e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2022; 14(8); 385-391

Original Research Article

To Study the Diagnostic Value of Flexible Thoracoscopy in Undiagnosed Cases of Exudative Pleural Effusion in a Tertiary Care Center

Ritesh Kamal[1], Pushpa Kumari[2]

[1]Associate Professor, Department of Pulmonary Medicine, Katihar Medical College and Hospital, Katihar, Bihar.
[2]Senior Resident, Department of Obstetrics and Gynaecology, Madhubani Medical College and Hospital, Madhubani, Bihar.

Received: 15-06-2022 / Revised: 20-07-2022 / Accepted: 05-08-2022
Corresponding author: Dr Pushpa Kumari
Conflict of interest: Nil

Abstract

Background: It is the accumulation of excess fluid in the pleural cavity and is one of the most common clinical scenarios coming in the pulmonologist practice. Pleural fluid formation occurs as a result of decreased removal or increased production. The Aim of the study to diagnostic utility of flexible thoracoscopy in undiagnosed exudative pleural effusion.

Material and Methods: This prospective study was done at KMCH, Katihar, Bihar. Total 40 cases, 30 male and 10 female are included in this study the diagnostic value of flexible thoracoscopy in undiagnosed cases of exudative pleural effusion. Collection of samples as per patients inclusion criteria: Antituberculous treatment history, Symptoms duration, Chest radiograph, CT chest, Sputum for AFB, Pleural fluid aspiration and analysis, Thoracoscopy in undiagnosed case, Histopathology findings.

Results: The most important indication for thoracoscopy is in exudative undiagnosed pleural effusion. It is also used in the diagnosis of malignant mesothelioma, diffuse parenchymal lung disease. It is also useful in talc pleurodesis and adhesiolysis. The overall diagnostic yield in pleural fluid cytology is 62% and blind pleural biopsy is 44%. The diagnostic yield of thoracoscopy varies from 60%-97% in various studies, where as in our study is 72.5%.

Conclusion: It is a semi invasive procedure and it can be done in conscious sedation. So if there is facility for thoracoscopy, it should be preferred in undiagnosed exudative pleural effusion because of its high diagnostic yield in tuberculosis and malignancy and it is a safe procedure.

Keywords: Thoracoscopy, exudative pleural effusion, AFB, Mesothelioma

Background

The normal pleural fluid daily formed in an adult is 15 ml. Most of it is removed by parietal pleura lymphatics with the help of stomas present in the parietal pleura. The rate of removal of pleural fluid is 0.20ml/kg/hr.

The pathophysiology of fluid formation varies depending upon the etiology. As a part of many diseases, pleural effusion can occur. So a systematic approach is necessary for identifying the etiology. Proper history and clinical examination itself guide into the diagnosis, so that unnecessary repeated therapeutic aspiration can be avoided.

If there is free fluid in the thoracic cavity, thoracentesis is indicated, if the thickness of fluid is 10 mm in the lateral decubitus X-ray, USG or CT. The value of radiology not only lies in the diagnosis of pleural effusion but also helps in finding out the lung changes in tuberculosis, heart enlargement in congestive heart failure, etc.

Most common causes of exudative pleural effusion in our country are TB, Malignancy, Para pneumonic effusion and pulmonary embolism. Malignancy is one of the commonest causes of exudative effusion. Malignancies presenting as pleural effusion are from the lung, breast, lymphomas, ovarian carcinoma, sarcoma, uterine carcinoma, kidney, stomach and colon etc.

Around 15% of the lung cancer has pleural effusion at the time of evaluation. Highest incidence of effusion is adenocarcinoma and lowest with small cell carcinoma. Congestive cardiac failure, Cirrhosis, Nephrotic syndrome is examples of transudative effusion.

Thoracoscopy is indicated for patients having undiagnosed pleural effusion, that is, pleural fluid cytology is negative and pleural fluid marker for TB (ADA) are negative. The procedure can be done with either rigid or flexible thoracoscopy. Both has its own advantages and disadvantages. Many studies shows that, yield of rigid thoracoscopy is more than flexible one. It is due to the larger cusps of the rigid biopsy forceps that we are using. But most of the patients complain of pain, which is the most important disadvantage in the rigid type. In our study, we are using flexible thoracoscopy that is, the distal tip is flexible.

