Original Article

RELAPSE RATE OF TWICE WEEKLY INTERMITTENT CHEMOTHERAPY DURING CONTINUATION PHASE IN THE TREATMENT OF PULMONARY TUBERCULOSIS IN TWO YEARS PERIOD AFTER COMPLETION OF TREATMENT

[1]Masako WADA, [2]Masao OKUMURA, [1]Hitoshi HOSHINO, [1]Satoshi MITARAI, [1]Masako OHMORI, [1]Kazuhiro UCHIMURA, [2]Takashi YOSHIYAMA, and [2]Hideo OGATA

Abstract [Objective] To evaluate the relapse rate after treatment of a twice weekly intermittent chemotherapy during continuation phase in the patients with pulmonary tuberculosis in two years poriod after completion of chemotherapy.

[Methods] The patients with drug susceptible pulmonary tuberculosis treated with 2HRZE/4H$_2$R$_2$ under the supervision by the pharmacists or the patients treated with 2HRZE/4HR by self-administration were followed-up for two years after completion of chemotherapy.

[Results] A total number of 135 pulmonary tuberculosis patients were treated with 2HRZE/4H$_2$R$_2$, 3 of 135 discontinued this intermittent treatment, and 11 of 135 completed chemotherapy was excluded from the relapse analysis, 105 out of the remaining 121 were followed-up for more than 6 months. On the other hand 240 patients were treated with 2HRZE/4HR, 37 out of 240 were excluded from the analysis, 147 of the remaining 203 were followed-up for more than 6 months. The relapse rate of this intermittent chemotherapy 1.89/100 person-year was similar to the relapse rate 1.86/100 person-year among 147 treated with daily regimen by self-administration. This difference was not statistically significant ($z=0.36$, $P=0.14$).

[Conclusion] As regards relapse rate, this 2HRZE/4H$_2$R$_2$ regimen is effective and useful for the expansion of DOT, and it should be expanded nationally in Japan.

Key words: Anti-tuberculosis chemotherapy, Intermittent chemotherapy, Directly Observed Treatment by the pharmacist observers, Relapse rate

[1]Research Institute of Tuberculosis, Japan Anti-Tuberculosis Association (JATA), [2]Fukujuji Hospital, JATA

Correspondence to: Masako Wada, Research Institute of Tuberculosis, JATA, 3−1−24, Matsuyama, Kiyose-shi, Tokyo 204−8533 Japan. (E-mail: wada@jata.or.jp)

Original Article

QuantiFERON®TB-2G AMONG NURSES WITH A HISTORY OF WORKING IN OUR TUBERCULOSIS WARD

Shuichi YANO, Kanako KOBAYASHI, Toshikazu IKEDA, Yoshiyuki TOKUDA, Kiryo WAKABAYASHI, Shigenori ISHIKAWA, and Hiroyasu TAKEYAMA

Abstract [Purpose] To investigate the infection rate of tuberculosis among nurses with a history of working in our hospital's tuberculosis ward (TW).

[Methods] We measured interferon gamma levels in 50 nurses who had worked in our TW, and evaluated the infection rate among these nurses before (I) and after (II) the use of our hospital's tuberculosis infection control manual.

[Results] The infection rate including probable infection was 6/50 (12.0%) in all TW nurses. The infection rate in the group I was 17.6%, but that in group II was 0%.

[Conclusion] Our hospital's tuberculosis infection control manual was effective for decreasing the infection rate, despite a high rate of infection in group I.

Key words: Tuberculosis ward nurses, QuantiFERON®TB-2G, Tuberculosis infection control manual

Department of Pulmonary Medicine, National Hospital Organization Matsue National Hospital

Correspondence to: Shuichi Yano, Department of Pulmonary Medicine, National Hospital Organization Matsue National Hospital, 5−8−31, Agenogi, Matsue-shi, Shimane 690−8556 Japan. (E-mail: yano@matsue.hosp.go.jp)

Original Article

ESTIMATION OF THE FUTURE EPIDEMIOLOGICAL SITUATION OF TUBERCULOSIS IN JAPAN

Masako OHMORI, Takashi YOSHIYAMA, and Nobukatsu ISHIKAWA

Abstract [Objective] To estimate the future trends of all forms of tuberculosis (TB) and sputum smear positive pulmonary TB in order to consider the emerging issues of TB control and eliminating TB in Japan.

