Original Article

EXAMINATION OF ONSET CASES IN CONTACT INVESTIGATION

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Abstract [Objectives] To analyze and evaluate onset cases of tuberculosis detected in contact investigations and to apply the results to future countermeasures.

[Methods] Index and secondary cases in contact investigations in which the secondary cases occurred in Osaka City between 2005 and 2008 were enrolled. The tuberculin skin test or QFT (QuantiFERON-TB Gold) was conducted to diagnose whether the contacts were infected with tuberculosis. X-ray examination of the chest was conducted to determine whether tuberculosis had developed, immediately or 6 months, 1 year or 2 years after the contact investigation.

[Results] (1) Index cases: Index cases followed by secondary cases numbered 131 patients. Regarding the chest X-ray findings, a cavity was observed in 67.7% of the index cases, and a sputum smear of 3+ was observed in 51.5% of the index cases. A 3-month or longer delay in index case-finding was noted in 50.4% of the index cases. (2) Secondary cases: Secondary cases numbered 177 patients, consisting of 107 patients who showed an onset of less than 6 months after their last contact with index cases. Of 70 secondary cases in whom tuberculosis was detected in the investigation conducted 6 months to 2 years after the contact investigation, 50% of them were not tested for infection due to their older age, consisting of 11 patients in their 40's, 8 in their 50's, and 16 in their 60's or over, and 17.1% of them refused or discontinued the treatment for latent tuberculosis infection, leading to onset.

[Discussion] Many secondary cases were detected immediately after the contact investigation, suggesting the importance of reducing the delay in index case-finding. Regarding the onset of secondary cases who showed an onset 6 months after the last contact with index cases, many cases showed an onset without being tested for infection due to their older age. More attention should be paid to the cases who refused or discontinued the treatment for latent tuberculosis infection, leading to onset.

Key words: Contact investigation, Index case, Secondary case, LTBI, Infection diagnosis, Delay in case-finding

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Short Report

MOLECULAR EPIDEMIOLOGY OF RIFAMPICIN MONO-RESISTANT *MYCOBACTERIUM TUBERCULOSIS*

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Abstract [Purpose] We aimed to investigate the prevalence and possible transmission routes of rifampicin (RFP) mono-resistant *Mycobacterium tuberculosis* strains.

[Methods] Drug susceptibility testing was used to identify 15 RFP-resistant strains out of 4,633 *M.tuberculosis* isolates. Sequencing of the *rpoB* gene and VNTR analysis were performed to further confirm the genetic classification.

[Results] Resistance-conferring mutations in the RFP resistance-determining region (RRDR) of the *rpoB* gene were found in 14 of the 15 strains with phenotypic RFP mono-resistance. VNTR analysis revealed 2 clusters of 5 identical strains each.

[Conclusions] Although the community prevalence of RFP mono-resistant *M.tuberculosis* is low, the results of VNTR analysis suggested that rather than being recently transmitted, these strains may have been widely transmitted as latent infections in the population.

Key words : *Mycobacterium tuberculosis*, Rifampicin, *rpoB* gene, Drug susceptibility testing, VNTR

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Case Report

TWO CASES OF PULMONARY TUBERCULOSIS WITH AN INTRA-FAMILIAL TRANSMISSION ROUTE

Keiko MITAKA, Takayuki HONDA, Kazuhiro FUKASAWA, and Yoshihiro MIYASHITA

Abstract Two patients with smear-positive adult-type pulmonary tuberculosis (TB) were admitted to our hospital. The patients in case 1 and case 2 were a 33-year-old woman and a 33-year-old man, respectively. None of the patients' family members had any apparent symptom indicating TB. However, the father of patient 1 was found to have recurrent TB with a positive smear in the contact investigation. The mother of patient 2 was then admitted to a hospital with acute respiratory failure caused by recurrence of TB. Her sputum sample also turned out to be smear-positive. Restriction fragment length polymorphism (RFLP) analysis of the isolates revealed identical DNA patterns in each pair of family members. These cases were typical examples of intra-familial infections involving young adults and their parents. This route of transmission is still important in areas with low prevalence of the disease.

Key words: Intra-familial TB transmission, Secondary infection, Old TB, Contact investigation

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Report and Information

NATIONWIDE SURVEY OF THE USE OF CLASS 2 INFECTIOUS DISEASE BEDS FOR IN-HOSPITAL CARE OF TUBERCULOSIS PATIENTS

Kunihiko ITO, Yohko NAGATA, Minako URAKAWA, and Seiya KATO

Abstract [Purpose] To investigate the possibility of employing in-hospital care for tuberculosis (TB) patients in beds meant for patients with Class 2 infectious diseases and determine the obstacles facing the same.

[Subjects & Methods] We conducted a questionnaire survey of all 225 hospitals that had beds meant for patients with Class 2 infectious disease but did not have tuberculosis wards.