Tuberculosis and malignancy are the two diagnosis usually we can establish by thoracoscopy. The advantages of medical thoracoscopy in the diagnosis of pleural effusions are fast and biopsies can be taken from parietal pleura, diaphragm, lung and mediastinum. It can be used for the staging in lung cancer and diffuse mesothelioma, and also helps to exclude malignancy and tuberculosis with high probability.

Objective of the study

- To ascertain the diagnostic utility of flexible thoracoscopy in undiagnosed exudative pleural effusion.
- To compare the thoracoscopy findings with the histopathology results.

Material and Methods

This prospective study was conducted at Department of Pulmonary Medicine, Katihar Medical College and Hospital, Katihar, Bihar from October 2020 to March 2022.

Inclusion criteria

- Moderate to massive pleural effusion by radiology, i.e. pleural effusion present at least up to the 4th intercostal space.
- Exudative pleural effusion based on light's criteria

Exclusion criteria

New smear positive TB, Smear positive retreatment tuberculosis, Patients with respiratory failure, Patients who are not willing to participate in the study, Patients who are not fit for thoracoscopy, Patients on anticoagulants, Patients with coagulation disorder, Patients with empyema, Patients with recent MI and history of arrhythmia, Patients with low platelet count <60000, Patients who cannot lie down in the lateral decubitus position.

Collection of Clinical Samples/ Data

Recruitment of patients as per inclusion criteria: Antituberculous treatment history, Symptoms duration, Chest radiograph, CT chest, Sputum for AFB, Pleural fluid aspiration and analysis, Thoracoscopy in undiagnosed case, Histopathology findings.

Method of Study

Patients with moderate to massive effusion by radiology will be evaluated with pleural fluid aspiration and sent for cytology, protein sugar analysis, total count, and ADA. Those cases which came us undiagnosed after initial pleural fluid analysis are subjected to thoracoscopy. Patients will be evaluated for fitness for thoracoscopy with complete blood count, bleeding time, clotting time, and sputum for AFB, ECG, pulse oximetry, cardiac evaluation and CT chest.

IV cannula is inserted on the arm. For widening and better access of the rib spaces, arm is placed above the head of the patient. Thoracoscopy is done under conscious sedation. Chest wall was draped with sterile cloth after cleaning the skin with 7.5% povidone iodine. Patient is placed in lateral decubitus position with the hemi thorax to be studied facing upwards. After cleaning and 72 draping, the skin, subcutaneous tissue, the intercostal muscles and the pleura is anesthetised by local anaesthetic agent lignocaine 2%, 5-7 ml. After that needle aspiration of the pleural fluid is done in order to confirm the position. Midazolam 0.05 mg/kg IV is given for sedation. Heart rate, blood pressure, continuous electrocardiographic monitoring and pulse oximetric saturation measurement were observed throughout the procedure and in the post-procedure period for 2 hours.

Incision (1-2cm) is done in the 4th – 7th intercostal space in the mid or anterior axillary line where the position has been confirmed by needle aspiration of the pleural fluid. By blunt dissection with curved artery forceps, the subcutaneous tissue and muscles are separated. After palpating the pleura, with the help of trocar and cannula parietal pleura is punctured. Trocar is taken out and through the cannula flexible thoracoscope is inserted.

Statistical Analysis

Analysis done using SPSS software 19.0 versions.

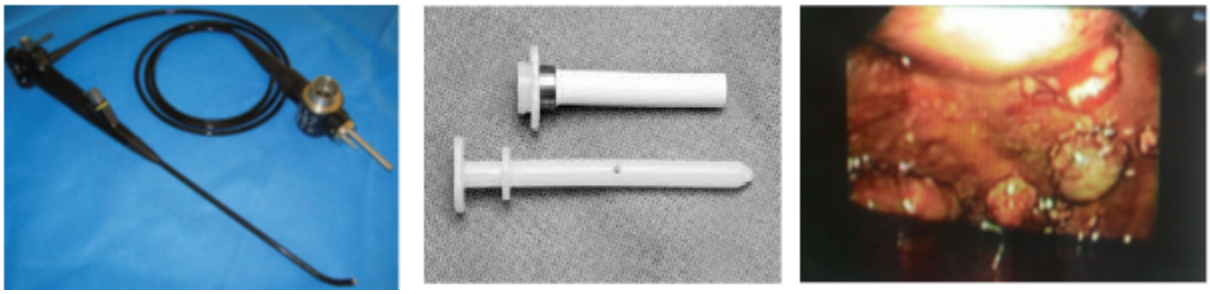

Figure 1:

a. Flexible thoracoscope, b. Trocar and cannula, c. Thoracoscopy showing multiple nodules in the parietal pleura

Results

Thoracoscopy was done in 40 patients who were admitted at KMCH, Katihar, Bihar during October 2020-March 2022. Indication for thoracoscopy for all these patients was inconclusive initial pleural fluid analysis. So, all these cases were undiagnosed exudative pleural effusion. Thoracoscopy was done and under vision

biopsy was taken from the parietal pleura in all the cases. The mean age of the study population was 43±14.9. Patient with the lowest age in this study group was 18 and highest was 71 years.

