EVALUATION OF MYCOBACTERIAL INFECTIONS USING ^{18}F-FLUORODEOXYGLUCOSE-POSITRON EMISSION TOMOGRAPHY: RESULTS OF NINE CASES

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Abstract ^{18}F-fluorodeoxyglucose-positron emission tomography (FDG-PET/CT) is a useful technique for distinguishing malignant and benign lesions, although the occurrence of false-positive results in cases involving benign lesions is possible. We evaluated nine patients with mycobacterial infections who underwent FDG-PET/CT from April 2008 to July 2010. FDG-PET/CT was performed 1−2h (during the early and late phases) after administration of FDG at a dose of 185 MBq/individual after fasting for at least 5h. Out of the nine patients, four were diagnosed with pulmonary nonmycobacterium tuberculosis, two with pulmonary tuberculosis, two with tuberculous lymphadenopathy, and one with pleural tuberculoma. All patients had a maximum standardized uptake value (SUVmax) of >2.5, and the SUVmax increased from the early to the late phase. One lesion that occurred due to tuberculous pleurisy after treatment demonstrated high FDG uptake, similar to the other cases. It is difficult to distinguish mycobacterial infections from malignant diseases using FGD-PET alone ; hence, the use of high-resolution CT and bacteriological tests is required for diagnosis and distinction.

Key words: ^{18}F-fluorodeoxyglucose-positron emission tomography: FDG-PET/CT, Tuberculosis, Non-tuberculous mycobacterial infection, Mycobacteriosis, Pleural tuberculoma

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Original Article

EVALUATION OF THE USE OF SPEED-OLIGO® MYCOBACTERIA FOR IDENTIFICATION OF *MYCOBACTERIUM* SPECIES

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Abstract [Objective] To evaluate the use of SPEED-OLIGO® MYCOBACTERIA (Vircell, Spain) in identifying *Mycobacterium* species.

[Method] We examined 15 type or reference strains of mycobacteria (*M.tuberculosis* H37Rv and 14 non-tuberculosis mycobacteria), 48 clinical isolates, and 17 AFB-positive sputa by using SPEED-OLIGO® MYCOBACTERIA, and compared the results with those obtained using other referral methods available for species identification.

[Result] SPEED-OLIGO® MYCOBACTERIA yielded favorable results in 80.0%, 91.7%, and 88.2% of the cases of the tested type/reference strains, clinical isolates, and clinical samples, respectively. However, the type/reference strains *M.celatum*, *M.fortuitum* subsp. *fortuitum*, and *M.marinum*, and the clinical isolates *M.intermedium*, *M.marinum*, and *M.szulgai* were misidentified when SPEED-OLIGO® MYCOBACTERIA was used.

[Discussion] SPEED-OLIGO® MYCOBACTERIA can facilitate the rapid identification of *Mycobacterium* species mainly because of its short turn-around time and simple procedures. However, the accuracy of this method remains unsatisfactory.

Key words: Dipstick method, *Mycobacterium* identification

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Case Report

A CASE OF DRUG-INDUCED HYPERSENSITIVITY SYNDROME CAUSED BY LEVOFLOXACIN USED FOR TREATING PULMONARY TUBERCULOSIS

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Hidenori TAKIZAWA, Yasuko KIKKAWA, and Toshio NUMAO

Abstract The patient was a 27-year-old man with pulmonary tuberculosis, who was initially treated with isoniazid, rifampicin, ethambutol, and pyrazinamide. However, because of hepatic dysfunction and visual impairment, the four-drug therapy was switched to a three-drug regimen with isoniazid, rifampicin, and levofloxacin. At 9 weeks after the initiation of levofloxacin, the patient developed cervical lymphadenopathy, fever, systemic erythema, and hepatic dysfunction. He was diagnosed with drug-induced hypersensitivity syndrome (DIHS) based on positive results in the human herpesvirus (HHV)-6 DNA test, an indicator of HHV-6 reactivation. The symptoms improved after withdrawal of the antituberculosis drugs and initiation of steroid administration. However, considering the risk of relapse of DIHS, the tuberculosis treatment, which was initially planned for 9 months, was stopped at 7 months. Neither DIHS nor tuberculosis recurred.

