ORIGINAL RESEARCH PAPER
Volume - 10 | Issue - 09 | September - 2021 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

UTILITY OF MEDICAL THORACOSCOPY IN THE DIAGNOSIS OF PLEURAL EFFUSIONS

Clinical Research

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ABSTRACT

Background: Pleural Effusion(PE) can be defined as the excessive accumulation of fluid within the pleural space[1]. Despite pleural fluid analysis and closed pleural biopsy 25 to 40% of pleural effusions remain undiagnosed. Accurate diagnosis of pleural diseases in many cases is very challenging[5,6]. In undiagnosed patients, 50% will ultimately be diagnosed with malignancy[7]. Medical thoracoscopy also known as pleuroscopy, can be used as a gold standard technique for managing and analyzing undiagnosed pleural effusion cases because of its high sensitivity in tubercular and malignant pleural effusions[8]. Medical Thoracoscopy(MT) is a minimally invasive and endoscopic procedure to enable a physician to visualize the chest cavity inside[10,11] and allows for directly visualised biopsies.

Aim: Our study was done to evaluate the utility of medical thoracoscopy in the diagnosis of pleural effusions.

Material & Method: 50 patients of pleural effusion were enrolled in the study after taking informed consent. All the patients underwent thoracentesis and pleural fluid was analysed, and biopsies obtained during medical thoracoscopy were sent for histo-pathological examination. The diagnosis obtained with these two methods were analysed and compared for final outcome.

Results: Tuberculosis(TB) was the most common definitive diagnosis (n=29,55%), followed by malignancy(n=16,32%) in our study. In five patients the diagnosis was inconclusive(10%) even after thoracoscopy. We have compared the diagnostic ability of pleural fluid analysis to thoracoscopy guided biopsy findings. Results showed thoracoscopy guided biopsy had given better diagnostic ability(total 45 diagnosed out of 50 cases, 90% cases) than pleural fluid analysis alone(9 diagnoses out of 50 patients, 18% cases).

Conclusion: Medical thoracoscopy is a simple and safe procedure that can be utilized for both diagnostic and therapeutic purposes. The present study confirmed that medical thoracoscopy has a better diagnostic ability than pleural fluid analysis alone.

KEYWORDS

Pleural Effusion(PE), Medical Thoracoscopy(MT), Thoracentesis, Tuberculosis(TB), Malignancy.

INTRODUCTION

Pleural effusion can be defined as the accumulation of fluid within the pleural space due to excessive exudation or transudation from the pleural surface[1]. Approximately a million patients annually develop pleural effusion throughout the world[2]. Diagnosis usually begins with detailed history taking, physical examination, chest radiography, ultra sonography. To determine pleural effusion's etiology, pleural fluid aspiration and its biochemical, cytological, microbiological analysis are the initial investigations of choice. Diagnosis can also be achieved by blind pleural biopsy in some additional cases[3,4]. However, 25 to 40% of pleural effusions remain undiagnosed even after these procedures. Accurate diagnosis of pleural diseases in many cases is very challenging[5,6]. Medical thoracoscopy also known as pleuroscopy, can be used as a gold standard technique for managing and analyzing undiagnosed pleural effusion cases because of its high sensitivity in tubercular and malignant pleural effusions[7].

Medical Thoracoscopy (MT) is a minimally invasive and endoscopic procedure to enable a physician to visualize the chest cavity inside[8,9]. Medical thoracoscopy with rigid thoracoscope can be performed under conscious sedation without mechanical ventilation[10]. It is increasingly used by chest physicians worldwide due to technical advancements, better instrumentation, and the manner of this procedure done as a day-care procedure. Thoracoscopy offers several advantages compared with thoracocentesis and closed pleural biopsy, it potentially permits access to the entire pleural cavity, including both the parietal and visceral pleura, allows for directly visualized biopsies, and affords control of bleeding[11]. The main indication for medical thoracoscopy is in the diagnosis and treatment of undiagnosed exudative pleural effusions. The diagnostic yield of thoracoscopy in malignant and tubercular pleural effusion ranges from 91% to 94% and 93% to 100% respectively.