[Result] Responses were obtained from 83.1% of the targeted hospitals. Around 60% of the hospitals had used these beds for patients other than those with Class 2 infectious disease (including TB patients). Around 50% and 30% of the hospitals had used these beds for suspected TB patients to ensure hospital infection control, and for treatment of patients diagnosed with TB, respectively. In response to the question on how they would use these hospital beds for TB or suspected TB patients if the regulations allowed such use, around 60% of the hospitals answered that the beds will be used for suspected TB patients until their diagnosis was confirmed, and 25% of the hospitals responded that they will never use their beds for TB patients. Only 10% of the hospitals answered that the beds will be used for in-hospital care of TB patients. With regard to the reasons why the beds cannot be easily used for in-hospital care of TB patients, several issues were pointed out, such as difficulty in appointing sufficient staff for care of TB patients, and a lack of doctors who had sufficient experience in TB medicine. However, there was no single predominant reason.

[Conclusion] To ensure that hospital beds for patients with Class 2 infectious diseases are utilized for in-hospital TB care, we need a flexible policy, which is suited to the specific conditions in each community and hospital.

Key words: Class 2 infectious disease beds, Tuberculosis, Tuberculosis ward, Infectious Disease's Control Law, National Policy to Control Tuberculosis

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TUBERCULOSIS ANNUAL REPORT 2009
— Series 8. Treatment of TB (1) —

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Abstract The standard treatment of tuberculosis (TB) is the key to its control. Here we report the statistics of treatment history and the initial regimen for treating TB in 2009.

In 2009, 24,170 TB patients were newly notified. Of those, 1,751 cases were reported as having had previous treatment and 410 cases were reported as having an unknown treatment history. The proportion of patients receiving retreatment was 7.4%, excluding those of unknown treatment history. The proportion of those receiving retreatment among newly notified TB patients increased with age from those at 20−24 years old (3.2%) to those at 80−84 years old (9.3%). The frequency of retreatment among newly notified TB patients might be partly an indicator of previous insufficient treatment.

Regarding the year of previous treatment, the greatest number of cases reported having received previous treatment in 2008 (n＝194). The total number of cases whose previous treatment had begun in 2008 or 2009 was 224, i.e. 12.8% of all retreatment cases in 2009. On the other hand, the number of cases having received previous treatment in the 1950s was also significant (n＝219, 12.5%).

As the initial treatment regimen, the combination of INH (isoniazid), RFP (rifampicin), PZA (pyrazinamide)＋EB (ethambutol) or SM (streptomycin) is recommended by the Japanese Society for Tuberculosis. This regimen was initially used in 80.8% of all forms of TB patients aged 15−79 years old, excluding those cases whose treatment regimen was unknown.

The data on duration of having actually received PZA was added to the central TB surveillance database starting in 2007. The number of cases who started TB treatment including PZA in 2008 was 15,146. Of those, 11,997 cases had completed TB treatment by the end of 2009, but 9.9% of them could not take PZA fully for 2 months.

Key words: Tuberculosis, Age, Treatment history, New treatment, Retreatment, Regimen, PZA

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The 86th Annual Meeting Educational Lecture

RECENT ADVANCES IN TUBERCULOSIS IMMUNITY

Kiyoko S. AKAGAWA

Abstract Primary tuberculosis infection is acquired by the inhalation of droplets containing *Mycobacterium tuberculosis* (MTB) bacilli. Only 5−10% of those individuals infected by MTB develop clinical diseases, and disease presentation itself is heterogeneous, suggesting that host factors play a large role in disease susceptibility. Protective immunity in the lung against MTB consist of the innate immunity in which alveolar macrophages play an central role, and the acquired immunity including various type of effector T cells. Recent studies show that the important roles of the receptors which recognize MTB for the development of protective immunity, the difference in the anti-MTB activity of macrophages between human and mice, the macrophage-heterogeneity that affects the anti-MTB activity, the role of IL-10 in the activation of anti-MTB activity of human macrophages, and the role of Th17/IL-17, Th22/IL-22 and TNF in the protective immunity against human tuberculosis. In this review, these recent advances in tuberculosis immunity will be described.

