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EVALUATION OF THE CHARACTERISTICS OF TUBERCULOSIS PATIENTS IN ASHIKAGA RED CROSS HOSPITAL, TOCHIGI PREFECTURE, JAPAN (2007–2011)

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Abstract [Objective] To retrospectively evaluate the trends in tuberculosis characteristics among patients attending the Ashikaga Red Cross Hospital, Tochigi Prefecture, Japan, between January 2007 and December 2011, and to compare this trend with that observed globally.

[Methods] In total, 273 newly reported tuberculosis patients attending the Ashikaga Red Cross Hospital were examined from January 2007 to December 2011 in terms of age, sex, mortality during tuberculosis treatment, race (Japanese or non-Japanese), nationality of non-Japanese patients, pulmonary (including sputum positivity and/or cavity formation in the lungs) or extrapulmonary tuberculosis, latent tuberculosis infection, residential areas of patients, and diseases coexisting with tuberculosis.

[Results] Among the 255 Japanese tuberculosis patients, 202 patients were aged over 60 years, while the 18 non-Japanese patients were aged less than 50 years. Latent tuberculosis infections in 10 patients, including nurses and members of the patients' family, were treated. Among the 239 patients with pulmonary tuberculosis, 160 (67%) had *Mycobacterium tuberculosis*-positive sputum cultures and 99 patients (41%) had cavity formation in their lungs. Moreover, 1 multidrug-resistant, 2 isoniazid-resistant, and 3 ethambutol-resistant strains of bacteria were isolated in the patients. Mortality during tuberculosis treatment, which increased with age, was observed in 41 patients. There were 66 cases of diabetes

mellitus and/or chronic kidney dysfunction (or failure), which were the most common diseases that coexisted with tuberculosis. Disability, dementia, and/or residing in nursing home was also commonly observed (31 cases). Furthermore, 240 (88%) tuberculosis patients were transferred from other clinics or hospitals to our hospital, implying that people visiting nearby clinics or hospitals are cautious about interacting with tuberculosis patients.

[Conclusion] To a certain extent, tuberculosis is still prevalent among the elderly (more frequently in men than women) in Japan; however, in the younger generation, more than 30% of the patients are non-Japanese. The trends in tuberculosis observed in the Ashikaga Red Cross Hospital, Tochigi, Japan over a 5-year period were concordant with the global epidemiology of tuberculosis.

Key words: Tuberculosis, Ashikaga Red Cross Hospital, Non-Japanese tuberculosis cases, Latent tuberculosis infection, Community health, Global tuberculosis epidemiology

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EXTENSIVE GENETIC ANALYSIS OF CLINICAL TUBERCULOSIS ISOLATES AND ANALYSIS OF HOST FACTORS TO EVALUATE RAPID DEVELOPMENT OF MULTIDRUG RESISTANCE DURING INITIAL TREATMENT

Original Article

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Abstract [Introduction] In this study, we aimed at determining the cause of resistance to tuberculosis treatment by performing genetic analyses of bacteria obtained from a patient who developed multidrug-resistant tuberculosis (MDR-TB) during the initial course of treatment for tuberculosis.

[Methods] Specimens obtained before and after the development of MDR-TB were subjected to spoligotyping, drugresistance gene analysis, and variable-number tandem repeat (VNTR) typing. The patient's clinical background was also reviewed.

[Results] After the development of resistance, the bacterial genome had changed with regard to only 1 mutation: S531L in the *rpoB* gene. Spoligotyping revealed that the genotype was that of the Beijing strain. VNTR typing confirmed all 35 loci. Review of the patient's clinical background showed that diabetes mellitus was present as a complication.

[Discussion] There was no evidence of reinfection or polyclonal infection. The strain belonged to a sublineage of the Beijing genotype that is a common precipitating cause of MDR-TB due to this genotype. The patient had diabetes mellitus and was thus vulnerable to the development of resistance. Factors associated with both the host and bacteria, therefore, contributed to the development of resistance in this case, which seemed to result in the rapid development of MDR-TB.

