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RESEARCH ARTICLE

COMPARATIVE STUDY OF DIAGNOSTIC YIELD OF THORACOSCOPIC PLEURAL BIOPSY V/S REPEAT CLOSED PLEURAL BIOPSY IN PATIENT HAVING NEGATIVE FIRST CLOSED PLEURAL BIOPSY

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ABSTRACT

Introduction: Pleural effusion is one of the most commonly encountered clinical conditions in pulmonary practice. In India common causes of pleural effusion are tuberculosis, Para pneumonic effusion, malignancy, congestive heart failure, renal failure, connective tissue disorders and pulmonary embolism. As many as 15–20% of all pleural effusions remain undiagnosed at various level despite intensive effort. To solve the dilemma of these undiagnosed cases of pleural effusion, we have two options in the form of closed pleural biopsy (CPB) and thoracoscopic pleural biopsy (TPB). So this study is planned to compare the diagnostic yield, safety of either technique. **Material and methods:** This was a hospital based prospective interventional study. It was carried out from JAN 2018 to DEC 2018 at tertiary care hospital & medical college (Department of Respiratory Medicine of Sardar Patel Medical college) Bikaner, Rajasthan. We have taken 100 cases (age 18 to 70 years) reported to Department of Respiratory Medicine for undiagnosed exudative pleural effusion. Initial closed pleural biopsy was done on these patients. Patients with negative initial closed pleural biopsy was randomized into two groups, Group A and Group B. Group A has been subjected to closed pleural biopsy with Abrams needle and four to six biopsy specimens has been taken. Group B was subjected to Medical Thoracoscopic pleural biopsy. Diagnostic yield of both procedures was calculated and comparison has been done with the help of appropriate statistical tools and conclusion has been drawn. **Results:** In our study, diagnostic yield of medical thoracoscopy was 92.0% (46/50 patients) whereas in Repeat closed pleural biopsy, yield was 86.0% (43/50).

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INTRODUCTION

Thoracoscopy is the insertion of an endoscope through the chest wall to enable a physicia.n to visualise the inside of the chest cavity (Ibrahim, 2010). Medical thoracoscopy is being increasingly used by chest physicians and CT surgen worldwide due to technical advancements and better exploration of thoracic cavity. The main indication for medical thoracoscopy is in the diagnosis and treatment of undiagnosed exudative pleural effusions. Thoracoscopy provides a direct visualization of parietal and visceral pleura, and thus the diagnostic yield of thoracoscopy guided pleural biopsy increases up to 95%. (Loddenkemper, 1983; Menzies, 1991) Pleural effusion is one of the most commonly encountered clinical conditions in pulmonary practice. Its diagnosis begins with history taking, physical examination and chest radiography. Pleural fluid aspiration and its microbiological, biochemical and cytological analysis is the initial investigation of choice to determine its etiology.

In India Malignancy and Tuberculosis are the two most important causes of Exudative Pleural Effusion. According to various studies (Poe, 1984; Suri, 1991), diagnostic yield of pleural biopsy taken by Abrams needle in all cases of pleural effusion is about 60 to 80%. Various means to achieve etiological diagnosis in those with negative first pleural biopsy includes repeat pleural biopsy, USG / CT guided pleural biopsy and lastly thoracoscopic pleural biopsy. Pleural fluid analysis and "blind" pleural biopsy are the initial investigations in patients with Exudative Pleural Effusion (Sahn, 1982). Between 20% and 40% of patients with Exudative Pleural Effusion remain undiagnosed despite these investigations (Sahn, 1982; Maskell, 2003; Prakash, 1985) Thus, the next step in undiagnosed EPEs is to obtain pleural tissue under vision. Thoracoscopy has been demonstrated to increase the diagnostic yield in undiagnosed Exudative Pleural Effusion, as it allows inspection of the pleural surfaces and permits multiple pleural biopsy under direct visualization (Harris,

1995). MT is the procedure of choice in the evaluation of undiagnosed EPE, due to its higher success rate and an acceptable safety profile. However, in certain countries where thoracoscopy is not feasible, CPB should be performed in preference to initiating empiric treatment because closed pleural biopsy is an inexpensive, less invasive, day care procedure and can be performed even in a sick patient at bedside. So the first procedure of choice in undiagnosed Exudative Pleural Effusion should be closed needle pleural biopsy, followed by CT guided needle biopsy or thoracoscopy. So this study is planned to compare the diagnostic yield, safety and complication between these two procedures.

