Comparision of Direct Detection of *Mycobacterium tuberculosis* Complex by Gen Probe and Culture for the Diagnosis of Abdominal Tuberculosis

Deepinder Kaur, Kanwal Deep Singh, Veenu Gupta, Rama Gupta, Jaspreet Kaur, Charu Arora

Department f Microbiology,
Dayanand Medical College & Hospital, Ludhiana

ABSTRACT

Abdominal tuberculosis is a most common type of extra-pulmonary tuberculosis. Abdominal tuberculosis can occur primarily or it can be secondary to a tubercular focus elsewhere in the body. A total of 153 samples (gastrointestinal biopsies and ascitic fluid) were processed and direct microscopy, culture and Amplified *Mycobacterium Tuberculosis* Direct Test (AMTDT) were performed. Comparative analysis of the results was done. The overall positivity by culture was 1.3% and by AMTDT was 5.2%.

INTRODUCTION

Tuberculosis is an infectious disease caused by *Mycobacterium tuberculosis (M. tuberculosis).* The disease primarily affects the pulmonary system but it can affect any organ system of the body including the gastrointestinal system. The extrapulmonary tuberculosis involves 11-16% of all patients of tuberculosis out of which 3 to 4% belong to abdominal tuberculosis.[1] Tuberculosis can involve any part of the gastrointestinal tract and is the sixth most frequent site of extrapulmonary involvement.[2] It can affect peritoneum, omentum, mysentery and its lymph nodes and other abdominal organs. Abdominal tuberculosis can mimic a variety of other abdominal conditions/diseases and only a high degree of suspicion can help in the diagnosis otherwise it is likely to be missed or delayed resulting in high morbidity and mortality. Early diagnosis and prompt treatment of abdominal tuberculosis is vitally important as it greatly reduces disease and treatment related morbidity and even mortality in extreme cases. The conventional methods used for diagnosis of abdominal tuberculosis are either time consuming [eg. culture on Lowenstein-Jensen (LJ) medium] or have low sensitivity (Ziehl-Neelsen (ZN) staining]. The newer molecular modalities like Amplified *Mycobacterium Tuberculosis* Direct Test (AMTDT) can provide prompt results within 4 – 6 hours and can help guide the clinician in reaching the accurate diagnosis. This can save the patients from a lot of pathological changes and co-morbidities that can occur during the long and insidious progression of the disease. We processed the abdominal samples from suspected cases of abdominal tuberculosis using conventional and molecular techniques and evaluated the results.

Corresponding Author :

Dr. Deepinder Kaur,
Professor & Head,
Department of Microbiology,
Dayanand Medical College & Hospital, Ludhiana
Mobile No.: 9872890032
Email : deepiderchhina@rediffmail.com

MATERIALS AND METHODS

Biopsies from gastrointestinal tract and ascitic fluid samples obtained aseptically from clinically suspected cases of abdominal tuberculosis, received in the department of Microbiology were included in the study. Biopsies were homogenized with sterile saline in pre-sterilized tissue grinder and ascitic fluid samples were centrifuged at 10,000 rpm for 20 minutes. Homogenized tissue sample and deposit of ascitic fluid was subjected to decontamination using the NALC-NAOH technique. From the decontaminated samples, ZN staining was performed and culture was done on LJ medium and AMTD test was performed using AMTD kits obtained from bioMerieux India Pvt. Ltd. All culture bottles were examined for the first 7 days and the twice weekly till 8 weeks before labeling them as negative. Any growth resembling that of M. tuberculosis was confirmed using ZN staining. AMTDT was performed as per

manufacturer's recommendations. Results were given in relative light units. Cut off value for positive cases was taken to be $\geq$ 500,000 RLU and value below 30,000 was labeled as negative. [3,4]

RESULTS

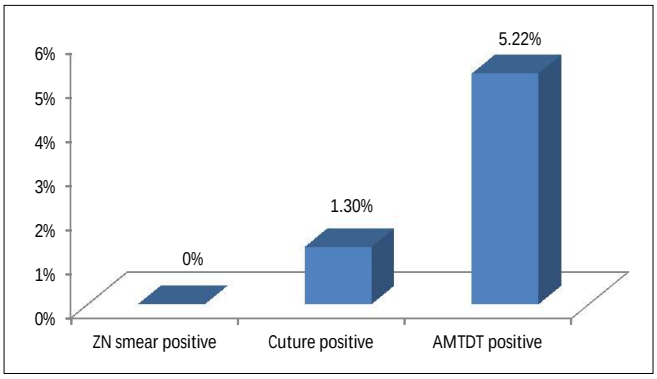
A total of 153 samples (GIT biopsy, Ascitic fluids, pancreatic tissue) were included in the study. Two samples showed growth of *M. tuberculosis* while 8 samples were positive for *M. tuberculosis* complex by AMTDT. The overall positivity by culture was 1.3% and by AMTDT was 5.2%. All ZN smears were negative for acid fast bacilli. Both culture positive samples were positive by AMTDT. Out of the total positive cases obtained by AMTDT, 50 % patients were males and 50 % were females. The most common age group affected was 31 – 40 years.

