ORIGINAL ARTICLE

Validity of Ca-125 in the Diagnosis of Pulmonary Tuberculosis Using Positive Sputum Culture for Mycobacterium Tuberculosis as Gold Standard

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ABSTRACT

Aim: To determine the diagnostic accuracy of Cancer antigen 125 (CA-125) for establishing the diagnosis of pul. TB taking AFB test as gold standard.

Methods: This validation study was conducted from February, 2018 to August, 2018. Sample size of 204 cases was taken for analysis. Data of patients of age 15 to 17 years of pulmonary tuberculosis by positive sputum culture were included. Blood samples were taken from all patients for determination of CA-125 levels. CA-125 >25 U/ml was used as cut-off to diagnose pul. TB. 2×2 table was used for calculation of diagnostic accuracy of CA-125 levels.

Results: Mean age of patients was 41.68±13.84 years. Out of 204 patients, 108 (52.94%) patients were male and 96 (47.06%) patients were female. CA-125 for pulmonary tuberculosis showed 86.6% sensitivity, 75% sensitivity, 94.9% positive predictive value, 51% negative predictive value and 84.8% diagnostic accuracy.

Conclusion: Serum CA-125 level can play any important role in rapid diagnosis of pulmonary tuberculosis, with good diagnostic accuracy. CA-125 levels can prove a valuable tool for diagnosis of pul. TB in patients having suspicion of pul. TB and have negative ABF staining results.

Keywords: Pulmonary tuberculosis, Cancer antigen 125, Diagnostic Accuracy.

INTRODUCTION

Pulmonary tuberculosis (Pul. TB) is a contagious bacterial infection that effects the lungs[1]. TB is among the highest mortality disease worldwide[2]. In spite of huge development and funding of TB programs, it is still estimated that in one third of patients proper screening and treatment is not done.[3] Almost 95% cases of pul. TB occur in developing world and nearly 12 million cases are co-infected with HIV as well, especially in people belonging to Asia and Africa[4].

Microscopic examination after acid-fast bacillus (AFB) stained is currently the gold standard test establishing the diagnosis of pul. TB[5]. However, in some patients, AFB stains are negative, or proper respiratory specimen is not given, resulting in under-diagnosis. In these patients other methods i.e. biochemical markers are used to diagnose pul. TB.[6,7] Cancer antigen-125 (CA-125) levels have been proposed as valuable tool for detection of TB. CA-125 levels are also raised in women with ovarian cancer and in some other cancers such as lung, colon, pancreas, and endometriosis.[8-10] But in the absence of active malignancy are valuable for detection of TB. So CA-125 can be used for validating the diagnosis of pul. TB[11,12+.] The present study is designed to determine the diagnostic accuracy of serum CA-125 levels for establishing the diagnosis of pulmonary TB taking AFB test as gold standard.

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METHODS

This validation study was conducted in the department of pulmonology and chemical pathology of Multan medical and dental college. Study was conducted from February, 2018 to August, 2018. Sample size of 204 cases was calculated with 95% confidence level, 10% margin of error and taking expected prevalence of pulmonary TB 67% with sensitivity 68.6% and specificity 77.8% of CA-125. Data of patients of age 15 to 17 years of pulmonary tuberculosis by positive sputum culture were included. Patients of extra-pul. TB, HIV seropositive patients, those having drug resistant pulmonary tuberculosis and active malignancy were excluded.A written consent was taken from patients by ensuring the confidentiality of their personal information. ERB approval was also taken. Blood samples were taken from all patients for determination of CA-125 levels. CA-125 >25IU/ml was used as cut-off to diagnose pul. TB.

