

Characteristics of patients with Xpert MTB/RIF-negative, culture-positive pulmonary tuberculosis

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Background/Aims: The Xpert MTB/RIF assay (Xpert) has been used for early diagnosis of active pulmonary tuberculosis, but false-negative Xpert results may lead to delayed diagnosis and increased risk of exposure in hospitals. We examined the characteristics of patients with Xpert-negative, culture-positive pulmonary tuberculosis. **Methods:** We performed a retrospective cohort analysis of adult patients who were diagnosed with active pulmonary tuberculosis during their hospitalization at Daejeon St Mary's Hospital in 2017-2018. **Results:** Among 122 patients, 102 patients were culture-confirmed and 86 were screened by Xpert on admission. We selected 81 patients whose sputum sampling dates for liquid culture and Xpert were within 5 days. Of these, 25 patients were Xpert-negative (30.9%) and 43 were AFB smear-negative (53%). Demographic characteristics including age, sex, and comorbidities were not significantly different between Xpert-negative cases and Xpert-positive ones. Compared with patients with Xpert-positive tuberculosis, those with Xpert-negative tuberculosis tended to have less advanced tuberculosis (Table 1). Xpert-negative patients were less likely to have cough or constitutional symptoms, and less extensive radiographic abnormalities such as cavitory lesions. Xpert-negativity was not associated with the grade of sputum specimen (P-value=0.52) but with the grade of AFB smear (P-value<0.01). Most Xpert-negative cases were sputum smear-negative (92%) with longer time to culture positivity (mean days 18±7 vs. 14±7, P-value=0.008). Anti-tuberculosis treatment was significantly delayed in Xpert-negative cases (mean days 13±3 vs. 3±1; P-value <0.001), but in-hospital mortality was similar. **Conclusions:** Xpert-negative cases had less advanced tuberculosis and less associated symptoms, and did not have adverse outcomes despite delay in treatment. However, given that delayed detection can pose the great risk of transmission, negative Xpert results should be cautiously interpreted.

Table 1. Characteristics of patients with active pulmonary tuberculosis screened diagnosed during hospitalization according to positive or negative XpertMTB/RIF results on admission.

	Xpert-negative (N=25)	Xpert-positive (N=56)	P value
Patient characteristics			
Age, median (IQR), years	78 (36-97)	78.5 (44-95)	0.906
Female	12 (48)	24 (43)	0.667
History of tuberculosis	3 (12)	4 (7)	0.472
Comorbidities*	17 (68)	31 (55)	0.285
Symptoms			
Cough	10 (40)	36 (64)	0.042
- duration > 2 weeks	3 (12)	16 (29)	0.104
Weight loss	2 (8)	12 (21)	0.140
Night sweat	0 (0)	7 (13)	0.064
Fever ^b	2 (8)	13 (23)	0.103
Co-infections	8 (32)	16 (29)	0.638
Cavitary lung lesions	3 (12)	17 (31)	0.070
In-hospital mortality	6 (24)	8 (14)	0.285

Footnote: No. (N) otherwise noted. *Comorbidities include cardiovascular diseases, cerebral vascular diseases, myocardial infarction, congestive heart failure, diabetes, chronic kidney diseases, COPD, liver cirrhosis, malignancy (including solid tumor, leukemia/lymphoma), AIDS, Femur Fracture, bed-ridden state. ^bFever is defined as body temperature >38 °C