[Materials and Methods] Annual reports of TB registrations were used for observing past trends of TB, and predictions were then made assuming that past trends would continue. At first, to obtain the number of TB patients by sex and age-group, sex-age-specific incidence rates were estimated for the years 2010, 2015, 2020, 2025 and 2030, and then applied to a sex-age-specific population which was projected by the National Institution of Population and Social Security Research.

According to the different methods used to calculate the reduction rates of incidence, we adopted model A and model B. In model A, the reduction rate was calculated by using two groups of the same age group but different members by calendar year. In model B, the reduction rate was calculated by using the same birth cohort but different age by calendar year. We also adopted two sub-models by the observation period of past trends. The incidence rates for the period from 1987 to 2005 were used in model 1 and the incidence rates for the period from 1998 to 2005 were used in model 2. The incidence rate in 1999 was excluded from both model 1 and 2, because the TB incidence rate increased abnormally due to the declaration of a state of emergency concerning tuberculosis in 1999. The speed of decline among particular several sex-age-groups was weighted taking into account the influence of foreign, homeless and elderly cases.

The future number of sex-age-specific sputum smear positive pulmonary patients was estimated by applying various parameters, i.e. pulmonary TB rate, sputum smear positive rate and its trend, to the estimated future number of TB incidence.

[Results] The TB incidence rate, which was 22.2 per 100,000 population as of 2005, would reach 9.8 in model A-1, 5.4 in model A-2, 7.5 in model B-1 and 3.2 in model B-2 by 2030. On the other hand, the sputum smear positive pulmonary incidence rate, which was 8.9 per 100,000 population as of 2005, would decline to 5.5 in model A-1, 3.0 in model A-2, 4.2 in model B-1 and 1.7 in model B-2 by 2030. The future number of TB patients and incidence rates by sex and age were discussed based on a mixed model which used the middle series of estimates, and was obtained by combining model A-2 and model B-1. The number of TB patients by the mixed model will become about 12 thousand with 10.1 per 100,000 population in 2020, and about 7.4 thousand with 6.5 per 100,000 population in 2030. From 2005 to 2020, the age composition of TB patients will change from 0.4% to 0.2% at 0−14 years old, 4% to 4% at 15−24 years old, from 10% to 11% at 25−34 years old, 8% to 11% at 35−44 years old, from 9% to 12% at 45−54 years old, from 15% to 10% at 55−64 years old, 18% to 15% at 64−74 years old, from 24% to 17% at 75−84 years old, and from 11% to 20% at 85 years of age or older. Although the proportion of the elderly aged 65 years or higher will not be so different, the proportion of TB patients aged 85 years or older will almost double.

[Conclusion] The year when the TB incidence rate will reach the level of low-incidence countries, which is defined as a country with a TB incidence rate of less than 10 per 100,000 population, might be around 2020 in Japan. At that time, the age composition of TB patients will tend to be very old patients, and the young adult and middle-aged patients. Problems such as delay in diagnosis and difficulty of treatment are expected among very old patients.

Key words: Tuberculosis, Incidence rate, Sputum smear positive pulmonary incidence rate, Estimation

Research Institute of Tuberculosis, Japan Anti-Tuberculosis Association (JATA)

Correspondence to: Masako Ohmori, Research Institute of Tuberculosis, JATA, 3−1−24, Matsuyama, Kiyose-shi, Tokyo 204−8533 Japan. (E-mail: ohmori@jata.or.jp)

