended this procedure as it is a safe intervention so particularly in cases of pleural effusion where the fluid is exudative showing lymphocyte predominant pattern is useful to perform the fibreoptic bronchoscopy before going for an empirical tubercular therapy.

BACTERIAL GROWTH

The present study describes that out of 80 patients who underwent bronchoscopy and bronchial wash culture and sensitivity showed 5 patients showed non tubercle

bacilli growth. All 5 patients who had exudative effusion, 4 were males and 1 female, 4 cases were right side effusion and 1 left sided effusion There was no history of hemoptysis in 5 patients. Radiologically 3 patients had no mediastinal shift and 2 patient had mediastinal shift to opposite side.

TB/MALIGNANCY

In the present study, comparison of the bronchoscopic findings 80 patients of tuberculosis and malignancy showed 32 patients diagnosed as malignancy (40%)and16 patients diagnosed as tuberculosis (20 %)., **P value : 0.000**, highly significant when compared to the results of R.W.Heaton et al[12]

VI. Conclusion

We conclude that this study while comparing bronchoscopic findings malignancy is described to be primary causes of pulmonary disease followed by tuberculosis and then bacterial growth. Bronchial aspirate confirms the involvement of lungs in many cases of pleural diseases. In the present era of evidence based medicine we can go for a safer intervention like fiberoptic bronchoscopy if the cases of pleural fluid analysis is inconclusive.

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