Vertebral Osteomyelitis Due to *Mycobacterium abscessus* in an HIV-Negative Patient: Case Report and Literature Review

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**ABSTRACT**

Atypical mycobacteria are an extremely rare cause of vertebral infection. Review of the English literature by use of MEDLINE from 1955 to 2012 revealed less than 50 cases of vertebral osteomyelitis due to atypical mycobacteria. Three of these cases were due to *Mycobacterium abscessus*. Infection of the musculoskeletal system with atypical mycobacterium usually involves tenosynovitis and occurs from either percutaneous inoculation or hematogenous spreading. The clinical course is indolent, slowly progressive, and destructive. Most cases were immunocompetent hosts. This presented case demonstrated vertebral osteomyelitis due to *M. abscessus* in an HIV-negative patient without history of any underlying diseases or trauma before having this infection. There are no consensus guidelines for the treatment of these infections. Treatment of these infections is difficult and requires a prolonged course of combination antimicrobial agents. Antimycobacterial treatments for infection due to *M. abscessus* are based on case series, in vitro susceptibility testing and the clinical experience of experts in patients with pulmonary diseases. Surgery is generally indicated with extensive cutaneous diseases, abscess formation or where drug therapy is difficult.

**Keywords:** Vertebral osteomyelitis, *Mycobacterium abscessus*


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**CASE REPORT**

A 75 year-old Thai woman presented with a one-month history of progressive back pain and fever. She had mild weakness and numbness on both feet. She denied night sweats, chronic cough, weight loss and any skin lesions. She did not have any underlying disease. There was no history of trauma before the appearance of the symptoms. She did not have any history of drinking or smoking.

Physical examination revealed fever and tenderness over the lumbar spine. Abnormalities on neurological examination demonstrated weakness of extensor hallucis longus and impaired sensation on L5 to S1 dermatomes of both extremities. She did not have any skin lesions. No lymphadenopathy was detected. Other physical examinations were normal.

Laboratory studies found leukocytosis with neutrophil predominate. Her erythrocyte sedimentation rate (ESR) was 94 mm/hr. A test for antibodies to HIV was nonreactive. Blood tests for renal function, liver function and fasting sugar were normal. (Table 1) Chest x-ray was normal. Plain film of spine demonstrated diffused osteoporosis with moderate to marked collapse of L1-L5 bodies. Magnetic resonance imaging (MRI) found enhancing vertebral bodies and paravertebral soft tissue at L5-S1 levels. (Fig 1) Hemoculture demonstrated *Mycobacterium abscessus* that was susceptible to amikacin and clarithromycin. Commercial DNA probes (INNO-Lipa Line probes)
were used for mycobacterial species identification. The susceptibility testing method was agar proportion method and reference of the minimum inhibitory concentration for amikacin, cefoxitin, ciprofloxacin, clarithromycin, doxycycline, imipenam and sulfamethoxazole-trimetroprim were 12, 4, 2, 3, 6, 16 and 36 mg/mL, respectively.

The patient’s initial antimycobacterial regimen included intravenous amikacin, imipenam and ciprofloxacin as well as oral clarithromycin. After 2 weeks of treatment, she had no fever and less tenderness over the lumbar spine. The treatment was followed by oral ciprofloxacin and clarithromycin following the susceptibility results. The patient received antimycobacterial treatment for 18 months. She was pain free and able to walk with minimal assistance. The ESR was 42 mm/hr.

**DISCUSSION**

Atypical mycobacteria are an extremely rare cause of vertebral infection. Review of the English literature by use of MEDLINE from 1955 to 2012 revealed only 34 cases reports and one nosocomial outbreak of vertebral osteomyelitis due to atypical mycobacteria. Three of these cases were due to *Mycobacterium abscessus*. The species identified most frequently was *Mycobacterium avium* complex (n= 14); this was followed by *Mycobacterium xenopi* (n=8) and *Mycobacterium fortuitum* (n=5). There were single cases involving *Mycobacterium kansasii, mycobacterium simiae, Mycobacterium chelonae* and one unidentified non-tuberculous mycobacterium.1-16

*Mycobacterium abscessus* is a rapidly growing mycobacteria (RGM). It is the most pathogenic of the RGM group to cause pulmonary infection, primarily in patients with underlying lung diseases.17 In Thailand, most patients infected due to *M. chelonae/abscessus* had disseminated diseases followed by lymphadenitis. Three patients had osteomyelitis from hematogenous spreading in disseminated diseases.18

Infection of the musculoskeletal system with RGM usually involves tenosynovitis and occurs from either percutaneous inoculation (e.g., trauma or surgery) or hematogenous seeding. The clinical course is indolent, slowly progressive, and destructive. Most cases were immunocompetent hosts.1-16 The presented patient had

