

Original Article

SOCIO-ECONOMIC FACTORS THAT INFLUENCE TUBERCULOSIS DEATH AMONG THE YOUTH AND MIDDLE-AGED POPULATION: A SYSTEMATIC REVIEW

Lisa KAWATSU and Nobukatsu ISHIKAWA

Abstract [Objective and Method] The number of tuberculosis (TB) deaths in Japan has decreased by 9% in the past 10 years. As of 2012, the death rate was 1.7 per 100,000 populations. Many studies have reported on the clinical factors associated with the number of TB deaths in Japan, and have identified aging to be a major cause of death among patients with TB. However, death among younger patients with TB is also a serious concern, and although several socio-economic factors have been suggested in the past, these studies have varied in methods and results. Therefore, we conducted a systematic review of previous studies that have focused on the association between TB death and socio-economic factors.

[Results] Our results revealed unemployment, education, history of homelessness, substance and alcohol abuse, and nationality to be risk factors for TB death.

[Conclusion] Many of these factors are markers of poverty, and in Japan too, various markers of socio-economic vulnerability have been suggested to have an influence on TB death.

These factors negatively affect patients' health-seeking behavior and thereby increase the risk of death. It is therefore necessary to encourage persons at risk of TB to seek early care by collaborating not only with public health and medical institutions, but also with welfare services, employment support services, and alcohol and drug support groups.

Key words: Youth, Middle-aged population, Tuberculosis death, Socio-economic factors, Systematic review

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Original Article

IDENTIFICATION OF MYCOBACTERIA BY MATRIX-ASSISTED LASER
DESORPTION-IONIZATION TIME-OF-FLIGHT MASS SPECTROMETRY— Using Reference Strains and Clinical Isolates of *Mycobacterium* —¹Katsunao NIITSUMA, ¹Miwako SAITO, ²Shizuko KOSHIBA, and ³Michiyo KANEKO

Abstract [Purpose and Methods] Matrix-assisted laser desorption-ionization time-of-flight mass spectrometry (MALDI-TOF MS) method is being played an important role for the inspection of clinical microorganism as a rapid and the price reduction. Mass spectra obtained by measuring become points of identification whether the peak pattern match any species mass spectral pattern.

We currently use MALDI-TOF MS for rapid and accurate diagnosis of inactivated reference and clinical isolates of *Mycobacterium* because of the improved pretreatment techniques compared with former inspection methods that pose a higher risk of infection to the operator. The identification matching rate of score value (SV) peak pattern spectra was compared with that of conventional methods such as strain diffusion/amplification. Also, cultures were examined after a fixed number of days.

Compared with the initial inspection technique, the pretreatment stage of current MALDI-TOF MS inspection techniques can improve the analysis of inactivated acid-fast bacteria that are often used as inspection criteria strains of clinical isolates. Next, we compared the concordance rate for identification between MALDI-TOF MS and conventional methods such as diffusion/amplification by comparison of peak pattern spectra and evaluated SV spectra to identify differences in the culture media after the retention period.

[Results and Discussion] In examination of 158 strains of clinical isolated *Mycobacterium tuberculosis* complex (MTC), the identification coincidence rate in the genus level in a matching pattern was 99.4%, when the species level was included 94.9%. About 37 strains of nontuberculous mycobacteria (NTM), the identification coincidence rate in the genus level was 94.6%.

M. bovis BCG (Tokyo strain) in the reference strain was judged by the matching pattern to be MTC, and it suggested that they are *M. tuberculosis* and affinity species with high DNA homology.

Nontuberculous mycobacterial *M. goodii* strain JATA 33-01 shared peak pattern spectra, excluding the isolates, with each clinically isolated strain. However, the mass spectra of

six *M. goodii* clinical isolates suggested polymorphisms with similar mass-to-charge ratios compared with those of the reference strains. The peak pattern spectra of the clinical isolates and reference strains, excluding the NTM *M. goodii* strain JATA33-01, were consistent with the peak pattern characteristics of each isolate. However, a comparison between the peak patterns of the reference strains and those of the six clinically isolated *M. goodii* strains revealed a similar mass-to-charge ratio, which may indicate few polymorphisms.

The SV spectrum of the improved inspection technique showed no fidelity, but it was acceptable after days of culture as indicated by the decrease in SV (0.3 degree). Also, the reproducibility of this method was good, but no difference was observed from the SV of the improved inspection technique, which decreased by approximately 0.3 because of the number of days of culture storage. In addition, expansion of the database and dissemination of regional specificity by genotype analysis of clinical isolates was relevant to the accumulated data, as expected.

In future studies, the relevance and regional specificity of clinical isolates by genotype analysis can be determined by stacking the solid media and database penetration.