Key words: Tuberculosis, Immunity, Pattern recognition receptors, Macrophages, Effector T cells, TNF

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ROLE OF NURSING IN TUBERCULOSIS CARE

Chairpersons: [1]Yoko NAGATA and [2]Keiko KUDO

Abstract One of the key roles of nursing in TB care includes coordinating with various other professionals and conducting patient education. DOTS conferences and cohort analysis are just some examples of areas in which nurses could effectively practice these roles. Naturally, nurses working in hospital TB wards must devote their time to providing medical procedures and care, and can rarely attend conferences. Yet on the other hand, nurses involved in TB care must prevent the spread of infection and at the same time maintain the QOL of patients—in other words, they are expected to have both specialist and general skills. The role of TB nursing may be said to have three aspects: 1) educate patients and ensure they are provided with accurate, professional knowledge on TB, 2) conduct assessment in order to provide appropriate patient support, and 3) coordinate between the medical establishments and the local communities. One of the places where nurses could effectively practice these roles is the DOTS conference. DOTS conference may also be thought of as an opportunity to re-affirm and expand one's knowledge of DOTS, and accumulate experience in coordinating with other professionals and related bodies. Medical establishments, social welfare and governmental bodies each need to clarify their roles and work in partnership to build a local network of TB care, with public health centers acting as a coordinator. On the other hand, the role of nursing in TB care is to provide high-quality TB nursing by sharing information with relevant individuals and bodies and practicing the three aspects as mentioned with the ultimate aim of ensuring that patients overcome TB.

1. The role of nursing in TB specialist hospitals: Haruko KIDO (National Hospital Organization Kinki-chuo Chest Medical Center)

One of the roles nurses are expected to play in TB specialist hospitals is the coordination within the hospital, and between the hospital and the outside bodies. In order to act as such coordinator effectively, the nurse must 1) be aware, as a nurse of a TB specialist hospital, of the role of TB nursing and recognize his or her responsibility, 2) hold appropriate knowledge and skills regarding TB and TB care, and be able to communicate assertively and coordinate with patients, their family members, doctors and co-medicals, and 3) disseminate the knowledge and skills of TB nursing to other institutions. Examples of such opportunities include DOTS conference, conference with the hospital team, research and participation in training and lectures as a trainer. In other words, the role of nurses in TB specialist hospital is not only to improve knowledge and skills regarding TB and TB care but also to disseminate these to other professions and bodies.

2. The roles and responsibilities of public health nurses in

tuberculosis control: Tomoko KAMIYAMA (Health Precaution Section, Takasaki City Health Center)

Despite the estimated rates of tuberculosis (TB) prevalence and mortality are declining, it remains a significant public health threat in Japan. Public health nurses, who practice in local health departments, play a major role in the prevention, treatment, and cure of TB. When a case of lung TB disease is discovered, the nurse works to determine which people might have been exposed to the TB bacteria and to make a plan to prevent developing the disease. The nurse also observes the TB patient take prescribed medication as ordered. The educational training on the job for fresh, inexperienced public health nurses to develop their faculties and to get knowledge of TB should be effective methods. However, it becomes a serious problem to decrease opportunities of on-the-job training at health centers in Gunma prefectural office. The author considers that elaborated and systematic TB control strategies, such as the DOTS conference, the critical path of TB for community healthcare network, and the cohort meeting in the TB control program, are important not only for TB control but also for TB expert development.

3. Basic nursing education and tuberculosis nursing: Keiko KUDO (Faculty of Nursing, Musashino University)

Mainstream university education is an integrated program requiring students to obtain the qualifications necessary to take the national examinations for both nurses and public health nurses. This system is thought to facilitate collaboration between ward and public health nurses at public health centers. However, as studying to be a public health nurse is becoming optional, there is concern that tuberculosis nursing will become an even smaller part of future basic nursing education. It is necessary to reexamine what tuberculosis nursing skills are required in basic nursing education.

Statement 1: What can we learn from working in a TB ward?: Mariko FUKUMURO (National Hospital Organization Tokyo National Hospital)

An anonymous self-administered questionnaire was conducted among nurses working in the TB word (of NHOTH) of investigate how nurses perceived their capacity regarding their DOTS-related work. The average years of experience in TB ward was 3.4 years, and all stated that they thought they are able to fully perform the tasks related to adherence support within the DOTS. They were most confident in providing adherence support in the TB ward. However, on the other hand, 60% of them had said that they were not being able to conduct patient interviews, participate in adherence conferences, communicate with patients and their family member, communicate with other relevant bodies, and share information with public health nurses when they came to visit patients, in a manner they considered satisfactory. Nurses in charge wished to improve skills in organizing their time so that they could attend conferences and communicate more fully with public health centers, so that they could discuss and plan patient support after discharge in detail. They also found their work in the TB ward, which requires specialist knowledge and skills in communication, challenging and meaningful in a different way from acute nursing care.

Statement 2: In-service training for nursing: Noriko KOBAYASHI (Research Institute of Tuberculosis, JATA)

Specific Guidelines on Prevention of Tuberculosis Infection was revised in May 2011. With regards to DOTS, the guidelines recommend strengthening of the DOTS system and promotion of local partnership. Nursing plays a key role in building this partnership, thus in-service training, where nurses who have experienced TB care can themselves disseminate information is essential to provide holistic team care which can overcome difference local bodies and establishments.

Key words: Nursing in TB care, Partnership, DOTS conference, Basic nursing education, In-service training

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