
To the Editor: Nontuberculous mycobacteria (NTM), defined as members of Mycobacterium species other than those in the M. tuberculosis complex or M. leprae, are mostly considered to be opportunistic pathogens (1). However, many NTM can and do cause disease in immune-competent hosts. Pulmonary infection by NTM can be a source of diagnostic uncertainty, especially in locations such as in China, where acid-fast staining of sputum samples is the mainstay of diagnosis for tuberculosis (2). NTM are also relatively resistant to many of the first- and second-line drugs used to treat tuberculosis, thus making accurate diagnosis and drug-susceptibility testing critical to clinical management of NTM infections (3). The medical and public health communities have been concerned about increasing prevalence of NTM infection in China, and 2 recent surveys, 1 from Shanghai and another from a rural population in Shandong Province, gave somewhat conflicting reports of the prevalence of these infections (4,5). We therefore decided to conduct a survey of NTM isolates in Beijing from the National Tuberculosis Clinical Laboratory of the Beijing Chest Hospital. We also tested isolates from specimens collected in this laboratory against an extended drug susceptibility panel to determine which agents (streptomycin, capreomycin, amikacin, protonamide, para- amino salicylic acid, ofloxacin, and levofloxacin) (Table). If a patient had multiple positive NTM isolates, DST was performed on the last isolate. In agreement with other studies (4,5), ethambutol remained the most useful agent against NTM; its overall resistance rate among isolates tested was 42%. Ranking of second or third agents, however, should be guided by species identification and DST. For example, levofloxacin appears to be a good choice for M. kanssii, M. gordonae, or M. fortuitum infections (overall resistance rate 22%), but a poor choice against M. avium complex infections (overall resistance rate 95%). The second most prevalent species in our study (28% of isolates), M. abscessus, was resistant to the test drugs in >90% of cases, highlighting the difficulties associated with treatment for some NTM infections.

Our study suggests that there has been no substantial increase in the prevalence of NTM in respiratory isolates from persons in northern China. Most of the isolates show substantial and extensive drug resistance, providing major therapeutic challenges for clinicians, especially if patients are treated as they would be for drug susceptible tuberculosis. To guide therapy, both species-level identification and DST of NTM isolates should be performed. Our data suggest that testing the efficacy of some second-line agents, in particular, fluoroquinolones, may be beneficial in identifying further options for therapy. Drug susceptibility testing (DST) was performed by the proportion method according to the WHO Guidelines for the Programmatic Management of Drug-resistant Tuberculosis, 2011 Update (http://whqlibdoc.who.int/publications/2011/9789241501583_eng.pdf). We tested 3 first-line anti-tuberculosis drugs (rifampin, isoniazid, and ethambutol) and 7 second-line agents (streptomycin, capreomycin, amikacin, protonamide, para-amino salicylic acid, ofloxacin, and levofloxacin).
Table. Species and drug-resistance profiles of 95 nontuberculous mycobacteria strains, northern China, 2008–2011*  

<table>
<thead>
<tr>
<th>Drugs</th>
<th>M. intracellulare</th>
<th>M. abscessus</th>
<th>M. fortuitum</th>
<th>M. gordonae</th>
<th>M. kansassi</th>
<th>M. avium</th>
<th>M. parascrofulaceum</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>INH</td>
<td>37 (97.37)</td>
<td>28 (100)</td>
<td>7 (87.5)</td>
<td>6 (75)</td>
<td>3 (42.86)</td>
<td>5 (100)</td>
<td>1 (100)</td>
<td>87 (91.58)</td>
</tr>
<tr>
<td>RIF</td>
<td>34 (89.47)</td>
<td>28 (100)</td>
<td>7 (87.5)</td>
<td>2 (25)</td>
<td>0</td>
<td>5 (100)</td>
<td>1 (100)</td>
<td>77 (81.05)</td>
</tr>
<tr>
<td>EMB</td>
<td>4 (10.53)</td>
<td>26 (92.86)</td>
<td>7 (87.5)</td>
<td>1 (12.5)</td>
<td>0</td>
<td>2 (40)</td>
<td>0</td>
<td>40 (42.11)</td>
</tr>
<tr>
<td>SM</td>
<td>38 (100)</td>
<td>28 (100)</td>
<td>7 (87.5)</td>
<td>4 (50)</td>
<td>6 (85.71)</td>
<td>5 (100)</td>
<td>1 (100)</td>
<td>89 (93.68)</td>
</tr>
<tr>
<td>CPM</td>
<td>31 (81.58)</td>
<td>26 (92.86)</td>
<td>4 (50)</td>
<td>1 (12.5)</td>
<td>2 (28.57)</td>
<td>3 (60)</td>
<td>1 (100)</td>
<td>68 (71.58)</td>
</tr>
<tr>
<td>AK</td>
<td>31 (81.58)</td>
<td>25 (89.29)</td>
<td>4 (50)</td>
<td>1 (12.5)</td>
<td>1 (14.29)</td>
<td>4 (80)</td>
<td>0</td>
<td>66 (69.43)</td>
</tr>
<tr>
<td>PTO</td>
<td>25 (65.79)</td>
<td>27 (96.43)</td>
<td>6 (75)</td>
<td>4 (50)</td>
<td>0</td>
<td>4 (80)</td>
<td>1 (100)</td>
<td>67 (70.53)</td>
</tr>
<tr>
<td>PAS</td>
<td>38 (100)</td>
<td>28 (100)</td>
<td>7 (87.5)</td>
<td>8 (100)</td>
<td>7 (100)</td>
<td>4 (80)</td>
<td>1 (100)</td>
<td>93 (97.89)</td>
</tr>
<tr>
<td>OFLX</td>
<td>38 (100)</td>
<td>28 (100)</td>
<td>3 (37.5)</td>
<td>3 (37.5)</td>
<td>1 (14.29)</td>
<td>5 (100)</td>
<td>1 (100)</td>
<td>79 (83.16)</td>
</tr>
<tr>
<td>LVFX</td>
<td>36 (94.74)</td>
<td>28 (100)</td>
<td>3 (37.5)</td>
<td>2 (25)</td>
<td>0</td>
<td>5 (100)</td>
<td>1 (100)</td>
<td>75 (78.95)</td>
</tr>
</tbody>
</table>

Total 38 (40)  28 (29.47)  8 (8.42)  8 (8.42)  7 (7.37)  5 (5.26)  1 (1.05)  95 (100)  

*INH, isoniazid; RIF, rifampin; EMB, ethambutol; SM, streptomycin; CPM, capreomycin; AK, amikacin; PTO, protonamide; PAS, para-aminosalicylic acid; OFLX, ofloxacin; LVFX, levofloxacin.

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