Key words: Matrix-assisted laser desorption-ionization time-of-flight mass spectrometry (MALDI-TOF MS), Clinical isolates of *Mycobacterium*, Reference strains, Database

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TWO CASES OF PULMONARY *MYCOBACTERIUM AVIUM* COMPLEX DISEASE WITH RESISTANCE TO CLARITHROMYCIN

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Abstract We encountered 2 patients with pulmonary *Mycobacterium avium* complex disease in whom resistance to clarithromycin (CAM) was confirmed after treatment with rifampicin, ethambutol, and CAM. We evaluated the disease course in both patients. The deterioration of radiological findings was preceded by the acquisition of resistance to CAM in both cases. When symptoms of pulmonary MAC disease exacerbate, and radiological findings deteriorate, we should reconsider the type of treatment after determination of the minimal inhibitory concentration (MIC) of CAM for culture positive MAC strains.

Key words : Nontuberculous mycobacteria, Pulmonary

Mycobacterium avium complex disease, Clarithromycin, Broth-MIC NTM

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—————The 88th Annual Meeting Symposium—————

PROGRESS IN MANAGEMENT OF SEVERE TUBERCULOSIS OR TUBERCULOSIS WITH SEVERE COMPLICATION

Chairpersons: ¹Hiroshi KIMURA and ²Kazuyoshi IMAIZUMI

Abstract

1. The management and therapy of miliary tuberculosis: Nobuharu OHSHIMA (Asthma and Allergy Center, National Hospital Organization Tokyo National Hospital)

2. Treatment and management of severe pulmonary tuberculosis: Yuta HAYASHI, Kenji OGAWA (Department of Respiratory Medicine, National Hospital Organization Higashi Nagoya National Hospital)

Death of a young (non-elderly) patient may become a large psychological burden not only for patient's family but also for medical staff. We analyzed non-elderly cases with severe pulmonary tuberculosis by comparing 13 patients who died of tuberculosis in the hospital (death group) and 31 patients who survived and were discharged from hospital (survivor group). The mean age was older and there were more patients who were out of employment in the death group compared to the survivor group. Among the factors related to the general condition evaluated on the admission, disturbance of consciousness, respiratory insufficiency, impairment in the ADL, poor dietary intake, and decubitus ulcer were more observed in the death group. Chest X-ray finding was not a predictive factor of poor prognosis. Among the laboratory findings, the numbers of peripheral blood lymphocytes, red blood cells, and thrombocytes significantly decreased in the death group. Serum level of total cholesterol, cholinesterase, and albumin were also significantly lower in the death group, indicating that malnutrition was related to the death of severe tuberculosis. Further studies are needed to establish the optimal nutritional management and evaluate the effectiveness of adjunctive use of steroid for severe tuberculosis patients.

3. Invasive fungal infection complicated with pulmonary tuberculosis: Akira WATANABE, Katsuhiko KAMEI (Division of Clinical Research, Medical Mycology Research Center, Chiba University)

Among the invasive mycoses, chronic pulmonary aspergillosis (CPA) is the most frequent disease as a sequel to pulmonary tuberculosis. However, identifying CPA early in patient with persistent pulmonary shadows from pulmonary tuberculosis is difficult. Serum microbiological tests such as *Aspergillus* precipitans (principally for *Aspergillus* IgG antibodies) are useful but sensitivity and specificity of this test are not high.

Even treated, CPA has a case mortality rate of 50% over a span of 5 years. Morbidity is marked by both systemic and

respiratory symptom and hemoptysis. Loss of lung function and life-threatening hemoptysis are common. As invasive pulmonary aspergillosis, early diagnosis and treatment of CPA might improve the outcome. Regarding the treatment, concomitant use of some anti-tubercular agents and antifungals is contradicted.

4. Treatment and management for pulmonary tuberculosis complicated with COPD and interstitial pneumonia: Shinji TAMAKI, Takashi KUGE, Midori TAMURA, Sayuri TANAKA, Eiko YOSHINO, Mouka TAMURA (National Hospital Organization Nara Medical Center), Hiroshi KIMURA (Second Department of Internal Medicine and Respiratory Medicine, Nara Medical University)

Recently, patients of pulmonary tuberculosis have many complications especially in the elderly population. It is recognized that patients with COPD and interstitial pneumonia (IP) have an increased risk for developing active tuberculosis. The aim of this report is to describe the clinical findings of pulmonary tuberculosis complicated with COPD and IP.

We reviewed 327 patients who were diagnosed as pulmonary tuberculosis. Twenty-six cases were complicated with COPD. All patients were male, and had smoking history. Cavitory lesions were observed only in 5 cases. Acute exacerbation of COPD occurred in one fatal case.

Ten cases were complicated with IP. Cavitory lesions were observed in 3 cases. Acute exacerbation of IP were observed in 7 cases, and 4 patients died during the anti-tuberculosis treatment.

Careful evaluation and treatment are necessary for tuberculosis patients complicated with COPD and IP.

Key words: Miliary tuberculosis, Severe tuberculosis, Pulmonary mycosis, COPD, Interstitial pneumonia

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