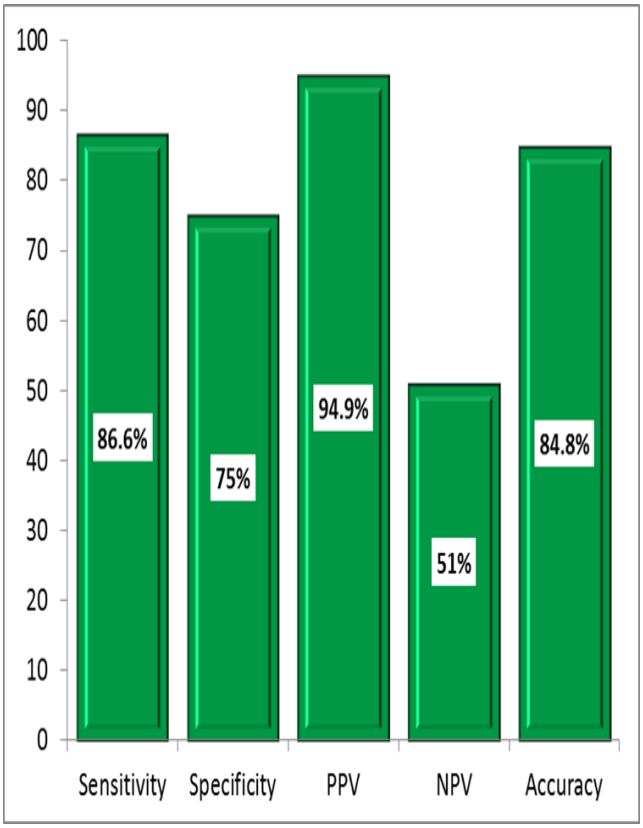
2×2 table was used for calculation of diagnostic accuracy of CA-125 levels. SPSS v23. was used for data compilation and analysis.

RESULTS

Mean age of patients was 41.68±13.84 years. 69 patients were in 15-33 years of age group, 94 patients were in 34-52 years of age group and 41 patients were in 53-70 years of age group. Out of 204 patients, 108 (52.94%) patients were male and 96 (47.06%) patients were female. CA-125

for pulmonary tuberculosis showed 86.6% sensitivity, 75% sensitivity, 94.9% positive predictive value, 51% negative predictive value and 84.8% diagnostic accuracy (Fig. 1). On CA-125 for pulmonary tuberculosis, 84 male patients had positive tuberculosis while 24 male patients had no tuberculosis and 73 female patients had positive tuberculosis while 23 female patients had no tuberculosis with insignificant p-value 0.769 (Table 1).

Fig. 1. Diagnostic accuracy of CA-125 for diagnosis of Pulmonary TB.



*Where **PPV**: positive predictive value, **NPV**: negative predictive value*

Table 1: Pulmonary TB by CA-125 in different gender of patients.

Gender	Pulmonary TB by CA-125	
	Yes	No
Male	84 (77.8%)	24 (22.2%)
Female	73 (76.0%)	23 (24.0%)

P value 0.769

DISCUSSION

It is now clearly established that conventional methods of pul. TB diagnosis have some limitations. They major factors of in-appropriate results are improper samples, inappropriate handling of specimens during AFB staining, PCR analysis and biochemical analysis tests. So researchers are now looking for more accurate diagnostic tests to diagnose pul. TB[6,7].

Taking all above in view, the present study was conducted to prospectively evaluate the role of CA-125 antigen in the diagnosis of tuberculosis.In our study, CA-125 for pulmonary tuberculosis showed 86.6% sensitivity, 75% sensitivity, 94.9% positive predictive value, 51% negative predictive value and 84.8% diagnostic accuracy.

Mohammad et al. conducted a study on 80 patients, having active pul. TB, pneumonia and healthy adults. They found significant difference CA-125 levels in these three category patients. At a cut-off value of 21.05 U/ml, the sensitivity of CA-125 was 82.5%, specificity 72.5% and diagnostic accuracy was 82.5%[13].

A study by Rajasekhar TS reported that CA-125 at cut-off value of 34.6 U/ml is 79.3% sensitive and 91.30% specific for diagnosis of active pul. TB[14].

Another analysis by Aoki et al. concluded that at a cut-off value of 35 U/ml, CA-125 has 100% accuracy, 75.0% sensitivity, and 84.0% specificity for diagnosis of active Pul. TB.

Aoki et al. reported that CA-125 >35 IU/mlis 100% sensitive, 75% specific,and has accuracy of 100% for diagnosis of pulmonary tuberculosis[15]. Nagasa et al. concluded that CA-125 can be effectively used for the diagnosis and treatment response of pul. TB[16].

Another study by Kim et al. compared CA-125 levels in patients of pul. TB and those having other lung disease other than TB. The authors found higher levels of CA-125 in pul. TB group as compared to the other disease group KIM18[17].

Fortun et al. compared 25 patients of pul. TB with 54 patients of pulmonary infections. The authors reported mean CA-125 levels of 104±36.1 U/ml in TB group and only 27±19 U/ml in infections group. they reported that cut-off value of 32.5 of CA-125 can sufficiently diagnose pul. TB[18].

CONCLUSION:

Serum CA-125 level can play any important role in rapid diagnosis of pulmonary tuberculosis, with good diagnostic accuracy. CA-125 levels can prove a valuable tool for diagnosis of pul. TB in patients having suspicion of pul. TB and have negative ABF staining results.

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