

EPIDEMIOLOGICAL & OPERATIONAL RESEARCH

Completed studies

Spoligotyping *M.tuberculosis* isolates from Tiruvallur district

[Funded by United States Agency for International Development (USAID) through the WHO under the Model DOTS Project]

Background

The last decade has seen a dramatic resurgence in the incidence of TB throughout the world and an increased need for more rapid methods to diagnose and prevent dissemination of this disease. Spoligotyping, a method for simultaneous detection and typing of *M. tuberculosis* complex bacteria, has been recently developed. The clinical usefulness of spoligotyping is determined by its rapidity, both in detecting causative bacteria and in providing epidemiologic information on strain identities.

The SpolDb4 defines 22 lineages and sub lineages. The previously defined Central-Asian (CAS) lineage has been split into CAS1-Delhi type (ST26) found mainly in the Indian subcontinent and CAS1-Kilimanjaro (ST21) found in Tanzania. Within the East-African-Indian (EAI) lineage, new prototypic spoligotyping-signatures for four sub lineages are presented (EAI2-Nonthaburi, EAI6-Bangladesh/1, EAI7-Bangladesh/2 and EAI8-Madagascar). The EAI2 clade has been designated as the "Manila family". EAI3 and EAI4 are now being shown as phylogeographically specific from India and Vietnam respectively, with suggested designations of EAI3-IND and EAI4-VNM.

Two new lineages from Bangladesh are found, designated as EAI6-Bangladesh/1 (58.1% of isolates from Bangladesh) and EAI7-Bangladesh/2 (91.2% of isolates from Bangladesh). EAI6-BGD1 harbours specificity for the eastern part of the South Asian region since it is also found in neighbouring Myanmar (results not shown).

Aim

- To analyse our spoligotyping data with the newly available classification

Results

Out of the 2000 samples, 1757 isolates were available for spoligotyping. Tables 10A & 10B gives the details of spoligotype distribution in Tiruvallur district that was analyzed using SpolDb3 and SpolDb4 data bases respectively.

The orphan strains correspond to 30.6% and EAI3_IND correspond to 28.9%, followed by EAI5 19 %. EAI6_BGD1 and EAI1_SOM were 5.2 and 4% respectively.

Conclusions

The initial 1362 samples analyzed by SpolDb3 database using Spotclust software showed an equal predominance of EAI 3 and EAI 5 spoligotypes. But our recent analysis using the spolDb4 database has shown that EAI3_IND is 28.9% (reduced by 10%) due to single spot variations. The earlier percentage of EAI 5 (19%) was changed to 21% due to reclassification into EAI1_SOM, EAI6_BGD1, EAI5 or EAI3, EAI2_MANILLA, MANU1 and EAI undefined.

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Ongoing studies

Epidemiological impact study: disease survey

[Funded by United States Agency for International Development (USAID) through the WHO under the Model DOTS Project]

Background

Directly observed treatment short course was implemented in Tiruvallur district of Tamil Nadu in May, 1999. In order to assess the epidemiological impact of DOTS strategy, TRC is carrying out a series of sample surveys with 2½ years duration between surveys to estimate the prevalence of TB disease in this district, covering a population of 5,80,000.

Aim

- To study the trends over time for disease occurrence and thereby to measure the impact of DOTS strategy in this region

Methods

All adults \geq 15 years included for the disease survey were screened by two screening methods namely, elicitation of symptoms and chest X-ray examination. Two sputum specimens were collected from those who were either symptomatic and/or having abnormal chest X-ray suggestive of TB. These specimens were processed for smear and culture, and those who became bacteriologically positive were referred for ATT if they satisfied the RNTCP guidelines.

Results

Three serial disease prevalence surveys have already been completed. The fourth survey was started in June, 2006 and is in progress. Coverage in this survey was above 90% for all examinations namely symptoms, chest X-ray and sputum examination. The coverage upto the period March, 2009 is shown in table 11.

Table 11: Coverage for examinations – fourth survey (till March, 2009)

Activities	Number of individuals
Enumeration	1,07,521
Symptom screening	95,619
X-ray screening	95,270
Sputum eligible	11,270
Sputum collection	10,857

Three hundred and seventy four individuals were identified as cases through sputum examination either by smear, culture or both.

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One time prevalence survey

Background

The reduction in prevalence of TB over a period of 10 years in the Tiruvallur area is contributed by the impact of DOTS strategy and continuous active surveillance for TB in this area. In order to measure the impact due to DOTS strategy alone, a one time survey has been planned in the villages that are not covered by the impact survey, but which have been included in the original Bacillus Calmette Guerin (BCG) trial area.

Aim

- To measure the contributions of the prevalence survey itself and other confounders to the documented decline in prevalence

The sample size for this survey was estimated to be 54110 (entire population). The survey methodologies are the same as that of the epidemiological impact survey. So far, 19251 persons have been covered. The survey is in progress.

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Training activities

The TRC has set up a training and demonstration centre at Tiruvallur which is being used for training health workers deputed from various institutions in conducting disease and tuberculin surveys. The duration of training for disease survey lasts for one month, while it is two months for tuberculin survey. In the last two years, the epidemiology division at TRC has trained health workers in the conduct of the disease survey from the following institutes:

1. NTI, Bangalore
2. RMRCT, Jabalpur
3. MGIMS, Wardha
4. PGIMS, Chandigarh
5. AIIMS, New Delhi
6. JALMA, Agra

Likewise, health workers deputed by the following institutes were trained in conducting tuberculin survey:

1. LRS Institute, New Delhi
2. NDTB Centre, New Delhi
3. CMC, Vellore
4. MGIMS, Wardha

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