Letter

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Clinicopathologic characteristics of patients with tuberculosis and schizophrenia

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Summary **The clinicopathologic characteristics of patients with tuberculosis (TB) and schizophrenia are unclear. In order to facilitate early diagnosis and prompt treatment, a retrospective study was conducted in China. Subjects were 54 consecutive patients who were seen between October 2006 and December 2015. Data on demographic characteristics, underlying diseases, clinical features, and outcomes were collected from medical records using a standardized data collection form. Acid-fast bacilli were detected at a rate of 26.9%, a mycobacterial culture was positive at a rate of 35.4%, and a real-time polymerase chain reaction was positive for TB at a rate of 35%. Of the 54 patients, *i*) 44 (81.5%) had symptoms for at least 2 weeks; *ii*) 10 (18.5%) were transferred from a local psychiatric hospital, and 23 (42.6%) were transferred at least twice before arriving at this Hospital. Unfortunately, the outcome was not successful in these patients, 18 patients (33.3%) had to be retreated, 7 patients (13.0%) had their care interrupted because their schizophrenia worsened. The current study found that the management of TB in patients with schizophrenia poses several challenges. These include delays in diagnosis and treatment of TB, inefficient strategies for control of TB transmission in psychiatric hospitals, the need for a psychiatrist to be involved in care, and a high rate of retreatment.**

Keywords: Tuberculosis, schizophrenia, diagnosis, treatment, outcome

Currently, tuberculosis (TB) remains one of the world's biggest threats. According to a 2017 report by the World Health Organization (WHO) (*1*), 10.4 million people are estimated to have contracted TB in 2016. A significant unrecognized challenge in TB care is a co-morbid mental illness, such as schizophrenia, and there are several common risk factors for mental illness and TB (*2*).

Currently, the standard short-course chemotherapy for TB involves a 6-month regimen. Alternative chemotherapy, which generally lasts longer than 18 months, is required for multidrug-resistant (MDR) and extensively drug-resistant TB (*3,4*). One major difficulty that treatment of TB shares with treatment of a mental illness is the issue of non-compliance, and especially for schizophrenics. Moreover, treatment for TB is hampered by drug interaction between antipsychotic medication and two first-line drugs (isoniazid or rifampicin) (*5,6*).

Improved diagnosis, treatment, and prevention of TB in patients with a mental illness will not only lower treatment costs but also help to reduce global disease transmission. In order to ascertain the clinicopathologic characteristics of patients with TB and schizophrenia, a retrospective study was conducted at Shandong Provincial Chest Hospital in China between October 2006 and December 2015. This study was approved by the ethics committee of this Hospital.

Subjects were patients diagnosed with: *i*) schizophrenia according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Ed., Text Revision

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(DSM-IV-TR) or the International Classification of Diseases, 10th Revision; and *ii*) TB according to WHO criteria (*7*), including evaluation with chest X-rays, symptoms, microscopy, mycobacterial cultures, and a real-time polymerase chain reaction (PCR). Subjects were 54 consecutive patients (27 males, 27 females) with a mean age of 59.3 years (range, 17-90).

Data on demographic characteristics, underlying diseases, clinical features, and outcomes were collected from medical records. Due to the descriptive nature of this study, a simple description (proportion as well as mean and standard deviation) was determined for each outcome.

Table 1 shows the clinicopathologic characteristics of patients with TB and schizophrenia. Upon admission to this Hospital, 44 patients (81.5%) had symptoms for at least 2 weeks. The mean time before admission was 411 ± 1,154 days (range: 1 day to 20 years). Ten patients (18.5%) were transferred from a local psychiatric hospital, and 41 (75.9%) were transferred from a general hospital. A point worth noting is that 23 patients (42.6%) were transferred at least twice before arriving at this Hospital.

Acid-fast bacilli were detected at a rate of 26.9%, a mycobacterial culture was positive at a rate of 35.4%, and TB-PCR was positive at a rate of 35.0%.

Eleven patients with TB (20.4%) had diabetes mellitus. Of the 54 total patients, *i*) 11 (20.4%) had isolated extrapulmonary TB, including 6 with pleural TB; and *ii*) 43 (79.6%) had with pulmonary TB, 14 (32.6%) of whom had both pulmonary and extrapulmonary TB.