Key words: Multidrug resistant tuberculosis (MDR-TB), Spoligotyping, Variable-number tandem repeat (VNTR) typing, Drug-resistance gene, Diabetes mellitus, Beijing genotype strain

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— Original Article —

CLINICAL FACTORS OF PULMONARY TUBERCULOSIS IN NON-TUBERCULOSIS WARDS AND ITS INCIDENCE AMONG CONTACT PATIENTS AND HEALTHCARE WORKERS IN OUR HOSPITAL USING QuantiFERON[®] GOLD TESTING

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Abstract [Objective and Methods] In our hospital, we analyzed the clinical factors of pulmonary tuberculosis (TB) diagnosed in non-TB wards and the incidence of TB infection among contact patients and healthcare workers (HCWs) using QuantiFERON®-TB GOLD (QFT) testing.

[Material] This study included 16 patients who were diagnosed with pulmonary TB in non-TB wards in our hospital from January 2008 to May 2011. Eight contact patients and 120 HCWs were also enrolled.

[Results] The 16 TB patients comprised 11 men (77.7 years) and 5 women (74.4 years). Among them, only 9 patients exhibited positive results for *Mycobacterium tuberculosis* after the first acid-fast bacterial examination; the other 7 patients presented positive results only after the second or third examinations. Moreover, there were 3 cases of positive *Mycobacterium avium* samples in the first acid-fast bacterial examination. Among 16 pulmonary *Mycobacterium tuberculosis* cases, 8 were sputum smear and culture positive, 7 were sputum smear and culture positive, and 1 was sputum smear and culture negative. Moreover, 17 days had elapsed from the

time of admission to the non-TB ward to diagnosis. TB contact examination revealed that QFT results for 2 HCWs changed from negative to positive.

[Discussion] We suspected pulmonary aspergillosis or old TB when presented with cases with a history of TB. Moreover, we believe that the periods from admission to diagnosis were delayed when the first acid-fast bacterial sputum examination was negative or showed non-tuberculous mycobacteria.

Key words: Pulmonary tuberculosis, Delayed diagnosis, Tuberculosis contact examination, QFT

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- Report and Information -

TUBERCULOSIS ANNUAL REPORT 2011 — (2) Childhood and Elderly Tuberculosis—

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Abstract In 2011, the number of newly notified childhood tuberculosis (TB) cases (tuberculosis patients aged 0-14 years) in Japan was 84, which corresponds to a notification rate of 0.50 per 100,000. The annual notified numbers and rates (per 100,000 population) of childhood TB cases decreased steadily until 2006, when the number became less than 100, after which the numbers have since remained stable. Among the 84 childhood TB patients who were notified in 2011, 33 (39.3%) were aged 0-4 years, 20 (23.8%) were aged 5-9 years, and 31 (36.9%) were aged 10-14 years. The proportion of TB patients aged 10-14 years was higher in 2011 than in previous years. In 2011, one TB meningitis case and two miliary TB cases were reported in children. Further, 23 symptomatic patients (27.4%) were identified at medical institutions and 45 patients (53.6%)were identified by contact investigation of household members. Together, these groups of patients accounted for nearly 80% of the cases of childhood TB that were detected, which was similar to the percentage in previous years.

Since 1999, the notification rates of TB patients aged 85 years and above have been consistently higher among those aged 65 years and above in Japan. The annual rate of reduction in the notification rates of TB patients aged 65-79 years has accelerated from 12,625 in 2000 to 6,427 in 2011. The proportion of TB patients aged 65 years and above has consistently increased, reaching up to more than 60% in 2011; notably, the proportion of TB patients aged 80 years and above has increased to more than 30%. The proportion of bacteriologically positive TB cases among pulmonary TB (PTB) cases

was higher in those aged 65 years and above than those aged 15-64 years. The proportion of PTB patients with only nonrespiratory symptoms increased with age, reaching 28.9% in those aged 85 years and above. The proportion of TB cases associated with a patient delay of two months or longer was much less in the patients aged 65 years and above than those aged 15-64 years (14.5% vs. 25.8%), whereas the proportion of TB cases associated with a doctor delay of one month or longer was slightly higher in the patients aged 65 years and above than those aged 15-64 years (24.2% vs. 20.0%). Of the newly notified TB patients in 2010 whose treatment outcomes are available as of writing, 28.5% died within a year after the initiation of TB treatment; of these, 16.3% died within three months. The proportion of deaths within three months after the initiation of the TB treatment among the patients aged 65 years and above showed substantial increase with age from 3.6% in 65-69 years old to 17.0% in 90 years and above.

Key words: Tuberculosis, Notification rate, Childhood tuberculosis, Elderly, Annual trend

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