

ROLE OF GENEXPERT IN DETECTING MTB IN BAL FLUID FROM SPUTUM-NEGATIVE PULMONARY TB SUSPECTS

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ABSTRACT

BACKGROUND

In India, tuberculosis remains a major public health problem with high mortality and contributing significantly to world tuberculosis burden. Early diagnosis still remains a challenge and GeneXpert, a molecular test helps in detecting tuberculosis as early as within two hours. In the present study, role of GeneXpert for detecting MTB (mycobacterium tuberculosis) in bronchial lavage of tuberculosis suspects has been reported. Total 36 cases were reported and GeneXpert is found to be positive for MTB in 22 cases and compared with direct smear and cultures of BAL (bronchoalveolar lavage) fluid for MTB.

MATERIALS AND METHODS

A total of 36 suspected TB (tuberculosis) cases were studied between 2015 to 2016 at Bhaskar Medical College. GeneXpert test was conducted for detecting MTB using real-time PCR technique along with direct smear and culture test for both male and female patients.

RESULTS

GeneXpert in BAL was positive for MTB in 22 cases, whereas direct smear was positive in 11 cases and cultures were positive in 32 cases.

CONCLUSION

The present study suggests that GeneXpert test is very effective and rapid test for detection of MTB in clinically and radiologically suspected cases of tuberculosis. GeneXpert is a good diagnostic test for tuberculosis suspects. The detection rate in BAL is superior to direct smear and then it detects MTB very early compared to cultures, which remains the gold standard diagnostic modality.

KEYWORDS

TB, GeneXpert, PCR and BAL.

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BACKGROUND

India is the leading country among six countries that account for 60% of new TB cases in the world.¹

Tuberculosis remains a major health problem with significant mortality and contributes to 23% of the world TB burden.²

The key to diagnosis remains early diagnosis and completion of treatment. Sputum is positive in only 30% of pulmonary tuberculosis suspects.^{3,4} Bronchoscopy with BAL has helped in diagnosing sputum-negative tuberculosis suspects.

The GeneXpert is a molecular method of diagnosing tuberculosis suspects within two hours and the yield is better than with direct smear of BAL for MTB.⁵ It is less cumbersome and can be done with less manpower.

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AIMS AND OBJECTIVES

It is a useful test in the diagnosis of tuberculosis.⁶ The additional benefit provided is detection of drug resistance to rifampicin. In this study, the role of GeneXpert in diagnosis of tuberculosis suspects and its comparison with direct smear of BAL for MTB and MTB cultures from BAL was done.

The MTB cultures for diagnosis of tuberculosis still remains the gold standard for diagnosis of tuberculosis, but takes longer periods (six weeks - solid media) for results.⁷

The sputum GeneXpert MTB/RIF assay has similar sensitivity, specificity and accuracy as culture on solid media for mycobacteria.⁸

MATERIALS AND METHODS

The study included 32 cases of clinically and radiologically suspected pulmonary tuberculosis admitted to BMC (Bhaskar Medical College) Hyderabad between August 2015 and July 2016.

The cases selected were between the age group of 20-65 years fresh smear negative cases, clinically and radiologically suspected of tuberculosis were selected in this study. The three sputum samples for MTB were negative.

Inclusion and Exclusion Criteria

Fresh smear negative case was a case with 3 sputum samples negative for MTB and did not receive any antituberculous treatment before.

A radiological suspect was a case with radiological criteria of tuberculosis and a confirmed case of tuberculosis was one with MTB grown on culture media.

Bronchoscopy was done after careful selection of cases fit for the procedure.

The procedure was done under local anaesthesia and mild sedation and BAL was collected from the diseased lobe and segment seen on chest x-ray and sent for analysis. BAL was centrifuged, processed and subjected for directed smear for MTB, GeneXpert and MTB cultures on LJ medium.

A confirmed case of tuberculosis was one with MTB grown on culture media.

Direct smear was examined with ZN stain for MTB. For GeneXpert the sediment was processed and DNA extracted and amplified with polymerase chain reaction.