Table 1: Sex Distribution

Gender	No. of cases	Percentage
Male	30	75.0%
Female	10	25.0%
Total	40	100.0%

Of these 40 patients, 75% were male and 25% were females.

Table 2: Size of Pleural Effusion

Size	No. of cases	Percentage
Massive	30	75.0%
Moderate	10	25.0%
Total	40	100.0%

75 % cases presented with massive effusion, 25% cases with moderate effusion.

Table 3: Colour of Pleural Effusion

Colour	No. of cases	Percentage
Straw	27	67.5%
Haemographic	13	32.5%
Total	40	100.0%

Of the 40 cases, 67.5% cases presented with straw colored pleural effusion. 32.5% cases were hemorrhagic effusion.

Table 4: Side of Pleural Effusion

Side	No. of cases	Percentage
Left	16	40.0%
Right	24	60.0%
Total	40	100.0%

16 cases (40%) presented with left sided pleural effusion. 24 cases (60%) presented with right sided pleural effusion. There was no bilateral effusion in our study group.

Table 5: Finding Thoracoscopy

	Thoracoscopy Finding in cases	Percentage
Adhesions	13	32.5%
Normal Pleura	11	27.5%
Nodule	12	30.0%
Mass lesion	4	10.0%
Total	40	100.0%

Thoracoscopy showed 13 cases (32.5%) had adhesions, 11 cases (27.5%) had normal looking pleura,12 (30.0%) had nodule, mass lesion in 4 cases (10.0%).

Table 6: Histopathological Findings

Histopathological Findings	Histopathological Result of cases	Percentage
Malignant	11	27.5%
Non-malignant	29	72.5%
Total	40	100.0%

Out of 40 cases, 11 (27.5%) came as malignant and 29 (72.5%) came as nonmalignant. Of the 29 nonmalignant cases 18 (62.06%) came as tuberculosis.

Table 7: Distribution of HPE in relation to Thoracoscopic findings

Thoracoscopic findings	Malignant	Non-malignant	Total
Normal Pleura	1	10	11
Adhesions	0	13	13
Nodule	7	5	12
Mass lesion	3	1	4
Total	11	29	40

P value 0.001.

Thoracoscopy showed 13 cases had adhesions and mass lesion in 4 cases. Of the 4 mass lesion 3 came as malignant. Normal pleura in 11 cases, of which 10 came out as nonmalignant and1 as malignant. Nodules in 12 cases of which 7 came as malignant and 5 as nonmalignant.

Table 8: Histopathology with colour of Pleural Fluid

Colour	Malignant	Non-malignant
Straw	2	25
Haemographic	9	4
Total	11	29

P value <0.001.

Straw colored effusion in 27 cases, of which 25 came as nonmalignant and 2 as malignant. Out of 13 cases of haemorrhagic effusion 9 came as malignant.4 came as nonmalignant.

Discussion

In this study 40 patients underwent thoracoscopy whose initial pleural fluid results were inconclusive. Flexible Thoracoscopic biopsy of the pleura yielded 72.5% in this study. This is comparable to the 74.3% by Mootha *et al* [1] Lokanathan *et al* [2] got a yield of 66.7%. Dhooria *et al* [3] got 73.3% and Laila *et al* [4] got 95%. Of the malignant cases majority was adenocarcinoma. There were 4 adenocarcinoma, 2 metastatic renal cell carcinoma, 1 metastatic carcinoma with primary bone, 1 metastatic deposits primary GI tract, 1 pleural lymphoma, 1 poorly differentiated carcinoma lung and 1 small cell carcinoma.

In our study the most common causes of pleural metastasis and subsequent effusion was from the lung. Among that the most common type was adenocarcinoma. This finding is comparable to the finding of Mootha *et al* [5]. In his study also most common type was adenocarcinoma. The second commonest cause was metastatic renal cell carcinoma. There was one case from metastatic bone carcinoma and one from GI tract. There was no case of squamous cell carcinoma or mesothelioma in our study group.