MATERIAL AND METHODS

The present study was conducted on 50patients of pleural effusions admitted in the department of respiratory medicine, NRI Medical College, General and Super Speciality Hospital, Chinakakani, Mangalagiri mandal, Guntur district.

INCLUSION CRITERIA

1) All patients in the age group between 19 to 85years with clinically and radiologically confirmed pleural effusions.
2) Patients who have given consent.

EXCLUSION CRITERIA

1) Patients not willing for the procedure.
2) Bleeding diathesis.
3) Patients who are not fit for undergoing thoracoscopy as in the following conditions:

Patients with severe hypoxemia .
Patients with unstable cardiovascular or hemodynamic status.
Patients with coagulation defects.

4) Patients with honeycomb lung, pulmonary arterio-venous aneurysms, and highly vascularized pulmonary lesions.

METHODOLOGY

All patients with moderate to gross pleural effusion undergoing medical thoracoscopy were included in this study. Patients meeting the exclusion criteria were not included in the study. Apart from a detailed history and clinical examination, the following investigations were done complete haemogram, bleeding parameters, chest x-ray, sputum for AFB, viral markers, CECT chest, pleural fluid - AFB, CBNAAT, cell count, protein, glucose, ADA, culture and sensitivity, RBC count, cell block, thoracoscopic biopsy.

PROCEDURE

First, informed consent was obtained from the patient and his/her attenders. Only then the patient was subjected to the procedure. The patient was positioned with the diseased side up with a towel roll below the opposite axilla to expose the ribs in order to get good access to inter coastal spaces. The patient was monitored with a pulse oxi-meter probe throughout the procedure. The patient remained conscious throughout the procedure. After obtaining intra venous access and ensuring the availability of supplemental oxygen, the patient was draped and then local anaesthesia was given with 2%xylocaine at the site of incision on the chest wall, then incision was made with scalpel/surgical blade. After the incision, the trocar is introduced through the incisional site, and then the scope through the trocar. Inspecting visceral and parietal pleura, evacuation of fluid, searching for air leak sites, releasing the adhesions, accessing the perfect site for biopsy, taking multiple biopsies from various sites of abnormality. After the procedure, an inter costal drainage tube was placed. The procedure was done in compliance with british thoracic society guidelines. The samples of pleural fluid were collected in heparinized test tubes and were subjected to the required investigations. In a few patients adhesiolysis was done during the thoracoscopic procedure to enable adequate lung expansion. The inter costal drainage tube was kept in place till the fluid drain is less than 50ml/day after which it will be removed.

POST OPERATIVE CARE

After the Procedure, the patient was observed for 24 hours. Adequate pain relief, appropriate antibiotic cover and daily ICD tube care, sterile precautions for dressing were provided to ensure a safe and uneventful post operative stay. Check x-rays were taken after 3hrs of the procedure, and at 24hrs, 72hrs, and 1week after the procedure for follow up.

DIAGNOSIS AND FOLLOW UP

Once the final diagnosis from the histo pathological report of the thoracoscopic biopsy is obtained, the patients were informed immediately. Based on the diagnosis, the patients were managed accordingly with anti tubercular treatment (ATT) or prompt oncology referral for chemotherapy or radiotherapy or other modalities. Exudative effusions are very frequently related to underlying malignancy or infections such as tuberculosis, both of which require a timely diagnosis to institute therapy. MT also termed as "Pleuroscopy," is a minimally invasive single port endoscopic technique using rigid and semi rigid thoracoscopes that offers direct visualization of pleural surfaces, as well as channels to perform diagnostic and therapeutic procedures.

OBSERVATIONS AND RESULTS

The value of thoracoscopies performed in 50cases of pleural effusion that satisfied the exclusion and inclusion criteria done at a tertiary care hospital in chinakakani are shown below.

AGE DISTRIBUTION

The maximum proportion of patients were in the age group of 41 to 50years.

