Perspective

Patients with pulmonary tuberculosis at risk for delayed isolation

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ABSTRACT

The objective was to investigate the incidence of delayed or unsuccessful isolation of hospitalized pulmonary TB patients as well as the contributing factors. After removing those who had a stay of more than one day and those who had just attended the emergency room, the patients with pulmonary TB at a university were included in this retrospective study. The delayed or no isolation group included patients who were not isolated for days at a time. We contrasted the clinical observations and diagnostic test results of individuals handled with timely isolation against delayed or no isolation (D-isolation) (T-isolation). Patients with pulmonary TB were included in the study. Isolation was sometimes imposed late or not at all, while other times it was done so quickly. In contrast to patients in the D-isolation group, patients in the T-isolation group had chest X-rays that revealed typical TB abnormalities. On univariate analysis, older age, admission route (emergency room vs. other), admitting department, negative acid-fast bacilli (AFB) stain, and negative MTB PCR were additional characteristics that were substantially associated with delayed or no isolation. On multivariate analysis, an atypical chest X-ray finding, negative sputum AFB stains, admission through an outpatient clinic, admission to a department other than infectious diseases or pulmonology, and admission to these risk variables were identified as risk factors for isolation failure.

Atypical radiological features and negative results from direct TB diagnostic testing were the main reasons why patients with pulmonary TB were delayed from being isolated or were not isolated at all.

Key Words: *Tuberculosis; Undernutrition; Pleural disease, Interventional pulmonology*

INTRODUCTION

The airborne method of transmission for tuberculosis (TB). For individuals with a confirmed or suspected infection, airborne measures are necessary since TB can spread in hospitals. However, sometimes TB is found after the patient has been admitted to the hospital. As a result, nosocomial exposure may affect medical staff, nearby patients, and those who are caring for them. Healthcare professionals may be at risk for TB transmission during endoscopic operations or respiratory management if they don't use the proper protective gear. It can be difficult to prevent healthcare workers from coming into contact with TB. It takes a long time to confirm an infection after exposure, and there are currently no known risk factors for developing active TB in a previously healthy person. As a result, even among populations with robust immune systems, a large number of persons with latent TB infection (LTBI) need therapy to stop the disease from becoming active. There have been new TB case reports. As a result, it is likely that medical staff members frequently come into contact with TB patients. The chance of TB infection among healthcare workers annually varied from, in nations with an intermediate-to-high TB prevalence, according to one study that claimed that healthcare workers harboured LTBI. Even when exposed to TB patients, LTBI seldom develops, and among those in whom it does, only healthy people experience reactivation into active TB. To avoid the danger of TB infection in healthcare workers (HCWs) and

