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A Study of Thoracoscopy under Local Anesthesia in a Rural Medical College of Maharashtra

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Abstract:
Background: *Thoracoscopy done under local anesthesia provides a diagnostic and therapeutic approach to manage pleural effusion. It permits us to biopsy under direct visualization compared to blind pleural biopsy. It has equivalent sensitivity as compared to Computerized Tomography guided pleural biopsy for diagnosing causes management of an undiagnosed pleural effusion in rural areas.*
Materials and methods: *A total of 70 cases of pleural effusion who visited out patient department at a rural medical college between November 2018 and November 2020, were included in the study. The thoracoscopy was done under local anesthesia under all aseptic precautions. A rigid 10 mm telescope, 5 mm trocar, biopsy forceps were inserted in the eight intercostal space. In some cases, pleurodesis was also done as a therapeutic measure.*
Results: *All the 70 patients underwent diagnostic thoracoscopy under LA successful. Out of the 72 cases,42 were diagnosed with benign transudative effusion following pleural fluid examination. All received treatment as per cause of transudative effusion .The other 12 had empyema, diagnosed with biopsy, culture and pleural examination. Rest 18 patients had malignant effusion confirmed with biopsy and cytology. They were investigated further for primary site and treated accordingly.*
Regarding complication, three patients had small bleed during the procedure, one patient had post procedure air leak while one patient developed subcutaneous emphysema with five patients reported pain post procedure. Two patients developed post procedure infection. Most patients tolerated the procedure well without any major complications related to the procedure.
Conclusion: *The thoracoscopy under LA appears to be relatively safe, easily available, and equally efficient in diagnosing pleural effusion.*
Key words: *local anesthesia, pleural effusion, thoracoscopy*

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I. Introduction

Endoscopic examination of pleural cavity was once a procedure requiring formal training. But, since a past few decades local anaesthetic thoracoscopy (LAT) has made a revolution in the field of pulmonology in diagnosing and treating the undiagnosed pleural effusion. It is increasing used in recent times for undiagnosed pleural effusion. Francis Richard Cruise in Ireland was probably the first to perform thoracoscopy as early as 1866(1). An increasing trend has been seen in the number of centres performing local anaesthetic thoracoscopy (LAT) as a gold standard diagnostic and therapeutic procedure (2).A significant number of cases of pleural effusion remain undiagnosed after simple diagnostic pleural aspiration(3).Local anaesthetic thoracoscopy allows direct visual assessment of the pleura and subsequent biopsy of visually abnormal areas, Hence maximising diagnostic yield. A total of 22 case series have reported diagnostic yield of local anaesthetic thoracoscopy for malignant disease. (5-16) Pooling results from all these studies, thoracoscopy has a 92.6% diagnostic sensitivity for malignant pleural disease (1268/1369, 95% CI 91.1% to 94.0%). Pooling results from only those eight studies in which a prior 'blind' pleural biopsy was negative, local anaesthetic thoracoscopy had a similarly high sensitivity of 90.1% (334/337, 95% CI 86.6% to 92.9%). This study aims to show the need and usefulness of thoracoscopy under local anesthesia for management of an undiagnosed pleural effusion in rural areas as it is cost-effective, readily available and helpful as a diagnostic and to a certain extent therapeutic modality.

OBJECTIVE
To study the efficacy of thoracoscopy under local anesthesia in management of undiagnosed pleural effusion.

II. Materials And Methods

Study Design: Single arm observational study
Study Location: A tertiary care teaching hospital based study done in Department of General surgery, at ACPM Medical College Dhule.
Study Duration: November 2018 to November 2020.
Sample size: 70
Sample size calculation: No formal sample size was calculated. All consecutive patients with pleural effusion as per inclusion criteria were included in the study during the study period.
Subjects & selection method: Patients visiting to JMF's ACPM Medical college satisfying the following inclusion & exclusion criteria

Inclusion criteria :
1. Any patient requiring Intercostal drain placement or pleural tapping
2. Any patients unfit for general anesthesia for video assisted thoracoscopy (VATS).

Exclusion criteria :
Patient not willing for the study
Patient with known pathology which requires definitive treatment.