Table 1: Age Distribution

AGE GROUP	NUMBER OF PATIENTS	PERCENTAGE
Less Than or Equal to 20	2	4
21 – 30	2	4
31 – 40	7	14
41 – 50	12	24
51 – 60	10	20
61 – 70	10	20
71 – 80	7	14

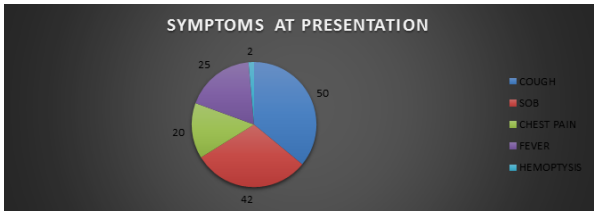
SEX DISTRIBUTION

Among the 50patients, 39 were male, and 11 were female.

SYMPTOMS AT PRESENTATION

All patients have cough as a common symptom, Followed by shortness of breath in 42patients. Hemoptysis was present in 2patients, whose diagnosis was turned out to be a malignancy.

Pie Diagram 1: SYMPTOMS AT PRESENTATION



DURATION OF COMPLAINTS

The Average duration of symptoms was 15days.

SMOKING HISTORY

Smoking history was seen in 26patients(52%), all were male patients.

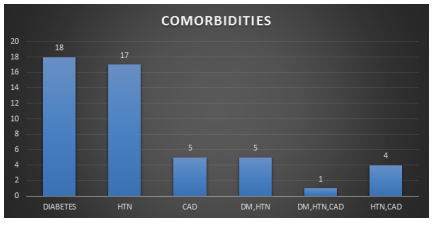
ALCOHOLISM

Alcohol abuse was seen in 54%patients(n=27).

COMORBIDITIES

In our Study, most patients have diabetic history, Followed by hypertension. One patient had a history of diabetes, hypertension, and coronary artery disease and tolerated the procedure well.

Bar Diagram 1: Frequency Distribution Of Comorbidities



X - RAY FINDINGS

Most of the patients showed right sided pleural effusion, followed by left sided pleural effusion. Eight patients have bilateral pleural effusion.

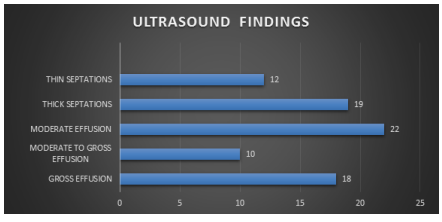
Table 2: X RAY FINDINGS

XRAY FINDINGS	NUMBER	PERCENTAGE
RIGHT SIDED	29	58
LEFT SIDED	13	26
BILATERAL	8	16

ULTRASOUND FINDINGS:

Moderate effusions and effusion with thick septations are the most predominant findings during chest ultrasonography, followed by gross effusion.

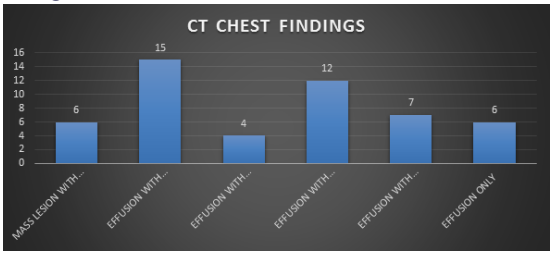
Bar Diagram 2: Observations During Ultra Sonography



CT CHEST FINDINGS:

Most patients showed pleural effusion with pleural based nodules, Followed by pleural effusion with lymphadenopathy. Six patients showed mass lesions along with effusion, all of which are malignant lesions.

Bar Diagram 3: OBSERVATIONS DURING CT CHEST



PLEURAL FLUID CHARACTERISTICS:
Straw coloured fluid was seen in 54% of the cases.
Most of the patients showed pleural fluid glucose in the normal range

PLEURAL FLUID PROTEIN :
According to light's criteria, all patients showed exudative effusions

Table 3: Pleural Fluid Protein

PROTEIN g/l	PATIENTS	PERCENTAGE
3 to 4	21	42
4.1 to 5	14	28
> 5	15	30

PLEURAL FLUID FOR AFB:
Only three patients showed positivity for acid fast bacilli.

PLEURAL FLUID FOR CBNNAT:
Twelve percent of the patients showed positivity for pleural fluid CBNAAT(n=6).

