Serratia fonticola Isolated from a Leg Abscess

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Serratia fonticola was isolated from a very large leg abscess in a patient following an accident. This is the first documented human infection due to S. fonticola.

In 1979, Serratia fonticola was described as a new species of Serratia. The strains were isolated from fresh water and soil. In 1985, Farmer et al. reported the isolation of S. fonticola as a contaminant in a wound and from the respiratory tract. In 1986, Muller et al. isolated 18 strains of S. fonticola from fecal specimens of 90 wild European birds, which indicates that one of the habitats of S. fonticola could be the digestive tract of birds. The case described below indicates that S. fonticola can also be encountered as a significant pathogen in a clinical microbiology laboratory.

A 73-year-old female with obesity (103 kg) was admitted on 8 November 1989 to an intensive care unit for a very large abscess of the external side of the right thigh. In June, she had been the victim of an automobile accident which had caused a right-knee traumatism with suprapatellar fracture of the femur, requiring fixation of a prosthesis (plate and screws). The patient required reoperation on 18 September. On 19 October, we noted a supra-aponeurotic abscess covering most of the thigh (40 cm below the knee). The infection site was incised on 6 November, and approximately 2 liters of pus was drained. Three Delbey drains were positioned. The patient presented with a hyperthermia of 38.5°C, and laboratory evaluation revealed a leukocyte count of 16,000/mm³, with 90% polynuclear leukocytes. The same day, a gram-negative bacterium was isolated in pure culture and in great quantity from a swab sample and from one blood culture. This bacterium was identified as S. fonticola. Treatment with ciprofloxacin (1 g/day intravenously) was started. The patient’s condition improved rapidly. On 15 November, the Delbey drains were withdrawn. Culture of these drains in brain heart broth was negative. The patient was discharged on 29 November and send to a rest home.

After 24 h, the organism produced smooth colonies on Mueller-Hinton agar (Diagnostics Pasteur, Marnes-la-Coquette, France). The strain had biochemical profile number 5104553 when tested by the API 20E system (API System S.A., Vercieu, France) and was classified as S. fonticola by the numerical identification program TAXIDEN (Intelligence Artificielle Applications S.A., Clapiers, France). Multiple biochemical tests were subsequently performed, as described earlier (1), to confirm the identification of the organism (Table 1). As noted by Grimont and Grimont (6), the strain failed to produce extracellular enzymes (DNase, gelatinase, Tween 80 esterase). The cocarde phenomenon, related to the cationic detergent-like activity of colistin (8), was not observed. The strong potato-like odor, related to 2-methoxy-3-isopropyl-pyrazine, was not found (4). The strain produced a fishy-urinary odor.

The strain was sent to the Pasteur Institute in Paris, France, where it was confirmed as S. fonticola by P. A. D. Grimont using carbon source utilization tests, as described earlier (2). The MICs of 18 antibiotics were determined by the agar dilution method, according to standards of the National Committee for Clinical Laboratory Standards (7a), using cation-supplemented Mueller-Hinton medium (Diagnostic Pasteur). The isolate was found to be susceptible to ampicillin (MIC, 8 µg/ml), amoxicillin-clavulanic acid (8 µg/ml), cefotaxime (0.12 µg/ml), cefotiam (0.25 µg/ml), cefazidime (0.25 µg/ml), ceftriaxone (0.25 µg/ml), tobramycin (0.5 µg/ml), amikacin (0.5 µg/ml), netilmicin (0.5 µg/ml), ofloxacin (0.25 µg/ml), pefloxacin (0.25 µg/ml), ciprofloxacin (0.12 µg/ml), nalidixic acid (0.5 µg/ml), piperacillin (0.5 µg/ml), and imipenem (0.25 µg/ml). The isolate was resistant to 4-Hydroxybenzoate (+ +), 4-Hydroxybutyrate (+ +), 3-Hydroxybutyrate (+ +), and 3-Hydroxypropionate (+ +).

**TABLE 1. Biochemical characteristics of the S. fonticola isolate**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Isolate</th>
<th>ATCC 29844 (type strain)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxidase</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Catalase</td>
<td>+</td>
<td>+</td>
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<tr>
<td>Growth at pH 4</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Lysine decarboxylase (Moeller)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Ornithine decarboxylase (Moeller)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Arginine dihydrolase (Moeller)</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Voges-Proskauer reaction</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Indole production</td>
<td>−</td>
<td>−</td>
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<tr>
<td>DNase</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Gelatin liquefaction</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Tween 80 esterase</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Urease</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Carbon source utilization</td>
<td></td>
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</tr>
<tr>
<td>Adonitol</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>L-Arabinose</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>D-Cellobiose</td>
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</tr>
<tr>
<td>meso-Erythritol</td>
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<tr>
<td>D-Glucose</td>
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<td>+</td>
</tr>
<tr>
<td>4-Hydroxybenzoate</td>
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<td>−</td>
</tr>
<tr>
<td>2-Keto-glutarate</td>
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<tr>
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<tr>
<td>D-Mannitol</td>
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<tr>
<td>D-Quinate</td>
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<tr>
<td>L-Rhamnose</td>
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<tr>
<td>Salicin</td>
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<tr>
<td>D-Sorbitol</td>
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</tr>
<tr>
<td>D-Sucrose</td>
<td>−</td>
<td>+</td>
</tr>
<tr>
<td>Trigonelline</td>
<td>−</td>
<td>−</td>
</tr>
</tbody>
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* Corresponding author.
to cloxacin (MIC, 16 μg/ml), cefoxitin (16 μg/ml), and fosfomycin (64 μg/ml).

Since no other causative agent was found, the thigh abscess seems to have been due to the penetration of *S. fonticola* during the operation or subsequent postoperative care. Since *S. fonticola* had previously been isolated from fresh water and given the resistance of *Serratia* spp. to antiseptics (6), it is possible that the strain came from disinfectants or parenteral fluids. However, cultures of these fluids and disinfectants were all negative.

Some of the strains isolated from wounds and respiratory tracts received by the Centers for Disease Control in Atlanta, Ga., have been identified as *S. fonticola* (3). None of these strains were of clinical significance. In the present case, *S. fonticola* was isolated as the single agent from a wound and from one blood culture. To our knowledge, this is the first documented human infection due to *S. fonticola*.

We thank F. Grimont and P. A. D. Grimont for the confirmation of the identification.

REFERENCES