Procedure methodology

After written consent from the patients or relatives, as per consecutive sampling, all patients with pleural effusion were enrolled in the study as per inclusion and exclusion criteria, between November 2018 to November 2020. Materials needed for this procedure were 10 mm telescope, 5 mm trocar and biopsy forceps. The procedure was done under local anesthesia under all aseptic precautions. The thoracoscope was inserted under 10 mm port in mid axillary line in 8^{th} intercostal space. In a few cases therapeutic procedures like pleurodesis was also done.

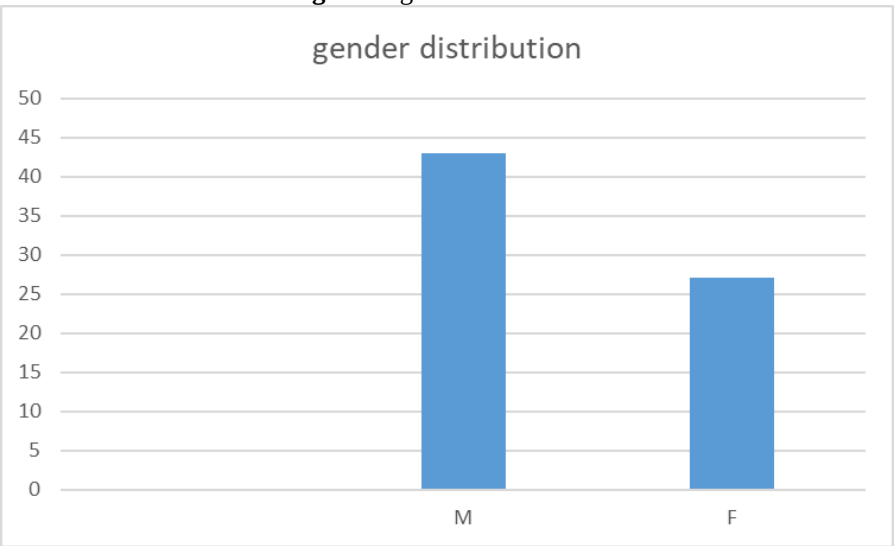
III. Observation And Graphs

A total of 70 cases were studied and reviewed. Following are the results of the cases:

Table 1: Gender distribution

Gender	M	F
Frequency	43	27

Figure 1: gender distribution

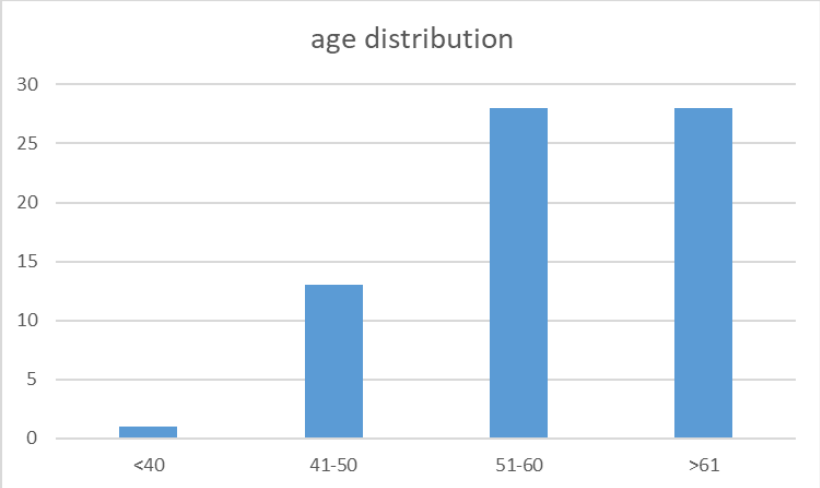


In our study, male predisposition to pleural effusion was observed. Total male patients were 43 (61.4%) out of 70.

