Field Activities

USE OF A RISK ASSESSMENT INVENTORY IN IMPLEMENTATION OF THE COMMUNITY DOTS IN SHINJUKU, JAPAN

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Abstract [Purposes] To investigate the effectiveness of a risk assessment for implementing the DOTS of outpatients in the Japanese city of Shinjuku.

[Subjects] A total of 435 patients with tuberculosis or latent tuberculosis infection who were registered in the city of Shinjuku between 1 April 2005 and 31 December 2007.

[Methods] Soon after their diagnosis or registration and again 4 months thereafter, the patients were interviewed by the public health nurse in charge using a risk assessment inventory that had 17 scales related to the risk of defaulting from the treatment. Based on the results of the risk assessment, the patients were provided with an appropriately adapted DOTS.

[Results] Out of all patients, 386 (88.7%) were assessed twice, of whom 338 (77.7%) were those with active disease. The patients were classified into three groups according to their risk scales: high-, medium-, and low-risk groups. There was no change in the risk grouping during the 4 months in 307 (90.8%) patients. However, in 12 patients (3.6%) the risk level was increased after 4 months, because of the development of side effects and problems with regular outpatient visits. The common methods of support in drug taking were daily DOT at the health center for patients in the high-risk group, and DOT at pharmacy shops once or twice weekly with self-medication on the other days for patients in the medium-risk group. For the low-risk group, the public health nurses made interview once or twice a month. There was no significant difference in the treatment success rate, default rate, or mortality rate among these three groups.

[Discussion] The treatment outcome suggests that the community DOTS in this area may be effective. It was important to assess possible risks in treatment for each patient in order to identify the support needs and means. Also, it is necessary to develop a good risk assessment inventory scale.

Key words: Tuberculosis, Shinjuku, Risk assessment, DOTS, Public health nurse, Medication support, Treatment outcome

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ZOONOTIC ASPECTS OF TUBERCULOSIS CAUSED BY *MYCOBACTERIUM BOVIS*

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Abstract Pathogens transmitting between the environment, wildlife, livestock and humans are major health concerns for human and domestic animal and in addition, for the sustainability of agriculture and the conservation of wildlife. Among pathogens causing zoonosis, Genus Mycobacterium including *Mycobacterium tuberculosis*, *M. bovis, M. avium* is thought to be important. The most important bacteria as an etiological agent of zoonosis in Genus Mycobacterium is *M. bovis*. *M. bovis* is the causative agent of bovine tuberculosis, which belongs to the *M. tuberculosis* complex and has a broad host range including wildlife, domestic livestock, non-human primates and humans. The reservoirs of *M. bovis* in wildlife have their own role as sources of infection in humans and domestic animals and have their health impact on humans. The approaches for the control and management of *M. bovis* infections are also discussed in this review.

Key words: Zoonoses, *Mycobacterium tuberculosis* complex, *Mycobacterium bovis*, wildlife

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The 84th Annual Meeting Special Lecture

JAPANESE NEW GUIDELINES FOR NONTUBERCULOUS MYCOBACTERIAL PULMONARY DISEASE

Atsuyuki KURASHIMA

Abstract Three important statements for Japanese pulmonary nontuberculous mycobacteriosis (NTM) were published in 2008. The first one is a new diagnostic criteria for pulmonary NTM, which was organized in association with the task force for nontuberculous mycobacteriois of the Japanese Society for Tuberculosis and the section for infectious disease and tuberculosis of the Japanese Respiratory Society. The second is a treatment guideline for pulmonary nontuberculous mycobacteriosis also which was made by the same joint working. The third is a sugical treatment guideline for pulmonary nontuberculous mycobacteriosis. The reason for the task of immediate importance is the number of pulmonary *Mycobacterium avium* complex (MAC) disease keeps increasing in our country and the disease cannot be disregarded widely in municipal hospitals or clinics.

