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Role of investigation in diagnosis of granulomatous pleural effusion

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Abstract---Background: Tuberculosis is second most common cause of pleural effusion. Chest pain, dyspnea, x-ray findings and clinical examination draw a suspicion of tuberculosis but clinicians need reliable and low cost tests todiagnose tuberculosis in pleural effusion. Method: 41 samples of clinically known tuberculous pleural effusion were taken in one year. All samples were tested by ziehlneelsen staining, adenosine deaminase, routine microscopy, and polymerase chain reaction. Results are analysed. Conclusion: It has been found, although PCR is highest sensitive and specific tool but due to high cost and unavailability at many facilities, combination of ADA and R/M can be done to diagnose tuberculous pleural effusion, which will decrease the cost and time for diagnostic tests.

Keywords---tuberculosis, pleural effusion, PCR.

Introduction

Pleural effusions are very common nowadays. Can occur in a variety of diseases like pneumonia, congestive heart failure, dengue shock, lung cancer, pulmonary embolism and tuberculosis.[1] Pleural effusion is pathological collection of fluid in pleural cavity i.e. between parietal and visceral pleura of lung. Pleural effusion can be of two types – transudative and exudative. Transudative is basically due to lo protienemias while exudative is due to infections and carcinomas. It can be presented as chest pain, dyspnea, dry cough, opacity on x-ray, dullness on percussion. A pleural rub may also be present.[2] Tuberculosis is the major cause of pleural effusions termed as tuberculous pleurisy. In endemic areas like India, tuberculosis is prevalent but it's diagnosis is still challenging. Because AFB culture takes days to result and many patients need treatment as early as possible.[3]

Materials and Methods

Clinically suspected patients who have suggestive history, positive examination findings and radiological evidences of tuberculosis with age above 18 were included in the study for one year from August 2021 to July 2022. Both OPD and IPD patients are included. Informed consent taken from patients. After permission of ethical committee samples of pleural effusion collected by pleural tapping and examined in microbiology laboratory. Aliquots sent to biochemistry and pathology department for protein, sugar and cell counts respectively. ZN staining done for all samples after centrifugation. All samples were tested by TB PCR genexpertmolbio to detect Mycobacterium tuberculosis nucleic acid. Results of above tests were analyzed.

Results and Discussion

It has been found that middle aged male has a preponderance to develop tuberculous pleural effusion. Jain j et al also observed similar findings in their study. All 41 samples were negative for acid fast bacilli in ZN staining ,[4] Yi-Chun Lai et al. also conclude with the low output of ZN smears,may be due to low bacterial load. Routine microscopy and biochemistry revealed 29 samplesas exudative with raise lymphocytes counts, suggestive of tuberculosis. A.H. Diacon et al. study goes in favour of our findings. Adenosine deaminase test results declared ADA levels > 40 IU/ml in 32 samples and > 60 IU/ml in 24 out of 32 samples. Vorster et al. and Zhai et al. found the same result in view of ADA. It is seen that the higher the ADA value the diagnosis goes in favour of tuberculous pleural effusion.[5] KanZhai et al. and Aggarwal AN et al. found the similar interpretation from their study. PCR for TB was positive in 38samples.[6,7,8,9] Chawla K et al. study about PCR concluded the same results as seen in our study.

Table 1
Shows gender and age distribution

Age/Gender	Male	Female	Total
18- 30	04	01	05
31-40	09	06	15
41-60	11	08	19
61-80	01	01	02
Total	25	16	41

Table 2
Shows results of tests done

Tests	ZN	R/M	ADA	PCR
Positive	0	29	32	38
Negative	41	12	09	03
Total	41	41	41	41

Conclusion

Based on this study male of middle aged male are more prone to develop pleural effusion in tuberculosis. The fact that middle aged man has higher exposure of outside than females due to their jobs make them vulnerable for tuberculosis. ZN staining has low sensitivity in detection of tuberculosis as > 10,000 bacilli/ ml needed for smear positivity. TB PCR test is proven as highest sensitive and specific tool in diagnostic tests for tuberculosis in pleural effusions. But its high cost and unavailability everywhere makes it difficult to apply on every patient. As far as ADA and Routine microscopy and biochemistry are concerned these tests have their own place because of lower cost and availability at most of centres. We can draw an inference from this study that the combination of ADA and Routine microscopy and biochemistry are emerged as a substitute of PCR to diagnose tuberculous in pleural effusion.

Informed Consent

Written informed consent was taken from patients.

Ethical Approval

Ethical committee approval was taken from the Institutional Committee of Ethics, VIMS (VIMSE/2022/12-95).

Source of funding

Funding source was self.

Conflict of interest

There was no conflict of interest.

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