Mycobacterium mageritense is a recently identified rapidly growing uncommon mycobacteria (RGM) (1). Only 9 cases of skin and soft-tissue infection with M. mageritense have been reported to date (1–7) (Table I). Although accurate identification of the pathogenic bacteria is mandatory for efficient treatment, using conventional methods for the identification of M. mageritense is complex and time-consuming. We report here a case of subcutaneous infection with M. mageritense that was treated successfully with antibiotics, in which matrix-assisted laser desorption/ionization-time of flight mass spectrometry (MALDI-TOF MS) (8) enabled rapid identification of the species.

**CASE REPORT**

A 70-year-old Japanese man developed subcutaneous abscesses in the periumbilical region within 2 weeks after a laparoscopic cholecystectomy. After unsuccessful treatments with antibiotics (cefamezin and vancomycin) and immunosuppressive agents (prednisolone and azathioprine) for 1 year, he was referred to our hospital. On examination, a total of 80 reddish nodules intermittently excreting pus were observed on the abdomen (Fig. 1a). Histopathologically, the dermis and subcutaneous adipose tissue were prominently infiltrated with neutrophils (Fig. 1b, c). An

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**Table 1. Summary of 9 cases of skin and soft tissue infection with M. mageritense reported**

<table>
<thead>
<tr>
<th>Sex/age, years</th>
<th>Surgical intervention</th>
<th>Antibiotics</th>
<th>Duration of treatment</th>
<th>Outcomes</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>F/37</td>
<td>Yes</td>
<td>DOXY, CFPM</td>
<td>9 months</td>
<td>Cured</td>
<td>1</td>
</tr>
<tr>
<td>M/25</td>
<td>Yes</td>
<td>AMK, IPM/CS</td>
<td>N/A</td>
<td>Improved</td>
<td>1</td>
</tr>
<tr>
<td>F/43</td>
<td>Yes</td>
<td>TMP-SMX, LVFX</td>
<td>3 months</td>
<td>Cured</td>
<td>2</td>
</tr>
<tr>
<td>F/56</td>
<td>No</td>
<td>GFLX</td>
<td>2 months</td>
<td>Cured</td>
<td>2</td>
</tr>
<tr>
<td>M/48</td>
<td>Yes</td>
<td>N/A</td>
<td>12 months</td>
<td>Cured</td>
<td>3</td>
</tr>
<tr>
<td>F/59</td>
<td>Yes</td>
<td>CPFX, CAM</td>
<td>12 months</td>
<td>Cured</td>
<td>4</td>
</tr>
<tr>
<td>M/66</td>
<td>Yes</td>
<td>MLFX, CAM</td>
<td>4 days</td>
<td>Cured</td>
<td>5</td>
</tr>
<tr>
<td>M/52</td>
<td>Yes</td>
<td>CAM, LVFX</td>
<td>6 months</td>
<td>Cured</td>
<td>6</td>
</tr>
<tr>
<td>F/85</td>
<td>Yes</td>
<td>LVFX, IPM/CS, MINO</td>
<td>4 months</td>
<td>Cured</td>
<td>7</td>
</tr>
<tr>
<td>M/70</td>
<td>No</td>
<td>CAM, LVFX, MINO</td>
<td>7 months</td>
<td>Cured</td>
<td>7</td>
</tr>
</tbody>
</table>

DOXY: doxycycline; CFPM: cefepime; AMK: amikacin; IPM/CS: imipenem/cilastatin; TMP-SMX: trimethoprim/sulfamethoxazole; LVFX: levofloxacin; GFLX: gatifloxacin; CPFX: ciprofloxacin; MLFX: moxifloxacin; CAM: clarithromycin; IPM/CS: imipenem/cilastatin; MINO: minocycline; N/A: not available; F: female; M: male.

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Fig. 1. Clinical pictures and histopathology.
(a) A clinical picture before the treatment, showing reddish nodules on the abdomen. Arrow: scar from the laparoscopic cholecystectomy contiguous to the umbilicus. Histopathology: (b) low-magnification view showing a prominent infiltration of neutrophils in the deep dermis and subcutaneous adipose tissue. (c) High-magnification view of the rectangle in (b). (d) A clinical picture after treatment with antibiotics, showing post-inflammatory pigmentation.
acid-fast bacillus culture grown from the excreted pus at 37°C for 3
days revealed a Mycobacterium species. It was identified as M.
mageritense using MALDI TOF-MS system (Microflex LT and
MALDI Biotyper, Bruker Daltonics GmbH) with a score value of
2.26 according to the MycoEx extraction protocol (v.3.0) and
Mycobacteria Library 4.0. In addition, full-length sequencing of
the 16S rRNA gene confirmed this finding. Based on these results,
the patient was given a diagnosis of subcutaneous infection with
M. mageritense.

In advance of the species identification and drug-susceptibility
tests, we empirically administered clarithromycin (800 mg/day),
levofloxacin (500 mg/day) and minocycline (200 mg/day). After
initiation of these antibiotics, no new lesions emerged and the
pre-existing eruptions began to subside. Following the species
identification, clarithromycin was stopped because M. mageritense
is known for its resistance to macrolides (1). Consistently, drug-
susceptibility tests later revealed that the isolate was sensitive to
levofloxacin and minocycline and resistant to clarithromycin.
Within 9 months after the initiation of the antibiotics, all of the sub-
cutaneous indurations had diminished, leaving post-inflammatory
pigmentation (Fig. 1d). After antibiotics were stopped, no recur-
rence was observed in 9 months of follow-up.

DISCUSSION

The standard treatment for non-tuberculous mycobac-
terial infections is a combination of antibiotics (9). The
selection of antibiotics is usually based on drug
susceptibility tests, yet the correlation between in vitro
drug susceptibilities and in vivo treatment outcomes can be
ambiguous for RGM infections (10). M. mageritense
is known for its resistance to macrolides, which are often
used for RGM infections; thus, an accurate identification of
the bacterial species is mandatory for effective
treatment of infections (1).

In general, the species within Mycobacteria are identi-
fied using PCR-based and/or DNA-DNA hybridization-
based methods in a clinical laboratory (11). However,
M. mageritense is not identifiable using commercially
available kits; and the more robust identification methods
(PCR restriction enzyme analysis, 16S rRNA gene se-
quencing, and high-performance liquid chromatography)
are complicated and time-consuming, delaying the
selection and administration of appropriate antibiotics.
Recently, MALDI-TOF MS has been widely used for
species identification, in which a colony is picked from a
culture plate and is directly submitted to the analysis
chamber after drying (8). Since the analysis processes of
MALDI-TOF MS itself takes only a few seconds,
MALDI-TOF MS enabled us to identify M. mageritense
in a day from the initiation of the examination, providing
a theoretical basis for the selection and long-term admi-
nistration of antibiotics. This patient’s broadly distributed
lesions were successfully treated using only antibiotics,
although a surgical resection of remaining lesions is often
required for the treatment of skin or subcutaneous tissue
infections with M. mageritense (Table I). In addition,
because of the paucity of evidence for the identification
of the minor NTM, M. mageritense, by MALDI-TOF
MS, we corroborated the result by the most robust met-

of full-length sequencing of the 16S rRNA. Further
accumulation of data might certificate MALDI-TOF
MS as a stand-alone method for the identification of M.
mageritense.

This report describes the clinical course of a case of
subcutaneous infection with M. mageritense showing a
broad distribution of abscesses. MALDI-TOF MS enab-
led the efficient identification of M. mageritense and thus
its effective treatment with a combination of antibiotics.

The authors have no conflicts of interest to declare.

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