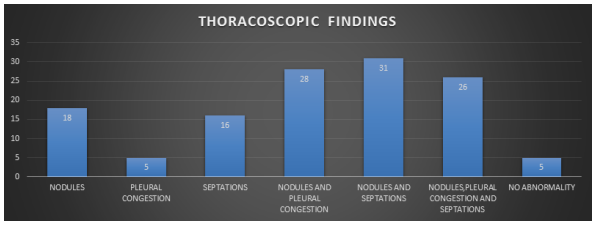
Rifampicin Resistance was not detected in these cases.

PLEURAL FLUID ADA:
23 Patients(46%) showed pleural fluid adenosine deaminase within the range of 20-40IU/L, Followed by > 40IU/L in 28%of the patients (n=14).

PLEURAL FLUID CELL BLOCK:
Pleural fluid in maximum number(n=29, 58%) showed lymphocytic cell predominance with associated macrophages. Three patients(6%) have Positivity for Malignant cells, and their diagnosis was confirmed by biopsy as secondary to adeno carcinoma lung.

FINDINGS DURING THORACOSCOPIC PROCEDURE :
Pleural effusion pleural based nodules and septations(thick more than thin) were the most common finding(n=31) during the thoracoscopic procedure. Most of the patients with tubercular granulomas as final diagnosis showed sago grain nodules over the parietal pleura during the procedure.

Bar Diagram 4: Observations During Thoracoscopic Procedure



COMPLICATIONS:
There were **NO Significant Complications** reported during or after the procedure.

Minor complications were reported after the process, of those most common are fever, bleeding, and subcutaneous emphysema was seen.

These complications were treated symptomatically.

Table 4: Complications Of The Procedure

COMPLICATIONS	NUMBER	PERCENTAGE
BLEEDING	3	6
FEVER	4	8
SUBCUTANEOUS EMPHYSEMA	3	6
INFECTION AT THE SITE	2	4
PERSISTENT AIR LEAK	1	2
PERSISTENT PAIN AT ICD SITE	2	4

HOSPITAL STAY IN DAYS:
Seventy percent(n=35) of the patients discharged within one week, with a mean duration of hospital stay 6.4days. Only ten patients(20%) had a hospital stay of more than seven days due to thick septations and persistent air leak as a complication after the procedure, which was resolved spontaneously or with medication during the hospital stay.

BIOPSY FINDINGS:
The biopsy was taken from the parietal pleura in all cases. 58%patients (n=29) revealed caseating granulomas Followed by malignancies, of which adenocarcinoma was predominant(n=12,24%). Other malignancies shown by HPE are malignant mesothelioma(n=3, 6%) and inflammatory myo fibroblastic tumour in one case. Inconclusive results were seen in 10% of the cases.

Table 5: BIOPSY FINDINGS

BIOPSY FINDINGS	NUMBER	PERCENTAGE
ADENOCARCINOMA	12	24
TB GRANULOMA	29	58
MALIGNANT MESOTHELIOMA	3	6
INFLAMMATORY MYO FIBROBLASTIC TUMOUR	1	2
INCONCLUSIVE	5	10

FINAL DIAGNOSIS:
Tuberculosis was the most common definitive diagnosis(n=29,55%), followed by malignancy in thirty-two percent of the cases(n=16) in our study. Five patients were inconclusive (10%) for diagnosis after the procedure. We have compared the diagnostic ability of pleural fluid analysis(by glucose, proteins, ADA, cellblock, AFB, CBNAAT) to thoracoscopy guided biopsy findings. Results showed thoracoscopy guided biopsy had given better diagnostic ability(total 45 diagnosed out of 50cases, 90%cases) than pleural fluid analysis alone(9 diagnoses out of 50patients, 18%cases). Chi-square test(for the number of diagnosed cases by thoracoscopy vs. pleural fluid analysis alone) revealed a p-value of <0.0001 with a 95% confidence interval).

