Original article:

Role of medical thoracoscopy in undiagnosed exudative pleural effusion

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Abstract:

Pleural effusion is a common clinical condition encountered in pulmonary practice and indicates the presence of an underlying disease.In India, it is usually caused due to tuberculosis, pneumonia, malignancy, congestive heart failure, renal failure, connective tissue disorders and/or pulmonary thrombo-embolism. In routine, a detailed clinical history, physical examination, radiological assessment, aspirated pleural fluid evaluation and/or blind percutaneous pleural biopsy procedures are enough to establish the diagnosis but there still remain about 20-45% cases of effusions where etiology continues to be elusive.

Since, thoracoscopy provides a direct visualization of parietal and visceral pleura, a thoracoscopy guided pleural biopsy is likely to increase the yield up to 95%.Through this study,we are sharing our experience of the procedure.

INTRODUCTION

Pleural effusion is a common clinical condition encountered in pulmonary practice and indicates the presence of an underlying disease.[1,2]In India, it is usually caused due to tuberculosis, pneumonia, malignancy, congestive heart failure, renal failure, connective tissue disorders and/or pulmonary thrombo-embolism. In routine, a detailed clinical history, physical examination, radiological assessment, aspirated pleural fluid evaluation and/or blind percutaneous pleural biopsy procedures are enough to establish the diagnosis but there still remain about 20-45% cases of effusions where etiology continues to be elusive.

Since, thoracoscopy provides a direct visualization of parietal and visceral pleura, a thoracoscopy guided pleural biopsy is likely to increase the yield up to 95%.[5,6]Through this study,we are sharing our experience of the procedure.

MATERIAL AND METHODS

This was a cross sectional observational study conducted, atInstitute of Respiratory Diseases(IRD), SMS Medical College, Jaipur. The study was approved by the Institutional Review Board. All the patients admitted with undiagnosed moderate to massive exudative pleural effusions during the period i.e. from July, 2014 to November, 2015,were enrolled for the study but patientswho were unwilling to participate in the studyand others patients younger than <12 yearsor older than 70 years, un-cooperative/morbid ones, patients with platelets<75,000/mm3/ PT > 4 sec above the controls,

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hemodynamicinstability or patients having other systemic or local conditions likely to complicate the procedure were excluded. After giving full details regarding the studyprotocol, awritten informed consent was obtained from all the patients. Then these patients were evaluated with aa detailed clinical history and thorough physical examination. Investigations included 2 sputum smears by Ziehl-Nelson method, blood examination for hemoglobin, total leukocyte count, differential leukocyte count, total eosinophil count, asting , liver function tests, kidney function tests, HIV serology, complete urine examination, electrocardiography, chest X-ray PA view, ultrasound of abdomen and chest, computerized scan thorax and abdomen, as and when required. A diagnostic thoracentesiswas done and pleural fluid was sent for cell count, biochemistry, cytology and ADA. Where ever required pleural fluid was also examined for amylase, RA factor, LE cell, malignant cell cytology, AFB smear and culture, Gram stain and pyogenic culture and sensitivity tests.

The patients were then divided as having transudativeor exudative pleural effusion based on Light's criteria. Those having transudativepleural effusion were excluded from study. Of those who were classified as having exudative pleural effusion, where diagnosis was possible prior to biopsy or those who were < age < 12 years, non-cooperative, moribund, or having minimal effusion (pleural fluid thickness < 3cm on USG at infra scapular border), bleeding diathesis and/or, local skin infection, were excluded. The remaining patients were subjected to blind pleural biopsy using Abraham's needle and medical thoracoscopy and guided pleural biopsy using standard procedure.[8]The tissue so obtained was sent for Histopathology. Etiological diagnosis was established on the basis of histopathology. Where the diagnosis could not be established even after biopsy, the patient was empirically put on category I DOTS treatment and followed up upto 6 months to see the outcome. Data so obtained were tabulated and analysed.Statitical significance was derived using studentst test and chi squire test.

OBSERVATIONS AND RESULTS

Atotal of 62 patients having pleural effusion could be enrolled during the study period. After initial evaluation,16 patients were classed as traansudates, 4 patients with exudates could be diagnosed prior to biopsy (AFB smear +ve-1, culture+ve-1 and malignant cell cytology +ve-2) and 4 patients fulfilled the other criteria for exclusion. The basic and other parameters of the remaining 38 patients, after these exclusions,are shown in table 1.