Original Article

IMPLEMENTATION AND EVALUATION BY A POPULATION-BASED RFLP ANALYSIS IN AN URBAN AREA, SHINJUKU CITY, TOKYO

— The Possibility of Application for Contact Investigations —

[1]Michiko NAGAMINE, [2]Masako OHMORI, [5]Megumi NAGAI, [1]Keiji FUKAZAWA, [3]Sumi KAGURAOKA, [1]Yuriko TATSUMI, [2]Akihiro OHKADO, [2]Yoshiro MURASE, [2]Masako WADA, [2]Kazuhiro UCHIMURA, [2]Norio YAMADA, [2]Shinji MAEDA, [4]Hideo MAEDA, and [2]Nobukatsu ISHIKAWA

Abstract [Objectives] The objectives were to examine *Mycobacterium tuberculosis* transmission patterns by RFLP analysis in Shinjuku city, and to elucidate more effective methods of contact investigations.

[Methods] We applied RFLP analysis to 389 *M. tuberculosis* isolates from 402 TB patients registered in Shinjuku city from September 2002 though August 2006.

[Results] Forty-six clusters consisting of 155 TB patients (average 3.4 people per cluster) were identified (proportion of clustering: 39.8%). The clustering rates were 34.5% among general patients, and 57.8% among homeless patients, and the latter was higher than that of non-homeless patients (odds ratio: 2.6, 95% CI; 1.6–4.1, $p<0.001$). On the other hand, the clustering rates were only 19.4% among foreigners (odds ratio: 0.5, 95% CI; 0.2–1.2, $p=0.090$). Twenty-eight of 46 clusters (60.9%) were consisted of mixture of general patients, homeless patients and foreigner patients. Thus, RFLP analysis can detect the transmission route which can not be identified by the routine contact examination, thus enabling contact investigations extended to the appropriate persons.

[Discussion] The homeless clustering rate was significantly high. This suggests that the proportion of transmission among the homeless patients might be high. However, many clusters were composed of a mixture of homeless patients and non-homeless patients, so transmission patterns are not easy to identify. It is not always true that transmission of tuberculosis to non-homeless patients took place from homeless patients. Clustering rates among homeless patients are high, therefore taking countermeasures for the homeless patients is an effective way to prevent the spread of tuberculosis. Introduction of RFLP analysis is a practical epidemiological methodology to investigate the source of infection and transmission route of infection, and can be applied to contact investigations. If RFLP analysis can be applied in a larger area, yearly changes of notification rates and molecular epidemiological clustering rates will provide indices for preventive measures against tuberculosis.

Key words: Tuberculosis, Shinjuku, RFLP analysis, Homeless, Foreigners, Contact investigation

[1]Shinjuku-ku Public Health Centre, Tokyo, [2]Research Institute of Tuberculosis, Japan Anti-Tuberculosis Association, [3]Nishi-shinjuku Public Health Centre, Tokyo, [4]Tokyo Metropolitan Institute of Public Health Centre, Tokyo, [5]Toshima-ku Ikebukuro Public Health Centre, Tokyo

Correspondence to: Michiko Nagamine, Shinjuku-ku Public Health Centre, Tokyo, 5−18−21, Shinjuku, Shinjuku-ku, Tokyo 160−0022 Japan.
(E-mail: yobo@city.shinjuku.tokyo.jp)

Original Article

EXHALED BREATH-GENERATED AEROSOLS OF *MYCOBACTERIUM TUBERCULOSIS* IN PATIENTS WITH ACTIVE PULMONARY TUBERCULOSIS DURING NORMAL BREATHING

Hiroshi KAWADA, Masaya YAMAZATO, Yoko SHINOZAWA, Kikuo SUZUKI, Sumire OTANI, Itsuo NEMOTO, and Mamoru MIYAIRI

Abstract [Objective] It has been understood that cough-generated aerosols act as an important vector for the spread of pulmonary tuberculosis. Humans commonly exhale aerosols during the normal respiration process that contain small droplets of the airway lining fluid. We aimed to determine whether aerosols exhaled by active pulmonary tuberculosis (AP-TB) patients may contain droplets with *Mycobacterium tuberculosis* (M-TB) during normal breathing.