Table 6: FINAL DIAGNOSIS

FINAL DIAGNOSIS	NUMBER	PERCENTAGE
TUBERCULOSIS	29	58
MALIGNANCY	16	32
INCONCLUSIVE	5	10

Bar Diagram 5: FINAL DIAGNOSIS

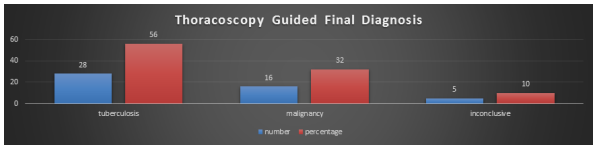


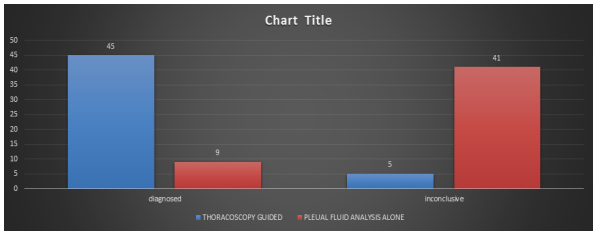
Table 7: Pleural Fluid Analysis Guided Results

Pleural Fluid Based Diagnosis	NUMBER	PERCENTAGE
Tuberculosis	6	12
Malignancy	3	6
Inconclusive	41	82

Table 8: Comparision Between Thoracoscopy Guided And Pleural Fluid Analysis

	DIAGNOSED	INCONCLUSIVE	"P" VALUE
THORACOSCOPY GUIDED ANALYSIS	45(90%)	5(10%)	0.0001
PLEURAL FLUID ANALYSIS ALONE	9(18%)	41(82%)	

Bar Diagram 6: Comparision Between Thoracoscopy Guided And Pleural Fluid Analysis



DISCUSSION
There was a great challenge in diagnosing pleural diseases accurately. Nearly 25% of the cases seen in a pulmonologist practice involves the pleura. Of these cases, 25% remain undiagnosed even after pleural fluid analysis and closed pleural biopsy. Medical Thoracoscopy[MT]is a minimally invasive procedure performed using the endoscopic telescope to visualize and evaluate the pleura, pleural space, mediastinum, and lung. Medical thoracoscopy is now considered the gold standard for diagnosing most pleural disorders[12], and it currently

achieves a diagnostic yield of 95% in patients with malignant pleural disease[13,14]. Apart from its good performance in diagnosing the cause of a pleural effusion, this technique has continuously developed in recent years not only in terms of new and advanced devices for the improvement of the diagnostic yield but also in clinical and basic research for many disorders involving the pleura[15].

Medical thoracoscopy should be performed if medical thoracoscopy facilities are available because of its high sensitivity in malignant and tuberculous pleural effusions. We report our experience in diagnosing pleural effusion of undetermined origin with rigid medical thoracoscopy.

A Total of 50patients were selected for medical thoracoscopy after inclusion and exclusion criteria in our study compared to Blanc et al study in 154patients and Tettey et al study with 38patients

AGE DISTRIBUTION

The Mean Age Group of the Study is 51.48, with a Standard Deviation of 14.5535

SEX DISTRIBUTION

Among the 50 Patients, 39 were Male(78%), and 11(22%) were Female. Here all patients who met the inclusion criteria were included in the study, and there was NO Selection Bias. This proportion of gender is similar to studies by Blanc et al.[16]Mootha et al.[17]Helala et al.[18]Rozman et al.[19]and Brims et al.[20]

SYMPTOMS AT PRESENTATION

All Patients(n=50) have cough as a common symptom(100%), Followed by shortness of breath in 42(84%)patients. Hemoptysis was present in 2patients, whose diagnosis was turned out to be malignancy. In a study by Prabhu and Narasimhan et al.[21] breathlessness was found in 75%patients, cough in 67.3%patients, fever in 45%patients, and chest pain in 42%cases. In another study by Rajesh Swarnakar et al.[22] presenting complaints at the time of admission are fever, cough, shortness of breath, chest pain, and hemoptysis presented in 73%, 93%, 66%, 53%, and 2.22%, respectively.

DURATION OF COMPLAINTS

The average duration of symptoms was 19days. 18Patients(36%) have a symptom duration of more than 20days. Twelve patients have more than 30days of symptom onset. Acute onset of symptoms(<5 days) seen in 2patients(4%).

CHEST XRAY FINDINGS

Most of the patients showed right sided pleural effusion, Followed by left sided pleural effusion. 8patients have Bilateral pleural effusion. A study by Prabhu and Narasimhan et al.[21] showed more left-sided pleural effusions than right-sided pleural effusions.