The morbidity rate of pulmonary MAC disease is assumed to be about 3.5 in the north American area. A lot of European nations are presumed that do not reach 1.0. Most of Asian researchers reply to our E-mail questions with the recent increasing of pulmonary MAC disease. Japanese estimated morbidity rate of this disease seems to be over 6.0 in 2007. It has been not clarified why a lot of this disease cases are in particular in Japan. In this situation, a concise diagnostic criteria is required from even a doctor who is not respiratory medicine specialists.

The diagnosis can be confirmed by twice culture from sputa or one culture in case of bronchoscopic examination regardless of the bacterial strain. Moreover, it is possible to correspond to wider varieties of radiographic findings than 2007 diagnostic criteria of the United States. This disease became possible to diagnose before the consciousness syndrome appeared by the advancement of today's excellent imaging technology and nuclear acid amplification method. Therefore, the diagnosis confirmation and the beginning of chemotherapy time has become separated.

In 2008, on Japanese medical insurance, the prescription of two drugs has become possible officially for pulmonary NTM due to the efforts of many stakeholders. However, pulmonary NTM is a disease to obtain a constant improvement at last continuing combination chemotherapy for a long term. Three drugs regiment of CAM as a main axis, adding EB, RFP or RBT is now a de facto international standard. New Japanese guideline for treatment describes the adverse events by a long-term administering more in detail than the previous one. However, it is difficult to control only by an internal therapy.In case of a localized lesion, we have recommended an appropriate surgical treatment. But a surgery treatment without combination of chemotherapy could not achieve an enough result. A multidisciplinary approach is important. The guideline of surgical treatment that reflected these content was also published in 2008.

Key words: Nontuberculous mycobacteriosis, *Mycobacterium avium* complex, Diagnostic criteria, Chemotherapy, Treatment period, Surgical treatment

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The 84th Annual Meeting Symposium

MEDICAL SERVICE SYSTEM UNDER INFECTIOUS DISEASES LAW

Chairpersons: [1]Katsuyuki TOBISE and [2]Seiya KATO

Abstract Tuberculosis control under Infectious Diseases Law had started in April 2007. New policy had introduced by the revision of notification standard, hospitalization standard, and the standard of medical care, however problems of securing human and financial resource as well as renewal of the system for medical service are left behind as challenges.

Hospital beds for tuberculosis had been decreasing due to decline of TB patients and shortened hospitalization period, however recently they are unreasonably decreasing because of deficient accounts in TB hospitals. It results in shortage of hospital beds for tuberculosis in some urbanized areas and poor access to the TB hospital beds in some areas. The deficient account is mainly due to unreasonably low payment by the health insurance and low occupancy rate in TB ward in some hospitals.

According to the questionnaire survey, actual number of TB beds was much less than that of accredited one. Hypothetical calculation revealed that more than half of prefectures require less than 50 beds, which is standard number of bed for one ward. Many prefectures have problems with management of accompanied serious diseases in TB hospitals. Maintaining technical appropriateness is an important challenge in the context of decreasing TB patients.

In New York, medical care for tuberculosis patients without health insurance is provided mainly at the outpatient department of chest center, which is specialized facility for TB patients run by city government. In UK, tuberculosis patients are treated mainly at a chest clinic of National Health Service Hospital. They are supported by Consultant of Communicable Disease Control. In Germany, medical service is provided by the coordination between chest specialist practitioner and chest hospital. As the tuberculosis incidence is decreasing, medical facilities need to give medical care for tuberculosis patients under the special support of the clinical TB consultation and TB prevention recommendations.

From the pandemic era until the days when public tuberculosis sanatorium had took financial assistance from the government, the deficient nature of the tuberculosis medical care was invisible, But when the national sanatorium was reorganized into National Hospital Organization, the deficit in TB medical care became heavy financial burden, since self-supporting system was applied to these hospitals. In 2008, even with the average occupancy rate of 60%, the deficit of 7,000−10,000 yen per person per day was recognized in TB hospitals. In addition, this deficit will be larger if tuberculosis inpatients decrease in the future.

In order to improve financial situation in TB hospital, we should consider increase of medical insurance payment as well as financial support by public fund. It should be considered to change the medical care system from the unit of ward to the unit of beds, which is expected to improve bed occupancy rate.

