The present preliminary report emphasizes that sputum samples of suspected cases of TB can be collected in the field setting and examined for AFB, culture and PCR testing. PCR test using IS6110 insertion does help as a rapid and ancillary test for diagnosis and monitoring treatment for TB. Any other target for detection of DNA sequence of M tuberculosis can also be used.

I. INTRODUCTION

India accounts for more than a third of the global burden of tuberculosis (TB). With the spread of HIV infection worldwide TB has emerged as one of the most common diseases causing dual infection in the HIV infected and has assumed greater importance. Identification of these cases and their successful treatment is posing a great challenge to the health services. We report here the preliminary experience of detection and treatment of pulmonary tuberculosis in Ghatampur tehsil of District Kanpur, Uttar Pradesh.

II. STUDY AREA

The Ghatampur area is situated about 280 KM from Agra and approximately 40 KM from Kanpur. This is one of our field areas for leprosy research of our Institute under the Indian Council of Medical Research (ICMR) and also of Department of Biotechnology (DBT), New Delhi. The population, approximately 29,000, residing in this rural area was mostly engaged in agriculture and dairy related activities. We report here the results of screening of about 40% of this population for prevalence of pulmonary tuberculosis.

III. METHODOLOGY

Field staff was recruited from the local area and given a short training of identification and treatment of TB in the field. They were attached to the para-medical workers working in the area who were also specially trained for detection and treatment of TB. One para-medical worker and one field worker formed a team and visited the field together on two wheelers. All patients with persistent fever of 3 or more weeks, persistent cough of 3 or more weeks, loss of weight, night sweats and history of haemoptysis were screened.

Two hundred and fifty symptomatics were picked by the field staff in a population of about 7,500. They were all examined by the medical officer and suspected cases were given a course of antibiotics for 1 to 2 weeks and again examined subsequently. Cases in whom the symptoms did not resolve after the course of antibiotics, were examined again and clinical sign and symptoms noted. Sputum was collected in sterile containers containing N-acetyl pyridium chloride as preservative and transported to Central JALMA Institute for Leprosy (CJIL), Agra for acid fast bacilli (AFB) examination, culture for mycobacteria on Lowenstein Jensen media and PCR using IS 6110 insertion. X-ray examination was done for each of the patients by transporting them to Ghatampur. Another sputum sample was collected and examined as earlier. The clinical findings, X-ray and sputum results for AFB and PCR were tabulated and discussed with consultant. Patients in whom the diagnosis of TB was made were put on Directly Observed Treatment Course (DOTS) therapy. Doubtful cases were examined by the consultant by visiting the field. Random checking of the suspected TB cases was also done by the consultant periodically, for reconfirmation of diagnosis and monitoring the response to therapy.

The field investigator visited the field every alternate day and gave the supervised DOTS-4 treatment for 2 months. After 2 months the patients were again examined in detail, sputum, collected in the same manner and sent for AFB examination, PCR and culture. Depending on the response to therapy the patients were then given DOTS-2 for a further 4 months. During this period depending on the response to treatment, attitude of the patient and his/her relatives, one weeks dose of DOTS-2 or any of the above alternative therapies was given to the patient, during his weekly or earlier visits. The number of empty foils were counted, family or other persons consulted and further doses given accordingly. The doctor visited the field and randomly examined the patients intermittantly. After completion of 6 months of DOTS therapy, the patient was re-examined. X-ray, sputum for AFB, PCR were repeated and treatment stopped after discussing the findings with the consultant.

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IV. RESULTS

Using the above criteria, 51 patients of pulmonary tuberculosis (TB) were diagnosed and put on DOTS-4 treatment. One of the patients refused DOTS therapy. All persuasion by us, our consultant, village pradhan, his family members, fellow villagers getting treatment could not persuade him to restart the treatment. The rest of the patients took DOTS regularly. None of the patients had any serious side effects to the drugs. Minor complaints like abdominal discomfort, nausea, irritability, passage of red coloured urine, etc were noted in a few patients. They were explained the advantages of taking the full treatment and were persuaded to take the drugs regularly.