ULTRASOUND FINDINGS

Moderate effusions and effusion with thick septations are the most predominant findings during chest ultrasonography, followed by gross effusion. Adhesiolysis was done in the cases with septations during the procedure. Massive effusion was seen in 84% of patients in the study by Ahmed et al. Moderate to severe pleural effusions were seen in the survey by Rajesh Swarnakar et al.[22] Uncomplicated effusions without loculations were the most common finding during ultrasound examination of the chest 57.78%, followed by multiloculated effusion in 42.22%patients in our study.

CT CHEST FINDINGS

Most Patients showed pleural effusion with pleural based nodules, followed by pleural effusion with lymphadenopathy. Six patients showed mass lesions along with effusion, all of which are malignant lesions. In the study by Ahmed et al. lymphadenopathy was the most common finding, followed by pleural thickening combined with lymphadenopathy.

PLEURAL FLUID CHARACTERISTICS

The straw coloured fluid was seen in 54%cases, followed by hemorrhagic effusions, of which malignancy was the principal diagnosis. These findings were similar to the study by Shaheen et al. 47% showed hemorrhagic effusions, and 53% showed non-hemorrhagic effusions, but in contrast to the study done by Rajesh Swarnakar et al.[22]

PLEURAL FLUID GLUCOSE

Most of the patients(n=23, 46%) showed pleural fluid glucose in the normal range.

PLEURAL PROTEIN

According to light's criteria, all patients showed exudative effusions, with most of the patient's pleural fluid protein was within the range of 3 to 4gm/l.

PLEURAL FLUID FOR AFB

Only three patients showed positivity for acid-fast bacilli. Ninety-four percent of the patients showed negativity for AFB. In a study done by Agarwal et al.[24]The pleural fluid has given positive results in 12 out of 33 patients, which is higher than our present study.

PLEURAL FLUID FOR CBNNAT

Twelve percent of the patients showed positivity for pleural fluid CBNAAT (n=6). Rifampicin Resistance was not detected in these cases.

PLEURAL FLUID ADA:

23 Patients(46%) showed pleural fluid adenosine deaminase within the range of 20-40IU/L, Followed by >40IU/L in twenty-eight percent of the patients(n=14).

PLEURAL FLUID CELL BLOCK

Pleural fluid in maximum number(n=29, 58%) showed lymphocytic cell predominance with associated macrophages. Three patients(6%) have positivity for malignant cells, and their diagnosis was confirmed by biopsy as secondary to adenocarcinoma lung. Most of the studies in their pleural fluid analysis revealed exudative effusions, as in our present study.

FINDINGS DURING THORACOSCOPIC PROCEDURE

Pleural effusion, pleural based nodules and septations(thick more than thin) were the most common finding(n=31) during the thoracoscopic procedure. Most of the patients with tubercular granulomas as final diagnosis showed sago grain nodules over the parietal pleura during the procedure. These findings are similar to studies by Mohan et al.[25] Prabhu and Narasimhan et al.[21], Mehta et al. [23], Helala et al.[18] and Rajesh swarnakar et al.[22]in which pleural based nodules were the most common findings.

COMPLICATIONS

There were NO significant complications reported during or after the procedure. Minor complications were reported after the procedure, of these most common are Fever(8%), followed by Bleeding, and Subcutaneous emphysema(6% each) was seen. These complications were treated symptomatically. Chest pain is the predominant finding in the study by Wang et al.[26] followed by fever and subcutaneous emphysema in the lesser proportion of the patients.

HOSPITAL STAY IN DAYS

Seventy percent(n=35) of the patients discharged within one week, with a mean duration of hospital stay 6.4days. Only ten patients(20%) had a hospital stay of more than 7days due to thick septations and persistent air leak as a complication after the procedure, which was resolved spontaneously or with medication during the hospital stay. Similar findings were seen inthe study by Rajesh swarnakar et al.[22]and Brims et al.[20]and lesser than the study by Tscheikuna et al, in which the mean duration of hospital stay was 9.1 days.