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Table 1 showing basic parameters of the patients:-

Parameter		Outcome
Age in years	Mean	45.81±17.14
	Range	17-67
Sex male		26
Female		12
Smoker Yes		25
No		13
BMI in Kg/M^2	<18.5	14
	≥18.5	24
Side of effusion Left		18
Right		20
Extent of effusion Minimal		03
Moderate		19
Massive		16
Type of effusion Straw colour		24
Opalescent		07
hemorrhagic		07
Predominant cell type Lymphocytic		31
Neutropholic		07
ADA levels	<40	12
	40-200	24
>200		02

The outcome of the 2 procedures in these 38 patients is shown in table 2.

Table 2 showing the outcome after closed and thoracoscopic guided pleural biopsy

Parameter	Outcome
Closed pleural biopsy	
Unclassified malignancy	04
Non-small cell carcinoma	01
Granuloma	04
Chronic nonspecific inflammation	12
Fibro-collagenous tissue	11
Inadequate tissue	06
Abnormality of pleural surface	
Thick adhesions	8
Granular lesions	8

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Nodular lesions	14
Mass lesion	1
Normal appearance	7
Diagnosis by thoracoscopy	
Unclassified malignancy	08
Other malignancies	
Non-small cell carcinoma	01
Hodgkins lymphoma	01
Mesothelioma	01
Spindle cell tumor	01
Granuloma	16
Chronic nonspecific inflammation	04
Fibro-collagenous tissue Chronic	06

Table 3 shows the comparison between the results of closed pleural biopsy with that of thoracoscopic guided biopsy.

Table 3

Comparison of closed pleural biopsy with thoracoscopic guided biopsy

Closed pleural biopsy Diagnosis confirmed		Thorascopic guided biopsy Diagnosis confirmed	
		Yes	No
Yes	09	09	00
No	29	19	10
Total	38	28	10

Table 4 shows that the average time taken to obtain pleural biopsy, cost of the procedure, hospital stay and complications encountered during the thoracoscopic guided procedure was significantly more as compared to the closed pleural biopsy.

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Table 4: comparison of the time taken, cost, complications and hospital stay for the 2 biopsy procedures

Parameter	**Closed biopsy**	**Guided biopsy**	**P value**
Time taken in minutes	**14.4±03.52**	**46.5±06.53**	**<0.0001**
Cost/procedure in rupees*	**200**	**1000**	**NR**
Hospital stay in days	**0.6±0.12**	**3.4±0.82**	**<0.0001**
Complications			**<0.0001**
Bleeding	03	13	
Pain	02	5	
Subcutaneous emphysema	01	2	

The 10 patients who were empirically put on DOTS category I treatment recovered of their illness in due course and pleural effusion did not recur during the 6 months of follow up.

DISCUSSION

Initial diagnostic work up of pleural effusion, pleural fluid includesbiochemical, microbiological and cytopathological analysis. This alone provides etiological diagnosis in most patientseg. transudativeeffusions, empyema, parapneumonic effusions, chylothorax and malignant pleural effusions but leaves many patients where etiology of pleural effusion still remains elusive.

In these patients closed pleural biopsy procedurewas considered as a valuable tool for the etiological diagnosis of exudative pleural effusions but after the availability of medical thoracoscopy, the value of closed pleural biopsy needs to be redefined. While closed pleural biopsy continues to be the procedure of choice at many centres, BTS guidelines[4] 2010 recommends that thoracoscopic biopsy should be the next procedure, if the initial diagnostic work up was inconclusive.

In our study, the diagnostic yield of closed biopsy procedure was 23.7% only. This is lower as compared to 38-55% reported in literature.The lower results in our study could be due to inadequate tissue yield in 6 of our patients. The yield of guided biopsy procedure was 73.7% and inadequate tissue wasn't reported in any of the patients. Thus, the diagnostic yield of guided biopsy was significantly higher as compared to closed pleural biopsy. Although, it was still inclusive in 10 out of the 38 patients studied yet all of these 10 patients responded to anti-tubercular therapy, meaning by that none of the malignant case was missed in the guided biopsy procedure. Thus thoracoscopic guided procedure proved to be a sensitive tool to pick up all the malignant pleural effusions albeit, many of the tubercular effusionswere missed in our study. Loddenkemper[5] reported that medical thoracoscopy is diagnostic in 95% of malignant pleural effusion.[5]

The time taken, cost, hospital stay and complications of thoracoscopy were significantly higher as compared to closed biopsy. Others have reported similarly.But it is justified looking to the higher diagnostic yield, more so when malignancy is suspected. Furhter, with growing experience, the diagnostic yield of thoracoscopic guided biopsy is likely to improve and the time taken, hospital stay and complications of thoracoscopy is likely to decrease in any set up.

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