Increase of aged tuberculosis patients raised the problem of managing accompanied diseases in tuberculosis hospitals. It resulted in poor prognosis and increased needs for care. It is difficult for most of TB hospitals to manage delivery, patient withdrawal syndrome for alcoholics and dialysis. More than half of patients over 70 years old were bedridden. Diversity of TB patients needs various services, from intensive medical care for complications, attentive care for the aged, to support for foreign young patients and control of homeless patients including confinement.

Hokkaido has large area of jurisdiction which occupies about 20% of land of Japan. It has 180 municipalities and the six tertiary health districts. The notification rate for all types of TB is 13.4/100,000, which made the prefecture the tenth lowest in Japan.

Fourteen hospitals in five tertiary health districts provide hospital care for smear-positive TB patients. Since every smear-positive patient has to be hospitalized until smear becomes negative under the law, some patients have to travel to the hospitals far away from their homes, which is particularly inconvenient for elderly. Other issues include staffing at health facilities, particularly doctors in remote area, not only for TB care but general care.

In Tokyo, TB patients who belong to the high risk group are increasing. They are the patients who came from high incidence countries, people with HIV/AIDS and homeless. In order to control tuberculosis, especially combating these specific issue in urban area, TMG (Tokyo Metropolitan Government) had established "TMG TB Prevention Plan (2005. 12)" and "TMG Medical and Health Care Services Plan, 4th revision (2008.3)". TMG ensure specialized TB medical care services in TMG's hospitals.

As total number of TB patients is expected to decrease in mid and long term, we have to consider concentration of medical facility to provide quality medical service efficiently, while at the same time, securing good access to the service and management of the serious accompanied disease is a challenge. For infection control of MDR TB, set up of negative pressure room is also challenge.

In order to solve the issue in tuberculosis patient medical care radically, it is necessarily to consider comprehensive reforms including medical service payment by health insurance, legislation on medical facility, technical support mechanism etc. It is to secure appropriate medical service for tuberculosis patients toward future, when low incidence situation

come to Japan.

1. Current status and challenges of medical care system for tuberculosis: Seiya KATO, Takashi YOSHIYAMA (Research Institute of Tuberculosis, JATA)

Recently hospital beds for tuberculosis are unreasonably decreasing because of deficient accounts. Actual number of beds for TB patients was much less than that of accredited one. More than half of prefectures require less than 50 beds, which is standard number for one ward. There are problems with treatment of accompanied diseases in TB hospitals. Maintaining technical appropriateness is an important challenge in the context of decreasing TB patients. Systematic reforms including finance, legislation, technical support etc. are necessary to secure appropriate medical service for tuberculosis patients.

2. The medical care system for the tuberculosis patient in USA, UK, and Germany: Toshio TAKATORIGE (Department of Public Health, Graduate School of Medicine, Osaka University)

As the tuberculosis incidence is decreasing, all medical facilities need to give medical care for tuberculosis patients under the special support of the clinical TB consultation and TB prevention recommendations.

3. The tuberculosis medical care considering from management standpoint: Katsuyuki TOBISE (National Hospital Organization Sapporo Minami National Hospital)

The historical change of tuberculosis care from the era of surgical operation to the era of medical chemotherapy caused the unprofitable nature of management dramatically. Since public tuberculosis sanatorium had took economic assistance from general accounts, the unprofitable nature of the tuberculosis medical care did not positively plan the increase of medical insurance fees. In 2008, even when we maintained the average of 30.9 inpatients (about 60% of operative sickbed rate), we recognized the deficit of 7,000−10,000 yen per person per day. In addition, this deficit will be larger if tuberculosis inpatients decrease in the future. So, in order to increase incomes, we should consider the income of public subsidy as well as medical insurance fees, and should change the medical care system from the unit of ward to the unit of beds. It is the time that we should think about the field of these problems.

