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SPUTUM EXAMINATION FOR MYCOBACTERIA-ARE WE OVERLOOKING IT IN THE DIAGNOSTIC WORKUP OF PATIENTS WITH TUBERCULOUS PLEURAL EFFUSION

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ABSTRACT **Introduction:** Pleural tuberculosis is a common form of extrapulmonary disease and may occur in presence or absence of pulmonary parenchymal disease on chest radiograph. spontaneous or induced sputum examination for mycobacteria is important as it is seldom looked in the etiological diagnosis. **Aim And Objectives:** To evaluate the role of sputum examination for mycobacteria by Acid fast bacilli(AFB) smear and Catridge Based Nucleic Acid Amplification Test(CBNAAT) in TB pleural effusion **Materials And Methods:** This is a prospective study conducted over one year.sample of 60 patients were included.50 patients proved to have tuberculous pleural effusion and 10 patients with high clinical suspicion of TB pleural effusion with Adenosine Deaminase(ADA)<40IU/L.Etiology of pleural effusion as tuberculous was confirmed by biochemical and cytological tests,emphasis was given on sputum for AFB,CBNAAT for sputum AFB negative cases and sputum in cases where pleural fluid ADA<40IU/L with high clinical suspicion of tuberculosis. **Results:** Sputum smear was positive for tuberculosis in 5 out of 40cases(13%)who had spontaneous expectoration and 1 out of 10cases(10%)of induced sputum and AFB was negative for all the 10 cases with ADA<40IU/L.sputum for CBNAAT was positive in 10 out of 54cases(19%) negative for AFB and 1 out of 10 cases(10%)with ADA<40IU/L.overall sputum was positive in 17 out of 60cases(28%). **Conclusion:** Sputum examination either spontaneous or induced in cases of tuberculous pleural effusion is simple,inexpensive,indicator of infectiousness and useful as diagnostic tool in diagnostic workup which shouldn't be overlooked owing to its positive results.

KEYWORDS : Mycobacteria, tuberculous pleural effusion, sputum examination, AFB, CBNAAT

INTRODUCTION

Tuberculosis (TB) presenting in its pulmonary and extra pulmonary forms is one among the major public health concerns in India.Tuberculous pleural effusion is the second common form of extra pulmonary TB.The definitive diagnosis of tuberculous pleuritis is - demonstration of tubercle bacilli either in the pleural fluid, sputum or by demonstrating granulomas in the pleura or pleural biopsy specimen.Parenchymal lung lesions are usually not apparent on chest radiography in cases of tuberculous pleural effusion..Sputum either spontaneous or induced for acid fast bacilli (AFB) and CBNAAT if AFB negative is seldom looked for in such cases. However, with the use of computed tomography parenchymal lesion including focal areas of subpleural cavitation and lymphadenopathy can be visualized which is not apparent on routine chest radiography.In such cases there is possibility of isolation of tubercle bacilli in sputum which help us as a diagnostic tool.

MATERIALS AND METHODS

This is a prospective observational study conducted over one year(December 2020-December 2021)in the department of pulmonary medicine,MIMS,Vizianagaram.sample of sixty(60) patients were included in the study.After obtaining informed consent,60cases of pleural effusion were subjected for following investigations- Medical history taking,full clinical examination,Sputum for AFB smear and CBNAAT, diagnostic thoracocentesis under aseptic conditions. Fifty(50)patients proved to have tuberculous pleural effusion and ten(10)patients with pleural fluid Adenosine Deaminase(ADA) <40IU/L but with high clinical suspicion of Tuberculous pleural effusion were included.Etiology of pleural effusion as tuberculous was confirmed by biochemical tests(ADA) and cytological tests(Total and Differential counts).Emphasis was given on sputum for AFB smear,Catridge Based Nucleic Acid Amplification Test(CBNAAT) for sputum AFB negative cases and sputum in cases where diagnosis in inconclusive with pleural fluid Adenosine Deaminase<40IU/L but with high clinical suspicion of tuberculosis.

CBNAAT- Cartridge Based Nucleic Acid Amplification Test

The rapid, fully automated NAAT also known as Xpert MTB/RIF assay –has been described as a major breakthrough in TB control and program. The GeneXpert is currently the only one of its kind using a cartridge containing lyophilized reagents, buffers, and washes. The Xpert MTB/RIF assay is based on hemi-nested real-time PCR amplifying the rpoB gene target.CBNAAT Testing involves three manual steps:

- Addition of sample treatment reagent to liquefy and inactivate the bacteria in the sputum.
- Transfer of 2ml of liquefied sputum into the cartridge.
- Loading of the cartridge into the device for the assay . All further steps are automated.
- The role of CBNAAT for early diagnosis of tubercular effusion has been evaluated as an alternative diagnostic tool with an added advantage to detect rifampicin resistance.

Inclusion Criteria

- Patients of age>18yrs with a medical history suggestive of pleural effusion.
- Patients with pleural effusion were identified by- Clinical examination, chest x-ray, ultrasonography, and diagnostic thoracocentesis for fluid analysis showing exudative nature.