[Methods] Preliminarily, the collection efficiency of M-TB that was suspended in normal saline or distilled water was examined after subjecting the suspension to centrifugation at 3,000 *g* for 20 minutes. Better collection efficiency was observed in case of M-TB suspended in distilled water than that suspended in normal saline after centrifugation. Therefore, we selected distilled water instead of normal saline to prepare the fluid that was bubbled with exhaled breath. AP-TB patients with smear positive pulmonary tuberculosis who were being treated with anti-TB drugs for less than 7 days or those before the initiation of therapy expired into a 50-m*l* tube containing 10 m*l* distilled water for 30 minutes. We also prepared an exhaled breath condensate by cooling exhaled air through the tubing apparatus.

[Results] In case of 20 AP-TB patients, the distilled water bubbled with the exhaled breath were negative for M-TB on smear, culture, and PCR (polymerase chain reaction) detection methods. The exhaled breath condensates were also negative in 24 AP-TB patients.

[Conclusion] These results suggest that exhaled breath-generated aerosols from AP-TB patients during normal breathing do not act as a vector for the spread of pulmonary tuberculosis.

Key words: Disease transmission, Air microbiology, Infectivity, Communicable disease control, Pulmonary tuberculosis

Department of Respiratory Medicine, National Hospital Organization South-Yokohama National Hospital

Correspondence to: Hiroshi Kawada, Department of Respiratory Medicine, National Hospital Organization South-Yokohama National Hospital, 2−6−1, Serigaya, Konan-ku, Yokohama-shi, Kanagawa 233−8503 Japan.
(E-mail: hk79108@yahoo.co.jp)

Case Report

A CASE REPORT OF TUBERCULOUS RETROPHARYNGEAL ABSCESS

Kazunao NIIZUMA and Miwako SAITO

Abstract We report a case of tuberculous retropharyngeal abscess. The case reported was an 89 year old female. She visited our hospital with a complaint of swelling in the neck, a feeling of choking and a feeling of dysphagia. With a test puncture to the neck tumor, acid-fast stained bacilli were detected from punctured pus and the patient was hospitalized immediately due to a suspicion of tuberculous retropharyngeal abscess. As present illnesses, mucosal retraction and protrusion were found in the area from the right pharyngeal back to the oral cavity. Palpation revealed soft tumors of a ping-pong ball size without tenderness nor febrile sensation in the right submandibular region and left supraclavicular fossa in the neck. In the cervical contrast enhanced CT images, an abscess was found in the hypopharyngeal posterior gap and was shown as LDA (low density area) surrounded by strongly contrasting walls. The tumor was divided horizontally at the second cervical vertebra and shown strongly at the left cervical region as it goes downward, and in the region from the 6th cervical vertebra to the second thoracic vertebra, vertebral body destruction and numerous small abscesses in the vertebral anterior gap were found. Chest images revealed infiltration (*r* Ⅲ 2) in the right lung, but the sputum smear was negative (−) for tubercle bacilli. As the abscess punctured fluid was TB-PCR (+), she was diagnosed as tuberculous retropharyngeal abscess, and a treatment was started with HRS (combination of isoniazid, rifampicin and streptomycin). Due to elevated feeling of suffocation and feeling of dysphagia during hospitalization, CT-guided cervical abscess puncture (using a 21G puncture needle) was performed twice to drain 100 m*l* and 80 m*l* pus. Subsequently, since the symptoms have improved and retention of abscesses was not found, the patient was discharged from the hospital. After the treatment for 9 months, no recurrence was reported.

Key words: Tuberculous retropharyngeal abscess, Tuberculous cervical spondylitis, Cervical abscess puncture

Department of Internal Medicine, Fukushima Prefectural Aizu General Hospital

Correspondence to: Kazunao Niizuma, Department of Internal Medicine, Fukushima Prefectural Aizu General Hospital, 10−75, Shiromae, Aizuwakamatsu-shi, Fukushima 965−0803 Japan. (E-mail: kazuniizuma@yahoo.co.jp)