4. Provision of medical service for tuberculosis patients: Eriko SHIGETO (National Hospital Organization Higashihiroshima Medical Center)

A postal questionnaire was sent to 97 hospitals with tuberculosis (TB) beds. In the responded 73 hospitals, only 17 can treat broad spectrum of complications such as blood dialysis, heart attack, childbirth. Forty-four hospitals experienced infectious TB patients who left hospital without permission. As for aged patients, of 97 patients over 70 yrs in our hospital, 47 patients were confined to bed on admission and 33 died. The diversity of TB patients needs various services, from intensive medical care for complications, attentive care for the aged, to support for foreign young patients and control of homeless patients including confinement.

5. (1) The TB at prefecture level in Japan—The current situation and issues in the future: Ryo YAMAGUCHI (Director for Health Affairs, Office of Health and Safety, Hokkaido Government)

Hokkaido has area of 80,000 km^2, which occupies about 20 % of land of Japan. It has 180 municipalities and the six tertiary health districts. The numbers of cases notified for all types and smear-positive pulmonary TB have almost halved from 1453 and 422, respectively, in 1999, to 747 and 299, respectively, in 2007. The notification rate for all types of TB has also halved from 25.5 to 13.4 in the same period, which made the prefecture the tenth lowest in Japan. Fourteen hospitals in five tertiary health districts provide hospital care for smear-positive TB patients with 534 TB beds and 2212 facilities provide outpatient care for TB patients. Since every smear-positive patient has to be hospitalized until smear becomes negative under the law, some patients have to travel to the hospitals far away from their homes, which is particularly inconvenient for elderly. Other issues include staffing at health facilities, particularly doctors in remote area, not only for TB care but general care.

5. (2) Current Issues of tuberculosis medical care service system in Tokyo:Tomokazu INAGAKI (Koto Public Health Center).

In Japan, TB medical care services providing system, especially in-hospital care system is under reconstruction due to decreasing TB patients and admission periods. And complications are increasing, as elder TB patients increasing. Additionally, in urban area, TB patients are increasing who are foreigners from TB spreading countries, PWA/H and homeless. TMG (Tokyo Metropolitan Government) had established "TMG TB Prevention Plan (2005.12)" and "TMG Medical and Health Care Services Plan, 4th revision (2008. 3)". And, TMG have ensuring specialized TB medical care services in TMG's hospitals. But, radically, it is necessarily for National Health Insurance System to correct prices for TB medical care services in hospital.

Key words: Medical service, Payment for medical cost, Occupancy rate, Accompanied disease, Technical support

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CAN WE HAVE ADEQUATE CHEMOTHERAPY REGIMENS FOR TUBERCULOSIS IN THE FUTURE?

— Current Status and Future Prospects for Development of New Antituberculosis Drugs —

Chairpersons: [1]Haruaki TOMIOKA and [2]Atsuhiko TADA

Abstract Worldwide, tuberculosis (TB) remains the most frequent and important infectious disease causing morbidity and death. One-third of the world's population is infected with *Mycobacterium tuberculosis* (MTB), the etiologic agent of TB. The World Health Organization estimates that about eight to ten million new TB cases occur annually worldwide and the incidence of TB is currently increasing. In this context, TB is in the top three, with malaria and HIV being the two other leading causes of death from a single infectious agent. Approximately 1.6 million deaths are attributable to TB annually. In Japan, there were 70,000 TB patients including 26,000 new TB cases and 2,300 deaths in 2006. In order to combat TB, it is urgently desired to develop new antituberculous drugs which are active against multidrug-resistant MTB and moreover efficacious in decreasing the periods of chemotherapy. In particular, we urgently need new drugs that display strong sterilizing activity *in vivo* against slowly metabolizing and, if possible, dormant and/or persistent populations of MTB organisms that cause relapse. Unfortunately, no such new and useful drugs other than rifabutin and rifapentine have been marketed for TB in the US and other countries during the 40 years since the release of rifampicin.

