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Aminoglycoside-Resistant *Aeromonas hydrophila* as Part of a Polymicrobial Infection following a Traumatic Fall into Freshwater

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Aminoglycoside-resistant *Aeromonas hydrophila* isolates were sensitive to all antibiotics tested. Strain 1 of *Aeromonas* was resistant to ampicillin and tetracycline. Strain 2 was resistant to the same antibiotics as strain 1. In addition, strain 2 was resistant to amikacin, aztreonam, ceftazidime, ceftriaxone, cefotaxime, gentamicin, and tobramycin (Table 1). Per the microbiology laboratory’s policy, susceptibilities were not ascertained for the *C. perfringens* and alpha-hemolytic *Streptococcus* species; however, these bacteria are generally susceptible to the empirical antibiotic regimen selected for our patient, vancomycin and piperacillin-tazobactam.

Due to the rapidly advancing cellulitis, the patient was taken emergently to the operating room for surgical debridement of the wound. Deep tissue cultures obtained in the operating room grew the same pathogens as the cultures obtained in the emergency department. When preliminary culture results the following day suggested possible *Aeromonas* infection, empirical treatment with vancomycin and piperacillin-tazobactam was supplemented with amikacin and levofloxacin. On hospital day 2, due to advancing cellulitis and purulent drainage from the wound despite intensive antibiotic therapy, a second surgical debridement was performed. Cultures of specimens from this surgery revealed only oxidase-positive Gram-negative rods, implicating *Aeromonas* as the primary pathogen in this infection. Due to the confirmed susceptibilities of the *Aeromonas* species (Table 1), the patient’s antibiotic regimen was narrowed to vancomycin and piperacillin-tazobactam.

The patient’s wound improved rapidly over the next 5 days, and a split-thickness skin graft was placed. After the grafting, the patient was discharged on oral levofloxacin and amoxicillin-clavulanolate and has fully recovered.

*Aeromonas hydrophila* is a Gram-negative, oxidase-positive bacillus that is a common freshwater and food-borne pathogen that can cause enterocolitis, bacteremia, meningitis, and soft tissue infections (3, 4). Here we report a polymicrobial soft tissue infection after a traumatic laceration and freshwater exposure that included two strains of *A. hydrophila*. We believe that *Aeromonas* played a major role in this patient’s disease process, since it was most numerous on the Gram stain and the...
only bacterium cultured from specimens taken during repeated surgical debride ments. One of the strains of Aeromonas exhibited an unusual resistance to amikacin and tobramycin as well as a ztreonam, cephalosporins, and aminoglycosides.

Here we report, of aminoglycoside resistance in Aeromonas species have been very limited. We are aware of only four strains of demonstrated aminoglycoside-resistant Aeromonas hydrophila in the literature: one strain resistant to gentamicin and amikacin but susceptible to tobramycin, isolated at the Massachusetts General Hospital in the mid-1970s (9), and in the literature: one strain resistant to gentamicin hydrophila strain. J. Bacteriol. 1878–1880.

Known antimicrobial resistance patterns can affect the choice of empirical antibiotic regimens used to treat specific infections. A 1996 study of antibiotic susceptibility in clinical isolates of Aeromonas in Taiwan (5) concluded that certain cephalosporins (moxalactam, ceftazidime, and cefepime), amikacin, aztreonam, imipenem, and meropenem were reasonable choices for empirical treatment. A 2009 study of Aeromonas in France recommended that a cephalosporin or a quinolone be prescribed along with an aminoglycoside in cases of severe infection (6). We believe that the reported emerging resistance of Aeromonas to quinolones (1, 10) and carbapenems (7, 11), as well as aztreonam, cephalosporins, and aminoglycosides (this report), might influence physicians to employ polymyxin B for empirical treatment of severe Aeromonas hydrophila infections. However, comprehensive studies are needed to examine broader trends in Aeromonas antibiotic resistance.

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We have no potential conflicts of interest to report.

REFERENCES


8. Reference deleted.


TABLE 1. Antibiotic susceptibilities of the Aeromonas hydrophila strains

<table>
<thead>
<tr>
<th>Strain</th>
<th>MIC (µg/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AMP</td>
</tr>
<tr>
<td>Aero1</td>
<td>&gt;16</td>
</tr>
<tr>
<td>Aero2</td>
<td>&gt;16</td>
</tr>
<tr>
<td>ATCC 7966</td>
<td>&gt;256</td>
</tr>
<tr>
<td>MB443</td>
<td>&gt;256&gt;256&gt;256&gt;256&gt;256&gt;256&gt;256&gt;256&gt;256&gt;256&gt;256&gt;256&gt;256&gt;256&gt;256&gt;256&gt;256&gt;8&gt;2&gt;16&gt;8&gt;256&gt;2&gt;16</td>
</tr>
</tbody>
</table>

a Antibiotic susceptibilities of the two Aeromonas hydrophila strains recovered in this study, the completely sequenced prototype strain ATCC 7966 (12), and the VIM metallo-beta-lactamase-producing strain MB443 (7).

b Aero1 and Aero2, Aeromonas hydrophila strains 1 and 2 from this study. MIC data for ATCC 7966 and MB443 are reprinted with permission from Libisch et al. (7).

c Boldface indicates resistance according to current Clinical and Laboratory Standards Institute guidelines (2). AMP, ampicillin; TZP, piperacillin-tazobactam; FOX, cefoxitin; CAZ, ceftazidime; CTX, cefotaxime; CRO, ceftriaxone; FEP, cefepime; IPM, imipenem; ETP, ertapenem; ATM, aztreonam; GEN, gentamicin; AMK, amikacin; TOB, tobramycin; CIP, ciprofloxacin; TET, tetracycline; CHL, chloramphenicol; POB, polymyxin B; ND, not determined.