Table 2: Age distribution

Age distribution	Frequency
< 40	1
41-50	13
51-60	28
>61	28

Figure 2: Age distribution

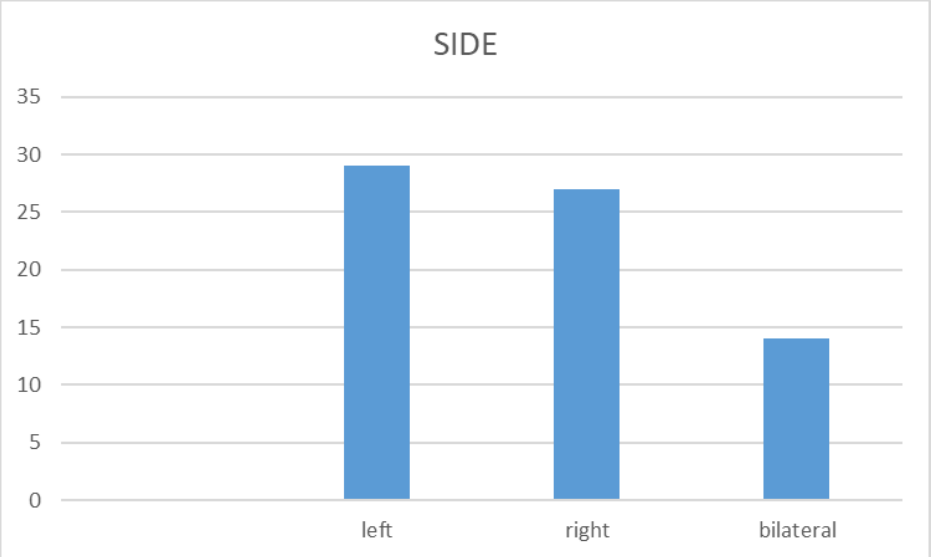


In our study, 56 patients (80%) were above the age of 51 years.

Table 3: Side of pleural effusion

Side of pleural effusion	Frequency
Left	29
Right	27
Bilateral	14

Figure 3: Side of pleural effusion

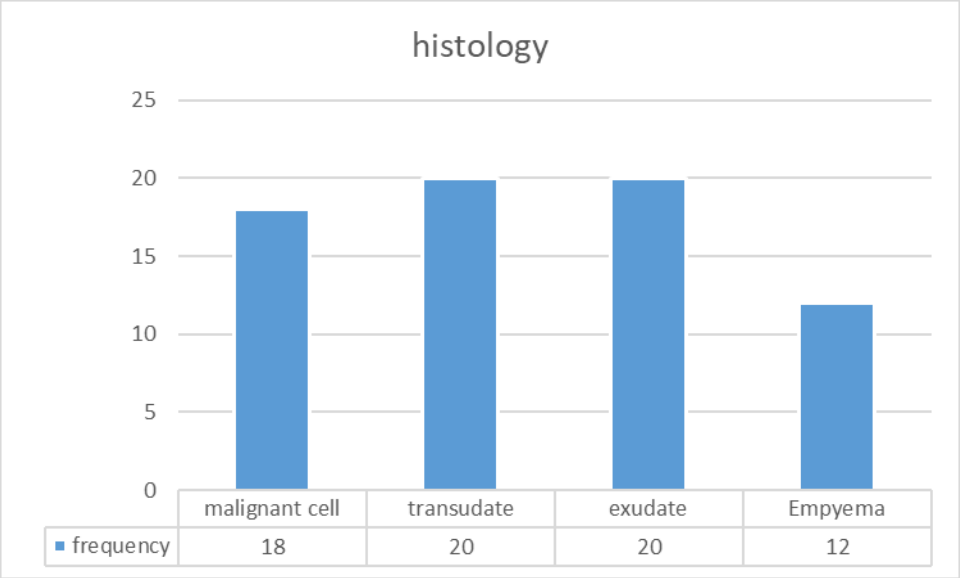


In our study, 29 patients (41.4%) had left sided pleural effusion, 27 patients (38.57%) had right sided pleural effusion while 14 patients (20%) had bilateral pleural effusion.

Table 4: Histology

Histology	Malignant cell	Transudate	Exudate	Empyema
frequency	18	20	20	12

Figure 4: Histological diagnosis



In our study, 20 patients (28.57%) each belonged to histopathological diagnosis of transudate and exudative pleural effusion, 12 patients had empyema, while 18 patients had malignancy which needed further evaluation for assessment of primary tumour.