There are a number of constraints that have deterred companies from investing in new anti-TB drugs. Research is expensive, slow and difficult, and requires specialized facilities for handling MTB. There are few animal models that closely mimic the human TB disease. A long development time will be required for any new anti-TB drug. In fact, clinical trials will require a minimum of six-months of therapy, with a follow-up period of one year or more. In addition, it is hard to demonstrate an obvious benefit of a new anti-TB agent over pre-existing drugs, since clinical trials involve multidrug combination therapy using highly effective ordinary anti-TB drugs. Finally, there is a perceived lack of commercial return to companies engaged in the development of new anti-TB drugs, because over 95% of TB cases worldwide are in developing countries. At present, several new promising antituberculous agents are being developed on the initiative of the TB Alliance and Stop TB Partnership with a view of eradicating TB worldwide in the near future. Indeed, in the US and some European countries, research and clinical trials for the bioinformatics-based development of novel antituberculous are currently proceeding. In particular, attempts for drug design using a three-dimensional quantitative structure-activity relationship (3D-QSAR) analysis based on genomics and proteomics on the novel drug targets of MTB pathogens are very promising. A great advance in the fundamental and practical studies is needed to promote the development of such kinds of

new anti-TB drugs in the near future.

In this symposium, we reviewed the following areas.

1. Dr. Atsuhiko TADA (Department of Internal Medicine, National Hospital Organization Minami-Okayama Medical Center) reviewed antituberculous drugs that can fully meet the requirement of physicians engaging in the clinical control of tuberculosis. Increase in incidence of MDR-TB and XDR-TB is the major problem. It is expected that new effective antituberculous drugs improve the treatment of MDR-TB and XDR-TB. Because the rate of co-infection with HIV is increasing, new antituberculous drugs that do not interact with anti-HIV drugs are needed. Clinicians require new antituberculous drugs with early bactericidal activity superior to that of INH and more efficacious against slow-growing or dormant MTB organisms than RFP. New drugs are also expected to be less toxic and less expensive.

2. Dr. Kunihiko ITO (Research Institute of Tuberculosis, JATA) reviewed the clinical usefulness of TMC-207, PA-824, and OPC-67683. Information about the clinical usefulness of these new agents has been relatively limited to date. The available information was summarized in this session. Generally those three drug-candidates seem to be very promising in the treatment of multi-drug resistant tuberculosis. However, it is not certain whether these agents have the same degree of antituberculosis effects as the first-line drugs, isoniazid, rifampicin, and pyrazinamide.

3. Dr. Norio DOI (Department of Mycobacteria References and Research, Research Institute of Tuberculosis, JATA) reviewed the present status and issues of a few antituberculous drug candidates other than the agents currently being clinically tested. According to the Working Group on New Anti-TB Drugs/StopTB Partnership/WHO, preclinical 9 and new drug discovery 20 projects are in progress. Among these, quinolones, nitrofuranylamides, hybrid antibiotics and post rifampicin RNA-polymerase-inhibitor myxopyronin appear to be promising. In preclinical stage compounds, new respiratory quinolone DC-159a, CPZEN-45 and capuramycin were synthesized in Japan. Aerosol drug (PA-824, Capreomycin, etc.) projects for inhalation therapy might develop a new route of administration in the future.

4. Dr. Haruaki TOMIOKA and Dr. Yutaka TATANO (Department of Microbiology and Immunology, Shimane University School of Medicine) reviewed recent advances in antituberculous drug development with special reference to novel drug targets. Newly elucidated, critical information on the entire genome of MTB and advances in knowledge regarding various mycobacterial virulence genes are promoting the identification of genes that code for new drug targets. Against this background, the future development of new antituberculous drugs is discussed in relation to potential pharmacological targets of MTB in the present article.

Key words: Antituberculous drugs, Drug targets, Bioinformatics, Clinical studies

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CURRENT STATUS OF MULTI-DRUG RESISTANT TUBERCULOSIS IN JAPAN

Chairpersons: [1]Kazunari TSUYUGUCHI and [2]Hideaki OHNO

Abstract In Japan, tuberculosis is still one of major health problems. From the report published in 2002, the frequencies of multi-drug resistant tuberculosis (MDR-TB) and extensively-drug resistant tuberculosis (XDR-TB) are 1.8%, 0.5% of all tuberculosis cases, respectively, and they are also critical issues. This symposium was designed to review the current status of MDR-TB in Japan, especially focusing on epidemiology, diagnosis, treatment including newly developed anti-TB agents, and patient management.

