Isolation of *Mycobacterium thermoresistible* from a mesh used in an incisional hernia repair

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**Abstract**

We present a case of *Mycobacterium thermoresistible* infection from a hernia repair mesh, the first reported case of this infection in New Zealand.

*Mycobacterium thermoresistible* infection is rare, with only seven recorded cases in the literature. The presence of this isolate has implications for antibiotic regime and treatment duration. In this report we detail the case particulars and a brief summary of the previously documented cases.

The incidence of non-tuberculous mycobacterial disease has been increasing, with an widening variety of species isolated both worldwide and within New Zealand.1,2

*Mycobacterium thermoresistible* is an environmental species, isolated from dust and soil3, and has only been involved in a handful of infections in humans.

We describe the first case of *Mycobacterium thermoresistible* infection in New Zealand, the eighth reported case in the medical literature4.

**Case report**

The patient is a 46-year-old woman with a history of breast cancer. She had previously had a right mastectomy and TRAM reconstruction. Following this she developed an abdominal incisional hernia, and required two operations to repair this using a mesh.

She presented 4 weeks postoperatively with erythema and induration around the repair site. There was clinical evidence of a collection and 300 ml of pus was aspirated and cultured. There was no growth on trypticase soy agar with 5% sheep blood or chocolate agar following 5-day incubation at 37°C.

A large number of leucocytes were seen on Gram stain, but no organisms. Given this result, the agar plates were reincubated. The patient was empirically treated with IV gentamicin, cefuroxime and metronidazole as an inpatient with a significant clinical improvement. She was discharged after a 4-day course, before the final culture results had returned.

The agar plates grew a rapidly growing *Mycobacterium* species at day 7. While further identification was pending the patient presented again with similar symptoms. A CT scan of her abdomen showed evidence of infection around the hernia mesh, but no significant collection. She had a further week course of IV gentamicin, cefuroxime and metronidazole and was discharged on a 10-day course of amoxicillin-clavulanic acid.
The *Mycobacterium* species was confirmed as *Mycobacterium thermoresistible* using and Heat Shock Protein 65 (*hsp65*) gene analysis (assay as described by Kim et al.\(^5\)) with 99% similarity (482 out of 485 nucleotides) of the polymerase chain reaction (PCR) product to the GenBank entry (www.ncbi.nlm.nih.gov) for *M. thermoresistible*. Unfortunately the isolate was too slow-growing for accurate antimicrobial sensitivity testing.

The patient was admitted electively for removal of the infective mesh and was started on a 3-month course of ciprofloxacin, doxycycline and rifampicin postoperatively.

She remained well on completion of the antibiotic course with no further complications.

**Discussion**

*Mycobacterium thermoresistible* was first isolated from soil samples in 1966,\(^4\) and subsequently house dust, by Tsukamura in Japan.\(^3\) As the name suggests, it is able to grow up to temperatures of 52°C, distinguishing it from other biochemically similar *Mycobacterium* species like *M. gordonae*.

Human infection is rare, but is not restricted to immunocompromised hosts, with over half the reported cases occurring in patients with no significant background of immune deficiency (Table 1).

**Table 1. Summary of previous *M. thermoresitibile* case reports**

<table>
<thead>
<tr>
<th>Case report</th>
<th>Method of identification</th>
<th>Isolate origin</th>
<th>Immunocompetent status</th>
<th>Antibiotic regime</th>
<th>Length of treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weitzman et al. 1981(^6)</td>
<td>Culture and Biochemical profile</td>
<td>Lung tissue biopsy</td>
<td>Presumed immunocompetent</td>
<td>Rifampin, ethambutol, and streptomycin</td>
<td>Not specified</td>
</tr>
<tr>
<td>Liu, Andrews and Wright. 1984(^7)</td>
<td>Culture and Biochemical Profile</td>
<td>Lung tissue biopsy</td>
<td>Immunocompromised (hypogammaglobulinaemia)</td>
<td>Rifampin, ethambucil and streptomycin</td>
<td>Not specified</td>
</tr>
<tr>
<td>Neely and Denning. 1989(^8)</td>
<td>Culture, biochemical profile and HLPC</td>
<td>Cutaneous nodule (thoracotomy scar site)</td>
<td>Immunocompromised (heart transplant recipient, diabetic)</td>
<td>Isoniazid, rifampin, ethambutol</td>
<td>Not specified</td>
</tr>
<tr>
<td>Wolfe and Moore. 1992(^9)</td>
<td>Culture, biochemical profile and high-performance liquid chromatography (HLPC)</td>
<td>Breast abscess (following mammaplasty)</td>
<td>Presumed immunocompetent</td>
<td>Rifampicin, ethambutol</td>
<td>16 months</td>
</tr>
<tr>
<td>Cummings et al. 2000(^10)</td>
<td>Culture, biochemical profile and HLPC</td>
<td>Cutaneous lesion (hands)</td>
<td>Presumed immunocompetent</td>
<td>Doxycycline and levofloxacin</td>
<td>3 months</td>
</tr>
<tr>
<td>LaBombardi, Shastry, and Tischler. 2005(^11)</td>
<td>Culture, biochemical profile and HLPC</td>
<td>Prosthetic knee joint.</td>
<td>Presumed immunocompetent.</td>
<td>Moxifloxacin and linezolid (doxycycline replacing linezolid)</td>
<td>8 months</td>
</tr>
<tr>
<td>Neonakis et al. 2009(^8)</td>
<td>Culture, biochemical profile, 16S RNA and hsp65 polymerase chain reaction (PCR)</td>
<td>Sputum</td>
<td>Presumed immunocompetent (diabetic, chronic obstructive pulmonary disease)</td>
<td>Not treated as isolate thought to represent colonisation.</td>
<td>--</td>
</tr>
</tbody>
</table>
Three of the seven cases were pulmonary infections. This case report is the third reported postsurgical case that involves a foreign body.

A survey of non-tuberculous mycobacterium infections in New Zealand, showed a similar incidence to other developed countries, with 1.92 cases per 100,000 population in 2004. *Mycobacterium avium-intracellulare* complex (MAIC) was the most common isolate.  

There are no specific guidelines for the treatment of *M. thermoresistible*. The American Thoracic Society comments that the treatment of the less common non-tuberculous mycobacteria is based on previous cases. They recommend that any foreign bodies are removed and point out that *in vitro* antibiotic susceptibility testing often does not correlate well with the clinical response to the antimicrobials used.  

The antibiotic regime for this patient was consistent with antibiotic choices in previous cases. As with the other cases, length of treatment was prolonged, but ultimately guided by resolution of clinical symptoms.  

A high index of suspicion is needed for accurate diagnosis of the non-tuberculosis mycobacteria. With the advent of genetic profiling of mycobacterial species, it is likely that more cases of *M. thermoresistible* will be recognised.  

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**References:**  