**Mycobacterium interjectum** as Causative Agent of Cervical Lymphadenitis

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A mycobacterial strain isolated from a lymph node of a 3-year-old female with cervical lymphadenitis was identified as *Mycobacterium interjectum* by means of sequencing of the 16S rRNA gene. Analysis of this case and previously published cases demonstrates the importance of *M. interjectum* as a causative agent of cervical lymphadenitis in young children.

Molecular techniques have made it possible to recognize previously overlooked mycobacterial species. A mycobacterial isolate from a lymph node of a child with lymphadenitis could not be identified with amplified ribosomal DNA restriction analysis (ARDRA), the molecular technique routinely used at our laboratory for identification of mycobacteria. Determination of the sequence of the 16S rRNA gene led to a final identification as *Mycobacterium interjectum* and prompted us to review previously described cases of infection due to this organism.

**Case report.** A 3-year-old female was admitted to Ghent University Hospital with cervical lymphadenitis lasting for a period of 8 weeks. In the left submandibular and left parotid areas, a firm nodular mass of 3 by 4 cm was palpable and the overlying skin was blue-red. There was discrete local pain but no systemic illness. A chest X-ray and routine hematological examination were normal. An intradermal skin test using purified protein derivative (PPD) (five tuberculin units) of both examination were normal. An intradermal skin test using PPD (five tuberculin units) of both

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very closely with that of *M. interjectum*), and an *M. tuberculosis*
strain (GenBank accession no. X52917) (Fig. 1).

Further confirmation of the sequencing results was done by
biochemical testing as described before (15). The strain was
found to be a scotochromogenic, slowly growing mycobacte-
rium, susceptible on LJ medium to NaCl (5%) and isoniazid
(10 μg/ml) but resistant to carboxylic acid hydrazide (2 μg/ml),
hydroxylamine (250 μg/ml), and para-nitrobenzoic acid (500
μg/ml).

The strain was found to be negative for semiquantitative
catalase (i.e., less than 45-mm foam production) nitrate reduc-
tion, acid phosphatase, and niacin production but positive for
Tween hydrolysis and urease. Thin-layer chromatography of
the fatty acids revealed alpha-, methoxy-, and keto-mycolic
acids. All of these biochemical characteristics fit with the iden-
tification as *M. interjectum* (10). The negative catalase reaction,
the positive Tween hydrolysis, and the susceptibility to 10 μg
of isoniazid per ml, as well as the mycolic acid pattern, differ-
entiate this species from the phenotypically very similar species
*M. scrofulaceum* (15).

*M. interjectum*, for which the species name refers to the
intermediate phylogenetic position between rapidly and slowly
growing mycobacteria, was first described in 1993 (9). Table 1
summarizes the clinical features of all published cases in which
*M. interjectum* was isolated.

*M. interjectum* was described as the causative agent in five
pediatric cases of cervical lymphadenitis. Four cases in adults
have been described, but in only one case (Table 1, case 7) was
*M. interjectum* considered clinically important. The four pa-
tients (three pediatric) treated with antibiotics alone and/or
undergoing partial resection were not cured. Cure was ob-
tained only after total resection of the infected region.

Nontuberculous mycobacterial lymphadenitis was tradition-
ally associated with *M. scrofulaceum* (5). During the 1980s, the
*M. avium* complex was predominant (16). More recently, how-
ever, a wide variety of mycobacterial species causing lymphad-

![FIG. 1. UPGMA clustering of the 16S rRNA gene sequence of the clinical isolate reported in this study with sequences obtained from
GenBank. Lengths are shown in base pairs.](http://jcm.asm.org/)

### TABLE 1. Summary of the clinical features of our case and previously reported cases of infection with *M. interjectum*

<table>
<thead>
<tr>
<th>Case (reference)</th>
<th>Patient age/sex</th>
<th>Symptoms</th>
<th>Treatment (initial; subsequent)</th>
<th>Outcome (initial; subsequent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (this study)</td>
<td>3 yr/female</td>
<td>Cervical swelling in the left submandibular region</td>
<td>Azithromycin; total resection</td>
<td>No response; no relapse</td>
</tr>
<tr>
<td>2 (9)</td>
<td>18 mo/male</td>
<td>Enlarged lymph node in the right submandibular region</td>
<td>Partial resection + isoniazid, rifampin, and pyrazinamide; Total resection + clarithromycin, isoniazid, and protonamid</td>
<td>Further enlargement of the lymph node, including a fistula; no relapse</td>
</tr>
<tr>
<td>3 (12)</td>
<td>2 yr/female</td>
<td>Right laterocervical swelling</td>
<td>Clarithromycin; total resection</td>
<td>No response; no relapse</td>
</tr>
<tr>
<td>4 (6)</td>
<td>2 yr/female</td>
<td>Enlarged lymph node in the left anterior triangle</td>
<td>Total resection</td>
<td>No relapse</td>
</tr>
<tr>
<td>5 (6)</td>
<td>3 yr/female</td>
<td>Cervical swelling in the left anterior triangle and mildly enlarged node in the right neck</td>
<td>Total resection</td>
<td>No relapse</td>
</tr>
<tr>
<td>6 (6)</td>
<td>Elderly/female</td>
<td>Widespread interstitial lung opacities</td>
<td>No treatment (considered not clinically significant)</td>
<td></td>
</tr>
<tr>
<td>7 (2)</td>
<td>52 yr/female</td>
<td>Chronic destructive lung disease, with multiple positive cultures</td>
<td>Amikacin</td>
<td>No response</td>
</tr>
<tr>
<td>8 (11)</td>
<td>71 yr/female</td>
<td>No specific symptoms; a single isolate from a urine sample</td>
<td>No treatment (considered not clinically significant)</td>
<td></td>
</tr>
<tr>
<td>9 (10)</td>
<td>36 yr/male</td>
<td>No specific symptoms; a single isolate from sputum of an AIDS patient</td>
<td>No treatment (considered not clinically significant)</td>
<td></td>
</tr>
</tbody>
</table>
enitis in young children have been reported, including some previously unrecognized mycobacteria (3, 4, 9, 12, 13). At present, it is difficult to establish whether this observation reflects real changes in the prevalence of different mycobacterial species or is due to increased diagnostic capabilities and to refined mycobacterial taxonomy.

Full identification of the nontuberculous agents causing cervical lymphadenitis in young children is warranted to reveal the role of different mycobacterial species and may indicate an underestimation of the pathogenic role of species such as *M. interjectum*. Also, correct identification may be important to guide therapy, since present experience seems to indicate that total resection is the only cure for lymphadenitis caused by species such as *M. interjectum*. Identification of *M. interjectum* by phenotypic methods is slow and not always straightforward, since the species has been reported to have quite a few variable reactions (6). Also, with high-pressure liquid chromatography analysis of mycolic acids, differences among the patterns obtained for different *M. interjectum* strains have been reported (6, 10). Accurate identification of *M. interjectum* is possible by means of 16S rRNA gene sequencing and by means of ARDRA, which results in *CfoI* restriction pattern 5, *MboI* pattern 4, and *RsaI* pattern 4, a profile thus far observed only for *M. interjectum*.

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REFERENCES