Initially, it is important to understand the trend of MDR- and XDR-TB in Japan. Dr. Kazunari Tsuyuguchi introduced the current epidemiology of MDR-TB in Japan. Moreover, it is also very important to diagnose drug-resistant tuberculosis rapidly, in order to prevent the transmission of drug-resistant tuberculosis to drug-susceptible tuberculosis patients. Genetic diagnostic method of rifampicin-resistant tuberculosis is now under the commercial. Dr. Tsuyuguchi also reported the usefulness of such genetic diagnostic method on clinical management of tuberculosis patients.

In addition, physicians should consider effective medical treatments, including surgical treatments, in case the patients are diagnosed as MDR-TB or XDR-TB. However, there are little published data regarding to the treatment results of drug-resistant tuberculosis in Japan. Dr. Takashi Yoshiyama presented the outcomes of 102 MDR-TB cases treated in Fukujuji Hospital, and his evaluation data about prognostic factor anal-

ysis of MDR-TB and effectiveness of surgical treatment on MDR-TB case.

On the other hand, there are limited numbers of effective drugs against tuberculosis after rifampicin was approved. For past several years, fluoroquinolones such as levofloxacin and moxifloxacin were considered to have a potential as anti-tuberculosis agent, however, there are many problems such as application or adverse effect due to long term usage. Recently, Global Alliance for TB Drug Development or other organizations have developed novel anti-tuberculosis agents, and also OPC-67683, which had been developed in Japan, has been expected to be a useful agent against MDR-TB. Dr. Norio Doi reported a review of novel anti-tuberculosis agents as powerful tools against MDR-TB in next generation.

Finally, tuberculosis patients can be forced into isolation under the law, however, it may lead to violation of human rights of incurable MDR-TB patients. Meanwhile, enforced isolation system do help treatment completion of poor compliant tuberculosis patients. Dr. Eriko Shigeto reported the management of tuberculosis patients, especially of MDR-TB patients, comparing that of European countries with Japan.

We believe that this mini-symposium is helpful for participants on their daily management of TB patients.

1. Multidrug-resistant tuberculosis in Japan: epidemiology and diagnosis: Kazunari TSUYUGUCHI (Clinical Research Center, National Hospital Organization Kinki-chuo Chest Medical Center)

Recent report indicated that the prevalence of multidrug-resistant tuberculosis (MDR-TB) in Japan is still not negligible and that the prevalence of extensively drug-resistant tuberculosis (XDR-TB) among MDR-TB cases is high. Rapid detection of drug resistance is needed for effective treatment and control of MDR-TB. We evaluated the utility of line probe assay (LiPA) directly on clinical specimens for rapid detection of rifampicin resistance. We observed a sensitivity of 93.3% and a specificity of 99.7%. Additionally, 73.3% of rifampicin resistant samples were also isoniazid resistant. These results indicate the usefulness of LiPA for rapid identification of MDR-TB patients.

2. Treatment result of MDR-TB: Takashi YOSHIYAMA (Fukujuji Hospital)

[Background] Treatment result of multi-drug resistant tuberculosis (MDR-TB) has not been reported recently in Japan.

[Purpose] To report the treatment result of MDR-TB in a hospital in Japan.

[Method] Retrospective review of medial record.

[Result] Among 102 MDR-TB cases, 59 cases were cured, 15 cases failed, 26 cases were without result (turned negative but either transferred out (15), died (6), lost (4) and others) and two cases relapsed after completion of treatment. The two relapse cases were relapse after surgery and both turned negative after medical treatment. Among 52 cases that were negative after 5 months of treatment, 5 cases turned positive during treatment.

[Summary] There was no improvement of treatment result from 1990s due to the lack of new anti-TB drugs wihtout cross resistance to old drugs.