The specific genes for detection of MTB were targeted and genes for rifampicin resistance were also detected if present.

The procedure required minimum manpower with results available within 2 hours.

The real time PCR system used was a closed system with minimum concerns for contamination.

RESULTS AND DISCUSSION

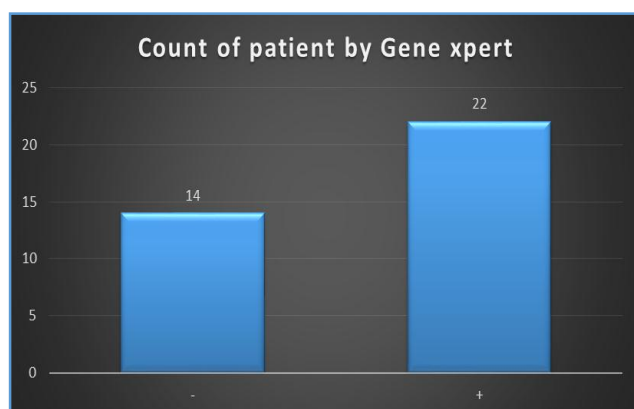


Figure 1

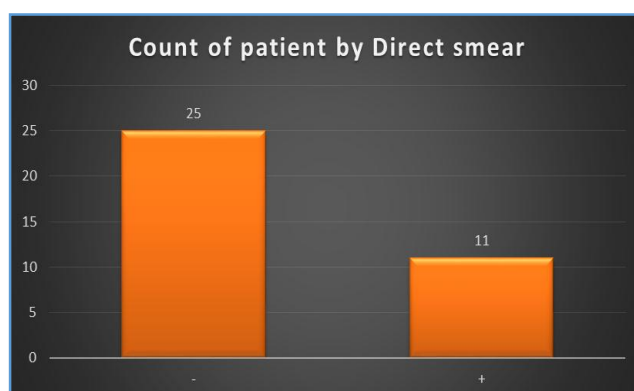


Figure 2

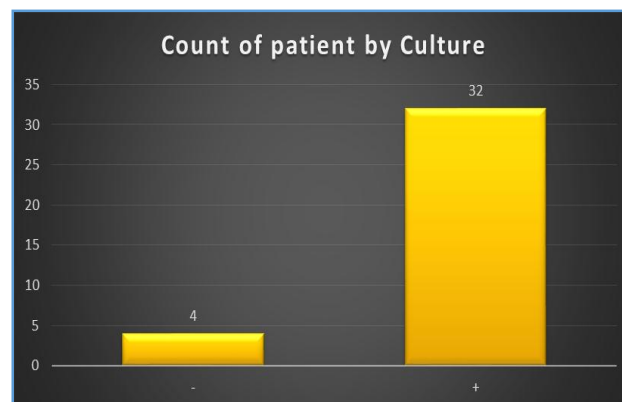


Figure 3

Figure 1, 2 and 3 presents the data on different cases of GeneXpert in bronchial washings out of 36 cases considered. In 22 cases, GeneXpert is found to be positive. In case of direct smear, 11 cases were reported to be positive, whereas in culture test the positive cases were found to be 32 cases, even though cases are identified more in culture when compared to GeneXpert. It requires six weeks for results, whereas GeneXpert gives results on the same day. Earlier study shows that the GeneXpert for MTB in BAL fluid has been found to be positive in 48.6%.⁹ The present study shows that in 25 cases, direct smear was found to be negative, but in GeneXpert was negative cases in 14 cases. This shows that the GeneXpert in BAL plays a vital role in diagnosing TB patients as compared with that of direct smear for MTB in BAL. Cultures remain the gold standard test for diagnosis of MTB, but takes long time for results.

CONCLUSION

GeneXpert is a good diagnostic test for tuberculosis suspects. The detection rate in BAL is superior to direct smear and then it detects MTB very early compared to cultures, which remains the gold standard diagnostic modality.

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