DISCUSSION

The diagnosis of mycobacterial infections remained practically unchanged for many decades.[5] The Amplified Mycobacterium Tuberculosis Direct Test (AMTDT) detects specific Mycobacterium Tuberculosis RNA by using an isothermal transcription-mediated amplification method. AMTDT has been shown to be a sensitive, specific and rapid method for detecting M. tuberculosis in clinical samples.[6]

The yield of organisms on smear and culture is low. Staining for acid fast bacilli is positive in less than 3 per cent of cases. A positive culture is obtained in less than 20 per cent of cases, and it takes 6-8 wk for the mycobacterial colonies to appear.[2] In literature, there is lack of data on comparision of microscopy, culture and AMTDT for diagnosis of abdominal tuberculosis.

In our study, none was positive by direct microscopy.



Similarly in a study by Gamboa et al also none of the sample was positive on microscopy.[7] In contrast 5.6% and 8.3% of the extra pulmonary samples were positive by direct microscopy in various studies.[8,9]

Culture positivity was 1.3% in our study. Higher positivity (5.6%, 13%) on culture was seen in some other studies on extrapulmonary specimens.[8,9]

In our study, 5.2% were positive by AMTDT while higher positivity was seen in a study by Piersimoni *et al* (12%) 8 and Thangappa *et al* (36.7%)[9]. Another study had higher positivity of 64.5% on ascitic fluids by both culture and AMTDT.[7]

To conclude in our study AMTDT is superior to culture in diagnosing abdominal tuberculosis.

REFERENCES

1. Sharma SK, Mohan A. Extrapulmonary tuberculosis. Ind J Med Res 2004;124:316-53.
2. Sharma MP, Bhatia V. Abdominal tuberculosis. Indian J Med Res 2004;120(4): 305-15
3. Miller N, Sandra G, Hernandez, Cleary TJ. Evaluation of Gen-Probe Amplified *Mycobacterium Tuberculosis* Direct Test and PCR for direct detection of *Mycobacterium Tuberculosis* in clinical specimens. J. Clin. Microbiol. 1994;33(2):393-7.
4. Kerleguer A, Fabre M, Bernatas JJ, Gerome P, Nicand E, Herve V et al. Clinical evaluation of the Gen-Probe Amplified *Mycobacterium Tuberculosis* direct test for rapid diagnosis of tuberculosis lymphadenitis. J Clin. Microbiol. 2004;42(12): 5921-2.
5. Tortoli E, Palomino JC. New Diagnostic Methods. In: Palomino JC, Leao SC, Ritacco V editors. Tuberculosis. 1st edition. 2007;441-86
6. Piersimoni C, Scarparo C, Piccoli P, Rigon A, Ruggerio G, Nista D, Bornigia S. Performance assessment of two commercial amplification assays for direct detection of *Mycobacterium Tuberculosis* complex from respiratory and extrapulmonary specimens. J. Clin. Microbiol. 2002;14(5): 4138-42
7. Gamboa F, Manterola J M, Vinado B, Matas L, Gimenez M, Lonca J et al. Direct detection of *Mycobacterium Tuberculosis* Complex in Nonrespiratory Specimens by Gen-Probe Amplified *Mycobacterium Tuberculosis* Direct Test. J Clin. Microbiol 1997;(1):307-10.
8. Piersimoni C, Callegaro A, Scarparo C, Penati V, Nista D, Bornigia S *et al*. Comparative Evaluation of the New Gen-Probe *Mycobacterium Tuberculosis* Amplified Direct Test and the Semiautomated Abbott LCx Mycobacterium tuberculosis Assay for Direct Detection of Mycobacterium tuberculosis Complex in Respiratory and Extrapulmonary Specimens. J. Clin. Microbiol, 1998,3601–4.
9. Thangappah R.B.P., Paramasivan C.N, Sujatha Narayanan. Evaluating PCR, culture & histopathology in the diagnosis of female genital tuberculosis Indian J Med Res. 2011;134(1): 40–6.