Key words: Tuberculosis, Drug-induced hypersensitivity syndrome, Levofloxacin, Allergy, Multiple drug hypersensitivity

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SPECULATION ON REASONS WHY CO-INFECTION OF TUBERCULOSIS AND HIV IS RATHER RARE IN JAPAN

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Abstract Co-infection of tuberculosis (TB) and HIV is a serious problem in most developing countries and in industrialized countries, co-infection of TB and HIV is seen mainly among migrant population. In case of Japan, the numbers of both new HIV infection and AIDS cases have been increasing except slight decline in both figures in 2012, however, the epidemiological situation of HIV and AIDS is still one of the lowest in the world, and among index diseases of AIDS, TB is 5th among Japanese.

Based on prevalence of radiological TB findings in the national TB prevalence survey in 1968 and the coverage of BCG vaccination, the author speculated that most TB primary infection took place among those with rather high delayed type sensitivity, thus formation of typical primary complex was rather rare and the number of tubercle bacilli in primary complex and post-primary early disseminated lesions were few, and less risk of development of active TB even among HIV infected individuals.

Key words: Co-infection of TB and HIV, Prevalence of radiological TB findings, Coverage of BCG vaccination, Age-specific tuberculin positive rate

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The 88th Annual Meeting Symposium

OUTPATIENT CARE OF TUBERCULOSIS

Chairpersons: [1]Tetsuo YAMAGUCHI and [2]Toshiaki FUJIKANE

Abstract The outpatient care is important still more in the treatment of tuberculosis (TB). The community DOTS is required, to accomplish the treatment of the TB patients those have various risks of treatment discontinuation.

In this symposium, the several points are reported. The number of TB hospitals are decreasing and are maldistributed. And even in TB hospitals, the person/time for the education of patient and the risk assessment of drug compliance, are not sufficient. In general hospitals, the knowledge/experiences of TB treatment are not sufficient. It is important to share the information of the TB patient, between the persons concerned. It is also important to notify and succeed the knowledge/experience regarding TB treatment. For outpatient care of TB, collaborating work in the area is necessary. As practical means, it is important to promote the liaison critical path in the area. The TB hospital and the health center should play a big role.

Key words: Tuberculosis, Outpatient care, Community DOTS, Liaison critical path

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LESSONS LEARNED FROM TUBERCULOSIS OUTBREAK CASES

Chairpersons: [1]Seiya KATO and [2]Katsuhiro KUWABARA

Abstract Most TB outbreaks were caused by exposure of many people to tuberculosis bacilli due to delayed detection of initial cases who had long-lasting severe coughs and excretion of massive tuberculosis bacilli. They were also affected by several other factors, such as socio-environmental factors of the initial case; time and place of infection; and host factors of the infected persons such as immune status, infectivity, and/or pathogenicity of the bacilli.

In this symposium, we learned the seriousness of infection and disease among immune-suppressed groups, special environmental factors with regard to the spread of infection, disease after treatment of latent tuberculosis infection, diagnostic specification of IGRA, and bacteriological features including genotyping of the bacilli.

We reaffirmed that countermeasures for the case are important, but outbreaks can provide excellent opportunities to learn important information about infection, disease progression, etc.

1. Tuberculosis outbreak in a cancer ward: Katsuhiro KUWABARA (Division of Respiratory Diseases, National Hospital Organization Nishi-Niigata Chuo National Hospital)

There was an outbreak of tuberculosis in a cancer ward of a highly specialized medical center. Outbreak cases included eight hospitalized patients and two medical staff members over a 1.5-year observation period after initial contact. Three immune-compromised patients including the index patent died of cancer and tuberculosis. Community hospitals and highly specialized medical centers, such as cancer centers, should carefully prepare a proper system to prevent nosocomial transmission of tuberculosis.