BIOPSY FINDINGS

The biopsy was taken from the parietal pleura in all cases. 58%patients (n=29) revealed caseating granulomas followed by malignancies, of which adenocarcinoma was predominant(n=12,24%). Other malignancies shown by HPE are malignant mesothelioma(n=3, 6%) and inflammatory myo fibroblastic tumour in one case. Inconclusive results were seen in 10% of the cases. This finding was in contrast to most other studies in which malignancy was the most common finding, followed by tuberculosis and other inflammatory and para pneumonic related effusions. Among malignancy, malignant mesothelioma was the most common finding in the study by Mohan et al.[25] Tubercular granuloma was the most common finding as a present study in the study by Rajesh swarnakar et al.[22], Inconclusive diagnoses were seen in lesser proportions in most of the studies.

FINAL DIAGNOSIS

Tuberculosis was the most common definitive diagnosis(n=29,55%),

followed by malignancy in thirty-two percent of the cases(n=16) in our study. Five patients were inconclusive (10%) for diagnosis after the procedure. We have compared the Diagnostic ability of pleural fluid analysis(glucose, proteins, ADA, cellblock, AFB, CBNAAT) to thoracoscopy guided biopsy findings. Results showed thoracoscopy guided biopsy had given better diagnostic ability (total 45 diagnosed out of 50 cases; 90% cases) than pleural fluid analysis alone (9 diagnoses out of 50 patients;18% cases). Chi-square test(for the number of diagnosed cases by thoracoscopy vs. pleural fluid analysis alone) revealed a p-value of <0.0001 with a 95% confidence interval). The present study's overall diagnostic ability is 90%, similar to studies by Wang et al.[26] Mohan et al.[25]Rajesh swarnakar et al.[22]and Rozman et al.[19] higher diagnostic ability than the present study was found in Lee et al. Prabhu and Narasimhan et al.[21], Helala et al.[18] 100% of diagnostic results were seen in the study by Mehta et al.[23]

SUMMARY

1. The study was done in 50 patients according to inclusion and exclusion criteria over two years.
2. In our study overall diagnostic ability of medical thoracoscopy was 90% (45 out of 50 patients).
3. Tuberculosis was the principal diagnosis in 29 patients(58%), malignancy was diagnosed in 16 patients(32%), the inconclusive diagnosis was found In the lesser proportion of patients 5 out of 50(10%).
4. Compared to pleural fluid analysis alone, which has the diagnostic ability of 18%, medical thoracoscopy has a better diagnostic capability.
5. In our study, 16 out of 50 patients showed hemorrhagic effusions, of which 11 out of 16 were malignant effusions. This finding shows that the risk of hemorrhagic pleural effusion is significantly (p-value of 0.0002) higher in malignancy.
6. There were NO significant complications during the procedure.

CONCLUSION

- Medical thoracpscopy is a simple and safe procedure that can be utilized for both diagnostic and therapeutic purposes.
- It allows the physician to examine and select the exact site for pleural biopsy which is not possible in a blind pleural biopsy.
- The present study confirmed that medical thoracoscopy has a better diagnostic ability than pleural fluid analysis alone.
- There were lesser significant complications with this procedure, which can be tolerated by different age groups.
- To conclude Medical Thoracoscopy is a safe and effective tool for diagnostic purposes in patients with pleural effusion.
- We recommend that medical thoracoscopy should be utilized for every case of moderate to severe pleural effusion for better diagnostic efficacy.