Twenty of the patients were females and the remaining 31 males, all between 15 to 70 years in age. Twenty-eight of these patients gave history of taking some sort of anti-TB treatment for varying duration in the past 10 years. They had discontinued the treatment due to economic and other reasons.

Nineteen persons were AFB positive at the start of therapy (37%). The rest of the 32 patients had radiological and clinical evidence of active pulmonary TB and were put on DOTS therapy. All the 19 AFB positive cases and twenty-four of the 32 AFB negative patients were PCR Positive (84%). Four cases were still AFB positive after completion of 2 months DOTS-4 therapy and were continued on DOTS-4 therapy for another one month. Two among these were sputum positive, while the other 2 were sputum negative, earlier. The latter patients were also suffering from chronic bronchitis and asthma. The results of the sputum culture reports are being processed.

After 2 months of DOTS-4 therapy, PCR positivity was observed in 10 of the 25 cases tested (40%). These included all the 4 AFB positive cases detailed above. Three patients have completed DOTS therapy of 6 months. None of these patients are sputum positive and PCR positive after completion of therapy.

V. DISCUSSION

This is a preliminary report of study of a small population of patients undertaken in a rural area. Difficulties have been faced in reaching these far off areas but these were overcome by training and recruitment of local youth and reaching these areas by the help of two wheelers. Due to these constraints we were unable to collect 3 samples of sputum in 24 hours, as is recommended by the Tuberculosis Control Programme. We collected one sputum sample from the patient in his/her residence and the other sample was collected when the patient was brought to Ghatampur for radiological examination. After seeing the results of this small study it now appears that 3 samples should have been collected with a little more effort and input. Further the study shows that sputum can be transported and analysed satisfactorily by collecting it in sterile containers containing a very small amount of N-cetyl pyridium chloride as preservative. Transportation of these samples does pose a problem. It is not accepted by routine courier agencies, as it contains infective biological material, and has to be carried personally. This may be overcome by educating the concerned agencies about the precautions required and then paying a higher cost for their services.

The ratio of number of smear positive cases detected and the number of smear negative cases at the start of therapy is approximately 1:1.7 in the present series. Ideally this should be 1:1 in well run programmes. This is probably so, as some of the sputum positive cases were missed because of lesser number of times the sputum could be collected in 24 hours, and/or because a large proportion of patients had a lower load due to earlier incomplete treatment. Moreover, in this area, the population on the whole is very fond of tobacco and ‘gutka’ and start eating it from childhood. Most of the cases were invariably chewing this, when examined. They were asked to throw out the mouth contents, wash their mouth and then give the sputum for testing. This could lead to collection of saliva instead of sputum and therefore wrong results. It was also observed in case of two patients, that they were not sputum positive earlier, but found to be sputum positive after 2 months of DOTS therapy. These patients were also suffering from chronic bronchitis, asthma and secondary infection. Overwhelming secondary infection could have rendered it difficult to detect AFB. Many of the culture reports are still unavailable and hence comparison of diagnostics could not be done.

IS 6110 insertion was used for PCR testing of sputum for DNA of M tuberculosis. This has been found to be a specific as well as sensitive maker of TB by various workers. The present study shows that the test can be successfully done in samples collected from the field and also corroborates with the bacteriological and clinical findings. PCR positivity was seen in 84% of cases at the time of diagnosis of pulmonary TB. Some of the affected patients were AFB negative, had treatment earlier, and had a low load of bacilli. The PCR results were negative possibly as a consequence. Lesser number of sputum samples examined at the start of therapy, or testing of salivary secretions instead of sputum, could also be contributory.
After 2 months of DOTS-4 therapy, 40% of the samples were still positive. This is not unexpected as DNA of the organism continues to be expectorated out even after death of the organism. Although only three cases completed the 6 months of DOTS therapy, none of them were either bacteriologically or PCR positive at the end of therapy.

The present preliminary report emphasizes that sputum samples of suspected cases of TB can be collected in the field setting and examined for AFB, culture and PCR testing. PCR test using IS6110 insertion does help as a rapid and ancillary test for diagnosis and monitoring treatment for TB. Any other target for detection of DNA sequence of M. tuberculosis can also be used.

SUGGESTED READING