Outcomes for the 54 patients included relief of symptoms in 43 (79.6%), death in 2 (3.7%), abandonment of treatment in 2 (3.7%), and interruption of care in 7 (13.0%) because their schizophrenia worsened. Unfortunately, 18 patients (33.3%) had to be retreated.

This study yielded several important findings. First, there were delays in the diagnosis and treatment of TB in patients with schizophrenia. The healthcare facilities visited by patients may have contributed to the delay. About 20% of patients presented with symptoms (for longer than 2 weeks) at a psychiatric hospital, and close to 50% of patients were transferred at least twice before arriving at this Hospital. A point worth noting is that about 20% of patients had diabetes mellitus. In a recent study, diabetes mellitus was considered to be associated with a delay in the diagnosis of TB (*8*).

Second, 20% of patients were transferred from a psychiatric hospital. Close contact with such patients increases the risk of infection, especially in the event of cohabitation (*9*). Therefore, TB needs to be screened for and treated in a timely manner.

Third, 7 patients (13.0%) has their care interrupted because their schizophrenia worsened. This number was significantly higher than that at the local level (about 1%, data not shown). Therefore, psychiatrists need to be involved in care for TB and schizophrenia (*2*). Moreover, the current study indicated that patients with TB and schizophrenia have a high rate of retreatment. The overall rate of retreatment for patients with TB admitted to this Hospital was 8% (data not shown). Treatment adherence is a key factor for a positive outcome. Poor adherence is the biggest risk factor for relapse among schizophrenics and is mainly due to patients' negative attitudes towards their medication (*10*).

In conclusion, the current study found that treatment of TB in patients with schizophrenia poses several

Table 1. Clinicopathologic characteristics of patients with TB and schizophrenia

Characteristics	No. of patients	%
Number	54	
Sex (male)	27	50.0
Age (years)	59.3 ± 29.5	
HIV status (negative)	40/40	100.0
Symptoms (longer than 2 weeks)	44	81.5
Family contact of TB	8	14.8
History of smoking	12	22.2
Smoking habit (pack-years)	16.6 ± 7.7	
Time (in days) before admission	411 ± 1154	
Transfer		
From a local psychiatric hospital	10	18.5
From a general hospital	41	75.9
Transferred (≥ twice)	23	42.6
TB assays		
PPD (positive)	5/10	50.0
T-SPOT.TB (positive)	9/13	69.2
AFB	14/52	26.9
Mycobacterial culture	17/48	35.4
TB-PCR	14/40	35.0
Complete blood count		
White blood cell (10^9/L)	7.90 ± 4.25	
Neutrophil (10^9/L)	5.62 ± 3.93	
Lymphocyte (10^9/L)	1.37 ± 0.75	
Monocyte (10^9/L)	0.75 ± 0.44	
Eosinophil (10^9/L)	0.10 ± 0.13	
Basophil (10^9/L)	0.01 ± 0.01	
ESR (mm/h)	38.2 ± 28.5	
EPTB	11/54	20.4
PTB	29/54	53.7
PTB +EPTB	14/54	25.9
Pleural	9/14	64.3
Lymph nodes	5/14	35.7
Symptoms of PTB		
Fever	23/43	53.5
Cough	33/43	76.7
Dyspnea	17/43	39.5
Abnormal imaging		
Cavitary lesions	13/43	29.5
Calcification	4/43	9.1
Outcome		
Relief of symptoms	43	79.6
Abandonment of treatment	2	3.7
Interruption of care	7	13.0
Retreatment	18	33.3
Death	2	3.7

AFB, acid-fast bacilli; EPTB, extrapulmonary tuberculosis; ESR, erythrocyte sedimentation rate; HIV, human immunodeficiency virus; PCR, polymerase chain reaction; PPD, purified protein derivative; PTB, pulmonary tuberculosis; TB, tuberculosis.

challenges. These include delays in diagnosis and treatment of TB, inefficient strategies for control of TB transmission in psychiatric hospitals, the need for a psychiatrist to be involved in care, and a high rate of retreatment.

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