Case Report of Spinal Epidural Abscess Caused by *Haemophilus paraphrophilus*

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*Haemophilus paraphrophilus* was recovered in pure culture from purulent material collected at surgery from a patient presenting with a spinal epidural abscess and a severe neurological deficit. This is the first report of such an occurrence.

Human disease caused by species of the genus *Haemophilus* other than *Haemophilus influenzae* has, with some exceptions, been considered unusual (14). More recently, the use of improved techniques for the isolation and identification of these species have allowed a better definition of their role in disease. The following case report describes a patient who developed a spinal epidural abscess caused by *Haemophilus paraphrophilus*. This is the first time that this association has been reported.

A 68-year-old male presented in March 1993 with 14 days of posterior neck pain of increasing intensity and 7 days of progressive weakness of upper and lower extremities. He reported difficulty walking and rising from a sitting position, was unable to raise his arms over his head, and had decreased strength in his grip bilaterally. He also described paresthesias and decreased sensation in both legs. The patient had been hospitalized 2 weeks earlier with an exacerbation of chronic bronchitis that was treated with oral erythromycin and bronchodilators. He had a history of mild, chronic neck pain for several years, and on the previous admission, plain radiographs of the cervical spine showed only chronic degenerative changes.

On physical examination, he was afebrile and had limited movement of the neck secondary to pain, distal weakness of both upper extremities, and an inability to move his lower extremities. The rest of the examination was unrevealing. Laboratory studies were as follows: leukocyte count, 12.6 × 10⁹/liter, with 81% polymorphonuclear cells; and an erythrocyte sedimentation rate of 56 mm/h. Cerebrospinal fluid analysis revealed two leukocytes, a glucose level of 56 mg/100 ml, and a protein level of 670 mg/100 ml. Magnetic resonance imaging of the cervical spine demonstrated the presence of an anterior epidural mass compressing the spinal cord at the level of C₄-C₅. The patient was scheduled for emergency surgical decompression of the spinal cord.

At surgery, he was found to have an abscess in the anterior epidural space at the level of C₄-C₅. Purulent material collected at surgery revealed many polymorphonuclear leukocytes but no organisms by Gram staining. After 48 h of incubation at 35°C in the presence of 5% CO₂, cultures on chocolate agar yielded pure growth of very small, yellowish colonies of a small gram-negative bacillus. No growth was observed on sheep blood agar, MacConkey agar, or chocolate agar incubated at 35°C in ambient air. Anaerobic cultures of the same surgical specimen were negative. Cultures of the cerebrospinal fluid were also negative.

Initial identification of this isolate in our laboratory yielded questionable *Haemophilus aphrophilus* or *H. paraphrophilus* (biocode 2322; RapID NH system; Innovative Diagnostic Systems, Atlanta, Ga.). The organism was catalase negative (3% hydrogen peroxide), oxidase positive (0.5% aqueous tetramethyl-p-phenylenediamine dihydrochloride), and β-lactamase negative (nitrocefin disk). Tests for X and V growth factors were done with factor-containing paper disks placed on inoculated Trypticase soy agar medium (7). The isolate required only the V growth factor (Table 1). Verification of its X factor-independent growth was done with the porphyrin test (positive; δ-aminolevulinic acid disk). Confirmation of the identification of this organism as *H. paraphrophilus* was obtained in a reference laboratory by testing carbohydrate utilization (Minitek system; Becton Dickinson, Cockeysville, Md.) and other biochemical reactions (HNIID Panel; American MicroScan, Sacramento, Calif.).

After surgery, antimicrobial therapy was initiated with intravenous ceftriaxone at 2 g every 12 h. The patient’s condition improved postoperatively, and 2 weeks later he was transferred to a rehabilitation unit. He completed 6 weeks of antibiotic therapy without complications. A neurological evaluation done 3 months after surgery was normal, except for mild residual weakness in the upper and lower extremities.

*H. paraphrophilus*, first described by Zimmernann et al. in 1968 (15), is a short, regular, gram-negative bacillus which forms part of the normal oropharyngeal microflora. It is a fastidious organism, best recovered on chocolate agar incubated in the presence of increased concentrations of CO₂ (5 to 10% CO₂ is recommended). *Haemophilus* species designated with the prefix "para" have a requirement only for the V growth factor (NAD), a characteristic used to differentiate them from other species (14). Biochemical characteristics distinguishing *H. paraphrophilus* from other species of the genus *Haemophilus* are presented in Table 1.

Infections attributed to *H. paraphrophilus* in the literature include endocarditis (1, 8), brain abscess (11, 12), laryngoepiglottitis (6), pneumonitis (5), osteomyelitis (15), septic arthritis (13), and soft tissue (9) and hepatobiliary (10) infections. Ours is the first report of a spinal epidural abscess caused by *H. paraphrophilus*. Underlying conditions that have been associated with infections caused by *H. para-
**TABLE 1.** Characteristics of the current isolate and comparison with profiles of *H. paraphrophilus*, *H. aphrophilus*, *Haemophilus parainfluenzae*, and *Actinobacillus actinomycetemcomitans*.  

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Result for:</th>
<th>Current isolate</th>
<th><em>H. paraphrophilus</em></th>
<th><em>H. aphrophilus</em></th>
<th><em>H. parainfluenzae</em></th>
<th><em>A. actinomycetemcomitans</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth on Trypticase soy agar</td>
<td></td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
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<tr>
<td>X factor dependent</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>V factor dependent</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Oxidase</td>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>±</td>
</tr>
<tr>
<td>Catalase (3% H₂O₂)</td>
<td></td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
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<tr>
<td>CO₂-enhanced growth</td>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<tr>
<td>Acid from:</td>
<td></td>
<td>Glucose</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<tr>
<td></td>
<td></td>
<td>Lactose</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<tr>
<td></td>
<td></td>
<td>Xylose</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>±</td>
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<tr>
<td></td>
<td></td>
<td>β-Lactamase</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

* Data are adapted from reference 7a. +, typically positive; –, typically negative; ±, differs among strains.

*paraphrophilus* in the previous case reports include recent dental manipulation (bleeding-prone procedures, such as tooth extraction and teeth cleaning), sinusitis, chronic lung disease, presence of abnormal heart valves (mitral valve prolapse and rheumatic heart disease), valvular prosthesis, and congenital heart disease. The most likely source of infection in our patient is pulmonary, since he initially presented with an exacerbation of chronic bronchitis; he had no recent history of dental manipulation and, as part of the evaluation, had a transthoracic echocardiogram that demonstrated no abnormalities. There was no evidence to support any other associated condition.

Organisms frequently recovered from patients presenting with a spinal epidural abscess include *Staphylococcus aureus* (the most common organism in all series reported, representing 55 to 65% of the cases), streptococci (alpha- and beta-hemolytic and pneumococci), gram-negative bacilli (most often *Escherichia coli*, *Pseudomonas aeruginosa*, *Enterobacter cloacae*, and *Proteus mirabilis*), and coagulase-negative staphylococci (2-4). In light of this current report, *H. paraphrophilus* should be added to this list, especially for patients with a history of recent dental manipulation, chronic sinopulmonary infections, and cardiac abnormalities.

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**REFERENCES**