3. Novel anti-TB drug candidates effective against MDR-TB: Norio DOI (Department of Mycobacteria References and Research, Research Institute of Tuberculosis, Japan Anti-Tuberculosis Association)

TB-Alliance and Stop-TB Partnership (WHO) target introduction of the first new TB drug in 2010 and the first entirely novel drug regimen for TB in 2015. Five candidates effective against MDR-TB; OPC-67683, TMC-207, PA-824, SQ-109 and LL-3858, are in progress at clinical trial Phase I to II-b. MDR-TB cases will be well treated at least within 5−7 years. PK/PD & drug-drug interaction study of new agents in combined with current anti-TB drugs and ARV drugs are essential. Establishment of the next generation of global standard regimen 3−4 months for TB is the most important focused issue at present.

4. Isolation, human rights and treatment system of MDR-TB patients: Eriko SHIGETO (National Hospital Organization Higashihiroshima Medical Center)

Under new infectious disease law, chronic excretors have to stay in the hospital endlessly, though many tuberculosis hospitals experience patients who left hospital without permission, many of them were homeless.

The Netherlands and Germany have system to detain infectious patients who do not follow treatment order. The most favorable consequence of this system is decrease of treatment failure and drug resistance, especially XDR-TB. The system of detention along with local DOTS might work to decrease chronic excretors in Japan.

Key words: Multi-drug resistant tuberculosis, Drug resistant gene, Prognostic factor, Novel anti-tuberculosis agents, Management

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Abstract Regarding current case findings, the mode of detection, delays in detection, the patient's occupation and so on were observed using the tuberculosis (TB) surveillance database.

81.3% of 24,760 TB patients newly notified in 2008 were detected at medical institutions. However, 10.8% of TB patients were detected during hospitalization with a disease other than TB and 8.5% of TB patients were detected under outpatients with a disease other than TB. The proportion of TB patients detected during inpatient or outpatient increased with age.

On the other hand, significant proportion of adolescents and young adults were also detected by active case finding such as periodic school mass-screening and periodic health examination for employees. 22.5% of TB patients aged 15−19 years were detected by periodic school mass-screening, and 24.9% of TB patients aged 25−34 years were detected by periodic health examination for employees. Although active case finding generally detects bacillary negative cases, 14.1% of sputum smear positive pulmonary TB patients aged 20−49 years were detected by periodic health examination for employees.

Although the proportion of TB patients detected by contact examination was only 3.0%, they were large among younger TB patients, e.g. 53.7% of those aged 0−14 years, 19.4% of those aged 15−19 years, 9.2% of those aged 20−24 years and 6.7% of those aged 25−29 years.

According to the symptoms of 19,393 pulmonary TB patients, 28.7% had respiratory symptoms, 30.4% had both respiratory and other symptoms, and 15.1% had symptoms other than respiratory symptom. 24.8% of pulmonary TB patients had no symptoms and 0.9% had no data about symptoms. The proportion of TB patients only having other symptoms without respiratory symptoms increased among the elderly TB patients, e.g. 13.7% of those aged 65−69 years, 16.2% of those aged 70−74 years, 18.0% of those aged 75−79 years, 19.7% of those aged 80−84 years, 22.1% of those aged 85−89 years and 26.5% of those aged 90 years and over.

Regarding the delay of case detection among 14,400 symptomatic pulmonary TB patients, patient's delay was longer in those aged 20−64 years and shorter in those aged 65 years and over. While, doctor's delay showed an inverse relationship with patient's delay. Total delay combining patient's delay and doctor's delay was strongly influenced by patient's delay.

The sputum smear positive symptomatic pulmonary TB patients showed much longer total delay, and the proportion of total delay exceeding 3 months was 27.5% in those aged 20−64 years.

Regarding occupation, the proportion of service workers and nurses/public health nurses were large among young TB patients. 8.4% of male TB patients aged 20−24 years and 10.8% of female TB patients aged 20−24 years were service workers. 10.7% of female TB patients aged 25−49 years were nurses/public health nurses. TB control for nosocomial infection is still important in Japan.

Key words: Tuberculosis, Mode of detection, Delay of case finding, Occupation, Sex, Age

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