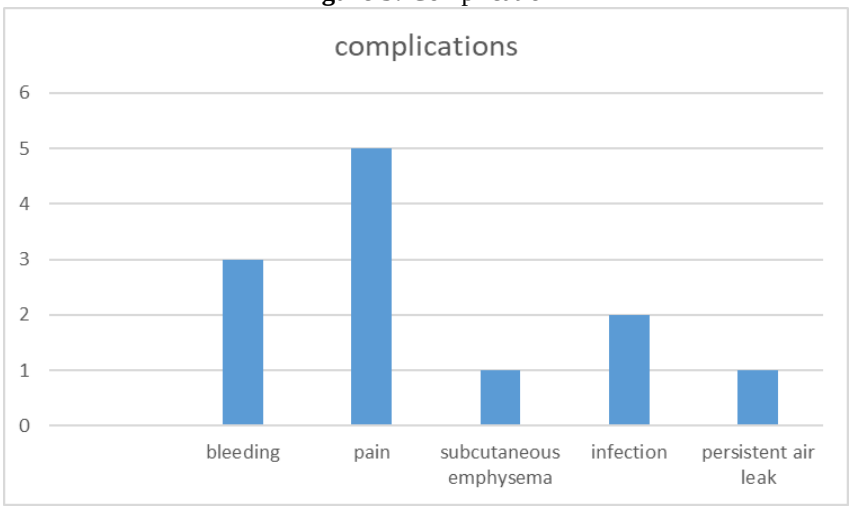
In our study, we observed following complications during/post procedure:

1. Bleeding
2. Infections
3. Persistent air leak
4. Hypotension
5. Subcutaneous emphysema
6. Pain

Table 5: Complication

Complication	Frequency
Bleeding	3
Pain	5
Subcutaneous emphysema	1
Infection	2
Persistent air leak	1
No complication	58

Figure 5: Complication



In our study, 12 (17.14%) patients had some complications, out of which pain was most common complication reported by in 5 patients, bleeding was observed in 3 patients, subcutaneous emphysema and persistent air leak was seen in 1 patient each.

IV. Discussion

Thoracoscopy under local anesthesia has revolutionised the diagnostic technique for management of undiagnosed pleural effusion. Now-a-days we can treat the patients with pleural effusion who are unfit for general anesthesia given for VATS with this method and know their histological diagnosis. Pleural disease is a common health problem and is estimated to affect > 3,000 people per million population. Pleural effusion is the most common condition in studied patients, and in approximately 75% of cases, the clinical history, physical examination, radiographic techniques, and pleural fluid analysis might identify a cause for the pleural effusion, with the remaining 25% requiring further invasive diagnostic procedures. An increasing trend has been seen in the number of centres performing thoracoscopy under local anesthesia as a gold standard diagnostic and therapeutic procedure. We consider that thoracoscopy has following advantages over blind needle biopsy:

1. The exact place for biopsy can be seen
2. Less amount of trauma to tissue
3. Pleurodesis can be performed
4. Pleural complication due to pneumothorax are rare.

In our study, we observed that thoracoscopy under local anesthesia was relatively an accurate tool in management of undiagnosed pleural effusion. It provides a better opportunity for an accurate histopathological diagnosis of pleural effusion. In our study, majority of patients (82.85%) had no post-procedure complications. Hence, it is a relatively safe diagnostic procedure in resource limited healthcare centres for patients with undiagnosed pleural effusion who are unfit for general anesthesia. (17) Hajjar et al concluded that VAT lung biopsy procedure in patients with Idiopathic Pulmonary Fibrosis under local anesthesia is safe, representative, and effective operation. In addition, high-risk patients for GA could go through this procedure under local anesthesia as an alternative and safe option with no added complications. The currently available data support local anaesthetic thoracoscopy as one of the techniques with the highest diagnostic yield in aspiration cytology negative exudative pleural effusion.(18) Bautista-Gonzale S et al concluded that local anaesthetic thoracoscopy was a high diagnostic sensibility for multiple pathologies.(19) Smit HJ et al reported that Video assisted thoracoscopy under local anesthesia was safe, effective, logistically simple and required no long waiting times with no conversion to General anesthesia needed. It was confirmed that thoracoscopy could accurately diagnose the cause of undiagnosed pleural effusion.

V. Conclusion

Thoracoscopy is a relatively cost-effective and less hazardous procedure in the management of undiagnosed pleural effusion. It has lesser complications with less morbidity post procedure. The unfit patients for general anesthesia are also benefitted by this procedure. LAT can be performed safely as a day care procedure in our centre with different characteristics, including size, population, and means of health-care service provision, models without compromising patient safety. The overall excellent diagnostic yield of the procedure suggests that LAT could be performed earlier in the diagnostic pathway, and in selected patients LAT

could potentially be used as the first and only test needed to obtain a definitive diagnosis. Thus, procedure can be employed for routine use in management of pleural effusion.

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