REFERENCES

1. Jones J. The pleura in health and disease. Lung.2001;179:397–413.
2. San Jose ME, Alvarez D, Valdes L, Sarandeses A, Valle JM, et al. Utility of tumor markers in diagnosing neoplastic pleural effusion. Clin Chim Acta. 1997; 265: 193-205
3. Christopher DJ, Peter JV, Cherian AM. Blind pleural biopsy using a Tru-cut needle in moderate to large pleural effusion--an experience. Singapore Med J. 1998; 39: 196-199.
4. Loddenkemper R. Thoracoscopy--state of the art. - Euro Respir J. 1998; 11: 213-221.
5. Light RW. Clinical practice. Pleural effusion. N Engl J Med. 2002; 346: 1971-1977.
6. Poe RH, Israel RH, Utell MJ, Hall WJ, Greenblatt DW, et al. Sensitivity, specificity, and predictive values of closed pleural biopsy. Arch Intern Med. 1984; 144: 325-328
7. Noppen M. The Utility of thoracoscopy in the diagnosis and management of the pleural disease. Semin Respir Crit Care Med. 2010; 31: 751-759.
8. Lee P, Mathur PN, Colt HG. Advances in thoracoscopy: 100 years since Jacobaeus. Respiration. 2010;79:177–186.
9. Michaud G, Berkowitz DM, Ernst A. Pleuroscopy for diagnosis and therapy for pleural effusions. Chest.
10. N. Rahman, N. Ali, G. Brown, S. Chapman, R. Davies, N. Downer, F. Gleeson, T. Howes, T. Treasure, S. Singh, G. Phillips, Local anesthetic thoracoscopy: British Thoracic Society pleural disease guideline 2010, Thorax 65 (Suppl. 2) (2010) ii54–ii60.
11. R.J. Harris, M.S. Kavuru, A.C. Mehta, S.V. Medendorp, H.P. Wiedemann, T.J. Kirby, T.W. Rice, The impact of thoracoscopy on the management of pleural disease, Chest 107 (1995) 845– 852.
12. Froudarakis ME, Noppen M: Medical thoracoscopy: new tricks for an old trade. Respiration, 2009;78:373–374.
13. Froudarakis ME: Diagnostic work-up of pleural effusions. Respiration 2008;75:4–13.
14. Rodriguez-Panadero F: Medical thoracoscopy. Respiration 2008;76:363–372.
15. Tassi G, Marchetti G: Minithoracoscopy: a less invasive approach to thoracoscopy. Chest 2003;124:1975–1977.
16. Blanc FX, Atassi K, Bignon J, Housset B. Diagnostic value of medical thoracoscopy in pleural disease: a 6-year retrospective study. Chest. 2002; 121: 1677-1683.
17. Mootha VK, Agarwal R, Singh N, Aggarwal AN, Gupta D, et al. Medical Thoracoscopy for Undiagnosed Pleural Effusions: Experience from a Tertiary Care Hospital in North India. Indian J Chest Dis Allied Sci. 2011; 53: 21-24.
18. Helala LA, El-Assal GM, Farghally AA, Abd El Rady MM. Diagnostic yield of medical thoracoscopy in cases of undiagnosed pleural effusion in Kobri El-Kobba Military Hospital. Egyptian Journal of Chest Diseases and Tuberculosis. 2014; 63: 629-634.
19. Rozman A, Debeljak L, Kern I. Thoracoscopy, a study of 129 procedures. ZdravVestn 2011; 80: 546-552.
20. Brims FJ, Arif M, Chauhan AJ. Outcomes and complications following medical thoracoscopy. Clin Respir J. 2012; 6: 144-149.
21. Prabhu VG, Narasimhan R. The role of pleuroscopy in undiagnosed exudative pleural effusion. Lung India. 2012; 29: 128-130.
22. Rajesh Swarnakar, Bhavesh Vaghani, and Chetan Dhoble: To Study the Diagnostic Yield of Medical Thoracoscopy in Patients with Pleural Effusion of Undetermined Etiology. Smj group 2017.
23. Mehta AA, Patel MN, Soni AH, Patel TB, Parmar SA, Dumra HS, Patel VR. The investigation into the role of medical pleuroscopy in the diagnosis and management of patients with pleural diseases. Indian J Thorac Cardiovasc Surg. 2012; 28:120-126
24. Agarwal R, Aggarwal AN, Gupta D. Diagnostic accuracy and safety of semi-rigid thoracoscopy in exudative pleural effusions: a meta-analysis. Chest 2013;144:1857-67.
25. Mohan A, Naik S, Naseer R, Boon C, Mills J, et al. Performance characteristics of semi-rigid thoracoscopy in pleural effusions of undetermined etiology. J BronchologyIntervPulmonol. 2010; 17: 289-294.
26. Wang Z, Tong ZH, Li HJ, Zhao TT, Li XY, et al. Semi-rigid thoracoscopy for undiagnosed exudative pleural effusions: a comparative study. Chin Med J (Engl). 2008; 121: 1384-1389..