secondary transmission to patients, emphasis should be made on TB exposure in hospitals. Few research, however, has looked at possible countermeasures to HCW exposure to TB. This study examined the rate of delayed or no isolation among patients with recently detected TB and the causes of failure of timely isolation measures in a hospital with an intermediate TB prevalence because exposure to TB is strongly associated with delayed or no isolation of patients with active TB. This retrospective cohort study was carried out in South Korea at a single hospital that was affiliated with a tertiary university. All pulmonary TB patients were included. extra pulmonary TB patients, hospitalized patients who had been on anti-TB drugs for weeks at the time of admission, and patients who had received a TB diagnosis at another hospital were also eliminated. Patients who spent days in the hospital or weeks in the emergency room were also disqualified. But regardless of how brief their stay was, all patients who had bronchoscopy for the purpose of diagnosing TB were included in the analysis. The route of admission, admitting department, hospitalization date, presence of fever during the first three calendar days of hospitalization, isolation date, date of acquisition of respiratory specimens positive for Mycobacterium tuberculosis, chest X-ray and chest computed tomography (CT) imaging dates, radiological evaluation results, and PCR test results for TB (AdvanSure TB/NTM real-time PCR) results were reviewed in patients' electronic medical records. Days after the first AFB-positive culture specimen was acquired, diagnostic tests that were completed were assessed. Patients whose respiratory specimen culture contained M. tuberculosis were considered to have pulmonary TB. There were only culture-positive instances listed. Infectiousness could not be determined in cases where the PCR was positive but M. tuberculosis did not develop in the AFB culture, hence we excluded these cases. The delayed or no-isolation group consisted of patients with active TB who were not isolated for days (D-isolation). Patients who were promptly segregated within days were referred to as this group (T-isolation). Because HCWs working inwards or intensive care units (ICU) work an average of and care for two or more patients at once, we estimated that the risk increases when they provide care for patients for at least days. In patients with an AFB-positive or AFB-negative smear, the infectivity period was referred to as the month or month period before acquiring the respiratory samples, respectively. The moment any positive test for TB was initially reported was considered the first time that TB was identified. The date of positive results was based on the dates that the chest X-ray and chest CT scans were performed, as well as the dates that the AFB smear, culture, and PCR tests were reported. The diagnostic procedures for patients with suspected TB and the TB infection screening procedure for HCWs who have been exposed to TB are shown elsewhere. Chest X-ray findings reveal active TB (please see supplementary material). SPSS software was used to analyze all of the data. Since the distributions of the date interval data were skewed, the median and interquartile range (IQR) were displayed. Continuous variables were analyzed using the Mann-Whitney U test or the Student's t-test. For the analysis of categorical variables, Fisher's exact test or the c2 test was utilized. Logistic regression was used to conduct a univariate analysis for each variable. Binary logistic regression was used for the multivariate analysis, which included all variables with univariate analysis. Each and every one of the given p values were two-sided and regarded as significant. Ethics position Hospital's Institutional Review Board gave its approval for this study. A total of patients had pulmonary TB, which was determined by the development of M. tuberculosis on AFB cultures. Patients from this group were not included in the analysis. Patients with confirmed pulmonary tuberculosis are included in this analysis, and among them, and were assigned to the D-isolation and T-isolation groups, respectively. Sixty-seven individuals were not isolated while they were in the hospital. Table S2 compares patients who were delayed in being isolated with those who were never segregated. For patients in the D-group, the median time between admission and isolation was days. In the T-isolation and D-isolation groups, the median length of isolation was days. On the initial chest X-ray, the patients showed typical TB signs. Comparing the T-isolation group to the D-isolation group, the T-isolation group had a considerably higher percentage of patients with classic TB chest X-ray results. In comparison to the T-isolation group, the D-isolation group had a considerably larger percentage of patients with negative AFB smear results. Delay or lack of isolation occurred in certain cases among the patients whose chest X-rays did not reveal the typical TB symptoms and whose sputum AFB smear was negative. We also offer other baseline parameters and clinical data. The D-isolation group had more immunocompromised individuals and was older than the T-isolation group. The T-isolation group included one of these patients. This patient was placed in isolation to treat grade neutropenia at the beginning of their hospital stay due to pancytopenia and bilateral lung involvement. Both varicella pneumonia and pneumocystis pneumonia were suspected. However, the patient's leukemia and pulmonary TB diagnoses came days after hospitalization With the exception of this patient, none of the other patients received prompt isolation care. Between those who were tested days before hospitalization and those who were tested days after admission, there was a sizable statistical difference in the prompt isolation rate. Less than three AFB smears of sputum were conducted. Because positive AFB smear results were found in the initial sample, some of them were carried out. Less than three sputum smears, however, were carried out on individuals who had negative AFB smear results. Less than three AFB smears performed in patients with a negative AFB sputum smear were linked to the failure of prompt isolation. Sputum AFB tests were carried out three or more times in patients with suspected active TB on chest X-rays, whereas three or more sputum AFB smear tests were carried out in patients with atypical chest X-ray results. Patients with atypical chest X-ray results experienced prompt isolation more frequently than patients with fewer than three sputum AFB smear tests among patients with unusual chest X-ray features. When a patient was admitted to a medical department other than pulmonology or infectious diseases or to a non-medical department, and when active TB was not visible on a chest X-ray, our multivariate analysis showed that delayed or no isolation was more likely. When neither PCR method was used, there was a small increase in the possibility of delayed isolation. AFB smear-negative patients were less likely to be effectively isolated than patients with a high sputum AFB grade. For TB patients in the D-isolation group, contact investigations were done. 556 HCWs were exposed to the index cases, and 438 of them had their LTBI tested. At the baseline test, 69 patients tested positive for LTBI. Of the cases where baseline LTBI testing was negative, there were recent LTBI-positive cases. There have been no HCW cases of active TB since the contact inquiry. This study evaluated the clinical findings and TB

diagnostic test results of patients with culture-confirmed TB who were or were not isolated promptly. The most crucial element in the early identification of patients needing isolation was the appearance of characteristic TB-related features on a chest X-ray, as the likelihood of improper isolation was significant in the absence of these symptoms. Atypical chest X-ray features were present in over 50% of TB patients, which contributed to a significant failure rate for prompt isolation.

Healthcare facilities confront a severe problem with nosocomial TB exposure because failing to separate patients within days of admission will surely expose HCWs to the disease. Although many methods have been created, the chest X-ray and AFB smear/culture continue to be the most crucial. The retrospective design of this study has certain drawbacks. Contrary to prospectively structured trials, data were gathered by reviewing medical records, making it difficult to adequately capture key clinical characteristics of TB, such as persistent coughing, weight loss, hemoptysis, and exhaustion. Additional application of these clinical traits could aid in TB diagnosis early, leading to earlier isolation. Additionally, the testing procedures used on each subject varied, which complicated interpretation. In particular, it would have been able to establish more conclusive information on the efficacy of these regimens if three or more AFB smears and PCR tests had been conducted consistently in all patients.