Exclusion Criteria

- Patients age<18 yrs.
- Patients not giving consent for thoracocentesis
- Transudative pleural effusions.

RESULTS

- Majority of the study subjects were with in the age of 30-50 years(73%)
- The minimum age affected by TB in study is 18 years and maximum age is 62 years
- In our study of 60 cases,40 were male(67%)and 20(33%)were female with Male to Female ratio 2:1
- The most common presenting symptom in study group is cough,followed by chest pain,fever,breathlessness,loss of weight.
- Analysis of pleural fluid showed it was mostly straw coloured and the cell type in pleural fluid was predominantly lymphocytes with ADA>40IU/L in majority of cases(83%) and ADA<40IU/L in 17% cases
- Light's criteria was used to distinguish exudate from transudate effusion
- After confirming etiology of pleural effusion as tuberculous, examination of sputum for AFB by Z-N method was done in all cases and CBNAAT in AFB negative cases and in cases with high clinical suspicion of tuberculosis withADA<40IU/L
- Sputum smear was positive for AFB in 5 out of 40cases(13%)who had spontaneous expectoration and 1 out of 10cases(10%)of

induced sputum and AFB was negative for all the 10 cases with ADA<40IU/L.

- Sputum for CBNAAT was positive in 10 out of 54cases(19%) negative for AFB and 1 out of 10 cases(10%)with ADA<40IU/L negative for AFB
- Overall sputum examination for mycobacteria was positive in 17 out of 60cases(28%)

Table – 1- Gender Distribution In The Studuy

GENDER	CASES
Males	40
Females	20
Total	60

Table – 2 : Sputum For Acid Fast Bacilli(AFB) Results

Sputum Examination	Cases	AFB Positive	Percentage
Spontaneous Sputum	40	5	13%
Induced Sputum	10	1	10%

Table – 3 : Sputum For CBNAAT Results

Sputum Examination	AFB Negative	ADA<40 IU/L
Cases	54	10
CBNAAT Positive	10	1
Percentage	19%	10%

Table – 4: Overall Sputum Positivity For Mycobacteria In The Study

Cases	Sputum Positive for Mycobacteria	Percentage
60	17	28%

DISCUSSION

In the Indian context, where Tuberculosis is endemic, an exudative pleural effusion is considered as tuberculous in origin until proven otherwise.In the present study we evaluated the utility of microbiological examination of sputum specimens.In this study of 60 patients, 40(67%)are males and 20(33%%)females with sex ratio 2:1(M: F).The incidence of tuberculosis is more in males due to exposure to outdoor pollution, the presence of confounding factors like smoking, and migration to high prevalent areas.From this hospital based study we observed that the majority were within 30-50 years of age group.

As stated in literature and by WHO, TB commonly affects productive age groups and vulnerable populations. From all these study findings, including the present study, it can be emphasized that TB forms an unavoidable differential diagnosis among younger patients with pleural effusion.High lymphocyte predominance in exudative effusions favours tubercular etiology, which is further confirmed by ADA levels.The overall sputum positivity was 28% in the present study with AFB positive in 23%and sputum CBNAAT positive in 29% of cases.The present study has 83% of cases with ADA>40IU/L Kate et al[6] showed a high value of 93.33%.In the present study ADA > 40IU/L seen in 50 out of 60 TPE accounting to 83%. In A. LokeswaraReddy.et.al[5] study 88.3%, Modi et al[7] (81.93%)

In tuberculous pleural effusion routine posterio anterior (PA) and lateral radiography usually do not reveal any parenchymal lesion as opacity of pleural effusion conceals parenchymal lesion even if they are present.Conde et al prospectively evaluated the diagnostic yield of AFB smear in 84 cases with sputum smear positive in 10 cases.Prior attention for sputum smear examination has not been given due to the absence of apparent radiological lung parenchymal lesion in tuberculous pleural effusion.But with the changing scenario after advent of CT scan, sputum examination is relevant and our study also proves that From the sputum smear and CBNAAT examination results of our study it is evident that all patients of tuberculous pleural effusion even with no radiological lung parenchymal lesion need meticulous sputum examination for AFB smear and CBNAAT. Therefore, careful and thorough sputum examination may help as a diagnostic tool.Besides all cases of tuberculous pleural effusion are considered extra-pulmonary and in these cases routine sputum examination is not done.Most of the studies done focussed on sputum AFB smear,but this study also focussed on sputum CBNAAT in AFB negative cases and sputum in inconclusive cases of tb effusion with high clinical suspicion and this study can be said first of its kind.

CONCLUSION

1. Pleural effusions are the most commonly encountered disease in medical practice posing a diagnostic difficulty. In developing countries like India, TB is the most common cause of straw-colored exudative lymphocyte-predominant effusions.

2. Sputum examination either spontaneous or induced in cases of tuberculous effusion is simple,inexpensive and useful as indicator of infectiousness

3. Most of the studies done focussed on sputum AFB smear but our study also focussed on sputum CBNAAT in AFB negative cases which also showed positive results

4. Sputum examination also turned out to be diagnostic in cases where ADA<40IU/L but with high clinical suspicion of tuberculosis.

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