Out of the 29 nonmalignant cases 18 were diagnosed as tuberculosis. This high number of tuberculosis is may be because ours is a tertiary care referral center for tuberculosis and it is highly endemic in our community. Rest of the cases was diagnosed as chronic pleural fibrosis, acute inflammatory process and chronic nonspecific inflammation.

During thoracoscopy adhesions are found in 13 cases, nodules were found in 12 cases, normal pleura in 11 cases and mass lesion in 4 cases. All cases with adhesions came as nonmalignant. 58.3% of the nodules came as malignancy. 90.9% of the normal pleura findings are seen in nonmalignant cases.75% of the mass lesion came as malignancy. All these finding were significant with a p value of 0.001. Some of these findings were comparable to findings of Prabhu *et al* [6] and Laila *et al* [4]. Prabhu *et al* [6] got the finding as more than 70% of patients with nodules were malignant lesion, more than 96%of patients with adhesion were chronic or subacute inflammation (nonmalignant lesion) and 100% of sago grain nodules were tuberculosis. Laila *et al* got 100% of patients with adhesions were non-malignant

76.9% of all hemorrhagic effusion came as malignant, that is out of 13 hemorrhagic effusion 10 came out as malignancy. Of the 27 straw colored effusions only 2 came as malignancy. This finding is significant with a p value of 0.001.About 59.2% of the straw colored pleural effusion came as tuberculosis.

Regarding the complication, thoracoscopy is a safe procedure with mortality rates is very rare. Most common minor complications encountered are subcutaneous emphysema, prolonged air leak and empyema. In our study none of them developed any of the previously mentioned complication.

Conclusion

The most important indication for thoracoscopy is in exudative undiagnosed pleural effusion. It is also used in the diagnosis of malignant mesothelioma, diffuse parenchymal lung disease. It is also useful in talc pleurodesis and adhesiolysis. The overall diagnostic yield in pleural fluid cytology is 62% and blind pleural biopsy is 44%. The diagnostic yield of thoracoscopy varies from 60%-97% in various studies, where as in our study is 72.5%.

Visualization of the visceral and parietal pleura is another advantage, so that we can take biopsy from the abnormal areas. The thoracoscopic appearance itself helps to get an overall idea about the diagnosis.

The most common major complications are empyema secondary to infection and acute respiratory failure due to re-expansion pulmonary oedema. By staged evacuation of pleural fluid and allowing air to replace the fluid re-expansion pulmonary oedema can be prevented. Proper asceptic precautions if taken, chance of secondary infection is rare.

So I wanted to conclude that, it is a semi invasive procedure and it can be done in conscious sedation. So if there is facility for thoracoscopy, it should be preferred in undiagnosed exudative pleural effusion because of its high diagnostic yield in tuberculosis and malignancy and it is a safe procedure.

References

1. V.K. Mootha, R. Agarwal, N. Singh, A.N. Aggarwal, D. Gupta and S.K. Jindal. Medical Thoracoscopy for Undiagnosed Pleural Effusions: Experience from a Tertiary Care Hospital in North India. Postgraduate Institute of Medical Education and Research, Chandigarh.
2. R. Loddenkemper Thoracoscopy state of art.ERS Journal,1998-11:213-221.
3. Loganathan Nattusamy, Karan Madan, Anant Mohan, Vijay Hadda, Deepali Jain, Neha Kawatra Madan,1 Sudheer Arava,1 Gopi C Khilnani, and Randeep

Guleria. Utility of semi-rigid thoracoscopy in undiagnosed exudative pleural effusion Lung India. 2015 Mar-Apr; 32(2): 119–126**.**

4. Dhoria S Singh, Aggarwal A N, Gupta D.A randomised trial comparing the diagnostic yield of rigid and semi rigid thoracoscopy in undiagnosed pleural effusion.
5. J.Gryminzki, P Krak Awka. The diagnosis of pleural effusion by USG and Radiologic technique. Chest Journal 1976, 70, 33-37.
6. Laila A. Helala, Gehan M. El-Assal, Ayman A. Farghally, Marwa M. Abd El Rady. Diagnostic yield of medical thoracoscopy in cases of undiagnosed pleural effusion in Kobri El-Kobba Military Hospital Egypt. Department of Chest Diseases, Faculty of Medicine, Ain Shams University, Egypt. Received 17 March 2014; accepted 6 April 2014.