MATERIALS AND METHODS

This was a hospital based prospective interventional study. It was carried out from JAN 2018 to DEC 2018 at tertiary care hospital & Medical College (Department of Respiratory Medicine of Sardar Patel Medical college) Bikaner, Rajasthan. We have taken 100 cases (Age 18 to 70 years) reported to Department of Respiratory Medicine for undiagnosed exudative pleural effusion.

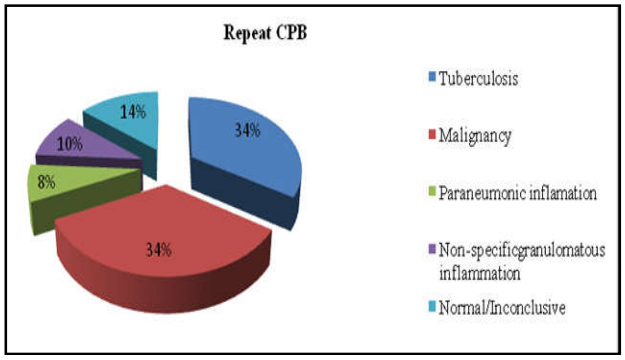

Figure 2. (A) Results of Repeat closed pleural biopsy procedure

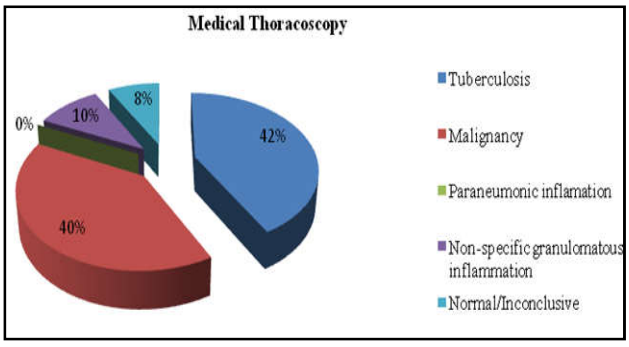

Figure 2. (B) Results of Medical Thoracoscopy procedure

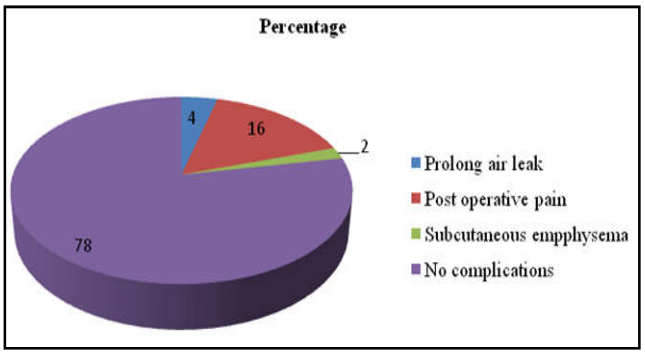

Figure 3. Distribution of patients according to Post Thoracoscopic complications

Inclusion criteria: - Patient of age 18 to 70 yr. and having exudative pleural effusion > 3cm on USG at infra scapular border.

Exclusion criteria

- Age <18 yr.
- Non-cooperative patient
- Moribund patient
- Pleural fluid thickness < 3cm on USG at infra scapular border
- Patients with bleeding diathesis
- Transudative effusion
- Empyema / Neutrophilic effusion
- Local skin infection

Initial closed pleural biopsy was done on these patients. Patients with negative initial closed pleural biopsy was randomized into two groups, Group A and Group B. Group A has been subjected to closed pleural biopsy with Abrams needle and four to six biopsy specimens has been taken. Group B was subjected to Medical Thoracoscopic pleural biopsy. Diagnostic yield of both procedures was calculated and comparison has been done with the help of appropriate statistical tools and conclusion has been drawn.

RESULTS AND DISCUSSION

In the current scenario, Pulmonologists commonly encounter large number of patients with pleural diseases like pleural effusion, pneumothorax and pleural thickening or pleural mass. Globally, approximately a million patients develop pleural effusion annually (San Jose, 1997) Undiagnosed pleural effusion is a frequently encountered problem in clinical practice. In areas of high incidence of TB, the commonest causes of pleural effusion include - TB (25%), malignancy (22.9%), congestive heart failure (17.9%) and pneumonia (14%) **(**Valdés, 1996**)**. Diagnosis of pleural effusion usually begins with detailed history taking, physical examination and chest radiography. Pleural fluid aspiration and its microbiological, biochemical and cytological analysis is the initial investigation of choice to determine the etiology of pleural effusion. Blind pleural biopsy may establish the diagnosis in some additional cases (Loddenkemper, 1983; Christopher, 1998). 25-40% of pleural effusions remain undiagnosed even after thoracocentesis and closed pleural biopsy.