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Result</th>
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<tbody>
<tr>
<td>Complete blood count</td>
<td>Hb 11.3 g/dL, Hct 34%, WBC 10,400/mm³ (N 72%, L 16%, M 9%, Eo1%), platelet 328,000/mm³</td>
</tr>
<tr>
<td>BUN/creatinine</td>
<td>BUN 13 mg/dL, creatinine 0.7 mg/dL</td>
</tr>
<tr>
<td>Liver function test</td>
<td>Total/direct bilirubin 1.5/0.5 mg/dL, AST/ALT 32/22 U/L, alkaline phosphatase 94 U/L</td>
</tr>
<tr>
<td>Fasting blood sugar</td>
<td>FBS 93 mg/dL</td>
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</tbody>
</table>

**TABLE 2.** Clinical characteristics of patients with vertebral osteomyelitis due to *Mycobacterium abscessus*.

<table>
<thead>
<tr>
<th>Case (ref)</th>
<th>Gender/age(y)</th>
<th>Underlying condition</th>
<th>Country</th>
<th>Clinical manifestations</th>
<th>MRI</th>
<th>Treatment</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (1) M/53</td>
<td>Intravenous drug abuse</td>
<td>USA</td>
<td>Low back pain, night sweat, weight loss</td>
<td>Destruction of L3-L5 vertebral bodies with paravertebral abscess</td>
<td>Clarithromycin+ imipenam+ cefoxitin for 12 months</td>
<td>Debridement and fusion</td>
<td>Walks with aid</td>
</tr>
<tr>
<td>2 (3) F/16</td>
<td>Skating accident</td>
<td>USA</td>
<td>Midthoracic back pain</td>
<td>Destruction of T9-T10 vertebral bodies with paravertebral abscess</td>
<td>Clarithromycin for 6 months No surgical treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 (17) F/17</td>
<td>SLE, Steroid therapy</td>
<td>USA</td>
<td>Groin and leg pain, decreased Achilles reflex</td>
<td>Destruction of T12-L1 vertebral bodies</td>
<td>Amikacin for 2 months + clarithromycin for 7 months Debridement and fusion</td>
<td></td>
<td>Pain free</td>
</tr>
<tr>
<td>Presented case F/75</td>
<td>No</td>
<td>Thailand</td>
<td>Back pain, fever</td>
<td>Destruction of L5-S1 vertebral bodies</td>
<td>Amikacin (2 weeks)+ imipenam (2 weeks)+ ciprofloxacin (18 months)+ clarithromycin (18 months)</td>
<td>Debridement and fusion</td>
<td>Able to walk with minimal assistance</td>
</tr>
</tbody>
</table>
no history of any underlying diseases or trauma before having this infection.

The definite diagnosis of atypical mycobacterial vertebral osteomyelitis requires culture of a bone biopsy specimen. Although, the presented patient did not have culture from bone biopsy, but positive hemoculture without any other sites of infection other than her spine implied vertebral osteomyelitis with disseminated infection.

*M. abscessus* is highly resistant to multiple antmycobacterial drugs. Therapy includes both medical and surgical interventions. Antimycobacterial treatments are based on case series, in vitro susceptibility testing and the clinical experience of experts in patients with pulmonary diseases. The susceptibility pattern of isolates of *M. abscessus* is clarithromycin, amikacin, cefoxitin, imipenam and linezolid. The initial therapy for severe infections includes intravenous amikacin, cefoxitin and imipenem combined with oral clarithromycin for 2-4 weeks. Therapy should be followed by an oral macrolide (clarithromycin or azithromycin) plus at least one other agent to which the organism is susceptible. The duration of therapy depends upon the site and severity of infection. A minimum of six months and twelve months of therapy were recommended for bone infection and for severe infections, respectively. Previous study suggested that in disseminated or deep *M. abscessus* infections, antimicrobial treatment should be continued for at least 4-6 weeks after complete resolution, so this usually requires 6–12 months of treatment. However, more prolonged courses for years may be necessary in severely immunocompromised patients. The presented patient received intravenous amikacin, imipenam and ciprofloxacin as well as oral clarithromycin for 2 weeks and followed by oral ciprofloxacin and clarithromycin for 18 months. Surgery is generally indicated with extensive cutaneous disease, abscess formation, or when drug therapy is difficult. The presented case responded well to antimycobacterial agents and no abscess was seen on MRI, so surgery was not indicated for her.

This presented case demonstrated a rare occurrence of vertebral osteomyelitis due to *M. abscessus*. Treatment of these infections is difficult and requires a prolonged course of combination antimicrobial agents.

**REFERENCES**