2. Sixty-one cases of TB exposures in hospital settings and contact investigations of the hospital staff, with special reference to the application of QFT: Hiroko Yoshikawa NIGORIKAWA (The Division of Infectious Diseases, Tokyo Metropolitan Health and Medical Treatment Corporation, Toshima Hospital ; present : Division of Infectious Diseases, Tokyo Teishin Hospital), Toru MORI (Research Institute of Tuberculosis, Japan Anti-Tuberculosis Association)

The index case was a patient who was admitted to a general hospital where she was treated with pulsed corticosteroid therapy and then put on a respirator. Soon after, she developed tuberculosis (TB) and died. Immediately after her death, the healthcare workers who had close contact with the index case were given the QuantiFERON®TB Gold (QFT) test, which indicated that all staff except one were negative. However, a QFT test administered eight weeks later had a positive rate of 18.6%. Subsequently, a total of five workers, including a doctor, nurses, and radiology technicians, developed TB. The bacterial isolates from five of them exhibited an RFLP pattern identical to that of the index case. These secondary cases of TB included a case who had contact of less than 5 minutes, a case whose QFT was negative (“doubtful” in the Japanese criterion of the QFT), and a case who was QFT-positive but declined to be treated for latent TB infection (LTBI). No other workers nor hospitalized patients developed TB.

The healthcare worker contacts were further examined with the QFT 6, 9 and 12 months after the contact. The QFT results revealed four additional positive reactors and four “doubtful” reactors who were indicated for LTBI treatment. Among them were seven subjects who turned positive six months after the contact. TB prevention in hospital settings and contact investigations were discussed with the hospital staff, with special reference to the application of QFT.

3. Summary and issues of concern relating to a tuberculosis outbreak in a prison: Mitsunobu HOMMA, Takefumi ITOH (Department of Respiratory Medicine, Akita City Hospital)

We report a tuberculosis outbreak that occurred in a prison in the spring of 2011, resulting in 11 cases of active disease and 40 cases of infection. The primary cause of the outbreak is thought to be the delay in identifying the index case, where the screening result interpretation might have contributed to the delay. However, we also speculate that environmental factors, such as occurrence in the closed space of a prison, inmates spending long periods living together, inmates staying in their rooms due to the cold winter, and poor ventilation in the prison factory, all contributed to accelerating the spread of the infection. Both the QuantiFERON®TB-2G (QFT)-positive rate and disease incidence were higher among the close contact group, and there were no cases of tuberculosis among QFT-negative individuals, proving the utility of QFT screening in contact surveys. Genetic testing for *Mycobacterium tuberculosis* is a useful method for studying outbreak cases. In the present case, it led to the discovery of an unexpected route of infection,

reaffirming its importance. This outbreak occurred among a particular population with whom it was difficult to deal and it occurred under unique circumstances. In fact, there were various obstacles to overcome, the most important of which was to ensure the three organizations involved (prisons, health centers, and hospitals) worked together closely, sharing accurate, real-time information.

4. Environmental factors, treatment for latent tuberculosis infection and molecular epidemiology relating to an outbreak of tuberculosis: Makoto TOYOTA (Kochi City Public Health Center), Seiya KATO (Research Institute of Tuberculosis, Japan Anti-Tuberculosis Association)

The ventilation rate within the room of a junior high school was analyzed using sulfur hexafluoride (SF6) as the tracer gas. Low ventilation of the room contributed to the massive outbreak. The risk of active tuberculosis was reduced by 81.0% with treatment for latent tuberculosis infection, compared with that without treatment. Delayed reactivation of tuberculosis was observed among patients treated with isoniazid for latent tuberculosis infection. Molecular epidemiology can provide insights into the process of tuberculosis transmission, which may otherwise go unrecognized by conventional contact investigations. Additionally, it can play an important role in identifying places of tuberculosis outbreaks and routes of transmission in a contact investigation.

Key words: Tuberculosis, Outbreak, Hospital, Prison, School

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