Memorial Lecture by the Imamura Award Winner

RISK OF **Mycobacterium tuberculosis** INFECTION
AMONG EMPLOYEES AT A GENERAL HOSPITAL WITHOUT WARDS
FOR TUBERCULOSIS PATIENTS
— A Study of Interferon-Gamma Release Assay Positivity —

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Abstract  
Objective] Risk of exposure to *Mycobacterium tuberculosis* among hospital workers was retrospectively evaluated using interferon-gamma release assay (IGRA) positivity as an indicator of exposure. We hypothesized that exposure to a hospital environment posed a risk of exposure to *M. tuberculosis*.  
[Subjects] The subjects were 870 employees who underwent IGRA from December 2010 to April 2012. They were divided into the following three groups based on exposure in the hospital environment: 161 new employees who were evaluated at hiring (non-exposure group) and 709 existing employees including those who had undergone contact examinations (exposure group).  
[Methods] QuantiFERON-TB Gold®3G was used for IGRA. Logistic regression analysis was used to calculate the odds ratios for positivity in the exposure group compared to that in the non-exposure group.  
[Results] The overall positivity rate was 6.7%, with a significant difference between the groups (1.9% and 7.8% in the non-exposure and exposure groups, respectively) (P = 0.005). After adjusting for gender, years of employment, smoking history, and alcohol intake, the exposure group’s odds ratio (95% confidence interval) for positivity compared to that in the non-exposure group was 4.1 (1.4–17.6) (P = 0.007).  
[Conclusion] These results suggest that exposure to a hospital working environment could present a risk of tuberculosis infection, regardless of years of employment.

**Key words:** Tuberculosis, Hospital-acquired infection, Contact examination, Interferon-gamma release assay, QuantiFERON

INTRODUCTION

Among medical professionals, nurses have higher relative risks of tuberculosis infection, and a tendency for a higher risk of tuberculosis has been observed in clinical laboratory technicians. The main reason for this increased risk may be their close contact with patients or patient specimens that can produce aerosols in their work, which suggests a risk of exposure to *Mycobacterium tuberculosis* in hospital environments (hereinafter abbreviated as "exposure to a hospital environment" or "exposure").

Interferon-gamma release assay (IGRA) is a method of diagnosing tuberculosis infection, including latent tuberculosis infection (LTBI), with high levels of sensitivity and specificity, and is a leading method for hospital-acquired tuberculosis infection control. Knowing the baseline level can raise the sensitivity and specificity of LTBI diagnosis in health checks for people who have been in contact with tuberculosis (contact examinations), thus greatly contributing to the early diagnosis and treatment of infections.

In 2010, a medical worker at our hospital experienced a hospital-acquired infection from a patient with miliary tuberculosis. Because of this, baseline IGRA using QuantiFERON-TB Gold®3G (QFT, Japan BCG Laboratory) was performed in all hospital employees as part of hospital-acquired infection control. Thereafter, IGRA was performed in all new employees upon hire. This study retrospectively analyzed these results to compare the IGRA positivity of a post-employment group (baseline group + contact-examination group: hospital-environment exposure group) to that of a new-employee group (non-hospital environment exposure group) to determine whether exposure to the environment of our hospital was a risk factor for tuberculosis infection among employees. We also examined how job type and years

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