Thus, the accurate diagnosis of pleural diseases is very challenging (Light, 1997; Jimenez, 2002**)** Almost 50% of these undiagnosed patients will ultimately be diagnosed with a malignancy (Jimenez, 2002). We have done a hospital based prospective interventional study to compare the diagnostic yield of Repeat closed pleural biopsy (CPB) with that of thoracoscopic guided pleural biopsy in the patients having negative first closed pleural biopsy. In our study, we have taken 100 patients who have negative initial closed pleural biopsy. All cases randomized into two groups, Group A and Group B. Group A was subjected to closed pleural biopsy with Abrahm's needle and Group B was subjected to Medical Thoracoscopic pleural biopsy. In our study out of total 50 patients, 2 patients (4.0%) had normal thoracoscopic findings. Total 48 patients (96.0%) had abnormal findings. Among them 4 patients (8.0%) showed diffuse pleural thickening, 1 patients (2.0%) had mass lesion over costal pleura, 14 patients (28.0%) showed multiple septations with or without adhesions, 5

Table 1. Distribution of patients according to Thoracoscopic findings

Thoracoscopic finding	Percentage(%)
Diffuse pleural thickening	8
Mass lesion over costal pleura	2
Multiple septations with or without adhesions	28
Sago grain appearance	10
Multiple variable sized pleural nodules	48
Normal pleura	4
Total	100

Table 2. Final histopathological diagnosis in patients with a successful pleural biopsy

	Histopathological diagnosis	Repeat closed Pleural Biopsy		Medical Thoracoscopy	
		frequency	Percent.	frequency	Percent.
A	Tuberculosis	17	34%	20	40%
B	Malignancy	17	34%	21	42%
1	Adenocarcinoma	11		`14	
2	Squamous carcinoma	2		2	
3	Small cell carcinoma	1		1	
4	Carcinoma NOS	3		4	
C	Paraneumonic	4	8%	0	0%
D	Non-specific granulomatous inflammation	5	10%	5	10%
E	Normal/Inconclusive	7	14%	4	8%
	Total	50	100%	50	100%

patients (10.0%) had sago grain appearance, 24 (48.0%) had multiple variable sized pleural nodules (Table-1). In our study, diagnostic yield of medical thoracoscopy was 92.0% (46/50 patients). In a sub-group who had gone MT, malignancy was diagnosed in 21 patients (42.0%), 20 patients (40.0%) were diagnosed TB, and 5 patients (10.0%) were having non-specific granulomatous inflammation (Table-2). Similar results were demonstrated in a study done by Saifullah and Rizvi (Saifullah, 2012) Yield of pleuroscopic biopsy in the diagnosis of exudative pleural effusion is 96.7%. A study was carried out by Tscheikuna et al (2009**)** in Thailand, The diagnostic yield was 95.2%. The malignancy was diagnosed by thoracoscopy in 45.35% patients.

Whereas in our study, diagnostic yield of Repeat closed pleural biopsy was 86.0% (43/50 patients). In another sub-group who had gone Repeat closed pleural biopsy, malignancy was diagnosed in 17 patients (34.0%), 17 patients (34.0%) were diagnosed TB, 4 patients (8.0%) had paraneumonic pleuritis, and 5 patients (10.0%) were having non-specific granulomatous inflammation. 11 patients (64.70%) were diagnosed Adenocarcinoma and 2 patient (11.76%) was diagnosed squamous cell carcinoma. 1 patient (5.88%) was diagnosed as small cell carcinoma, Remaining 3 (17.64%) patients were in the category of carcinoma of non-specific origin. Whereas 14% cases were given inconclusive outcomes (Table-2). In our study, we found 14% inconclusive result by CPB, which is almost double of inconclusive outcomes (8%) of medical thoracoscopy(MT). Therefore diagnostic yield is better with MT. Similar results were found by Mature et al. (2015) that compares the use of CPB and MT and confirm that MT remains the procedure of choice for unexplained exudative pleural effusion, with a diagnostic yield of 93.2% versus 84.5% for CPB. Thoracoscopy was associated with mortality and complication rates of 0.37% and 5.6%, respectively, whereas the complication rate with CPB was 8.3% with no mortality **(**Maturu, 2015**)**

Conclusion

MT is the procedure of choice in the evaluation of undiagnosed EPE, due to its higher success rate and an acceptable safety profile. However, in centers where thoracoscopy is not feasible, CPB should be performed in preference to initiating empiric treatment and if inconclusive Repeat closed pleural biopsy can be an effective alternative for MT.

Abbreviations:- CPB- Closed Pleural Biopsy**, MT-** Medical Thoracoscopy**, EPE-** Exudative Pleural Effusion

Conflict of interest:- there is no conflict of interest between authors.

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