CASE REPORT

Raoultella planticola bacteremia following consumption of seafood

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Raoultella planticola is a Gram-negative bacillus commonly found in water, soil and aquatic environments. There have only been 16 cases of R planticola infection documented in the literature to date. R planticola possesses the ability to convert histidine to histamine and can produce symptoms of scombroid poisoning when poorly prepared seafood is consumed in large amounts. The present report describes a case involving a 56-year-old woman who presented with R planticola bacteremia and symptoms consistent with cholangitis four days after consuming a seafood salad containing squid and octopus. She was successfully treated with intravenous ceftriaxone followed by oral ciprofloxacin. Recent chemotherapy, proton pump inhibitor use and altered biliary flow secondary to hepatic metastases may have been contributing factors to the pathogenesis of disease.

Key Words: Bacteremia; Cholangitis; Raoultella planticola; Seafood

CASE PRESENTATION

A 56-year-old woman presented to hospital with a one-day history of fever, chills, anorexia, fatigue and right upper quadrant abdominal pain. She had stage IV non-small cell lung cancer with bone and liver metastases, hypertension and remote cholecystectomy. She had completed her second cycle of pemetrexed chemotherapy two weeks before admission. Four days before onset of symptoms, she attended a fish market. She was treated empirically with ceftriaxone and defined imaging of the biliary tract was not obtained because the patient’s symptoms and laboratory abnormalities improved with antibiotic therapy. She was discharged home eight days after admission.

DISCUSSION

R planticola is an encapsulated, aerobic, nonmotile, Gram-negative bacillus commonly found in water, soil and aquatic environments. Infections in humans have been rarely reported. R planticola is a difficult organism to isolate in the laboratory and has been commonly been mistaken for Klebsiella species.

R planticola (along with Raoultella ornithinolytica) possesses the ability to convert histidine to histamine via decarboxylation. This can lead to scombroid poisoning when there is consumption of poorly refrigerated histidine-containing seafood (not only scombroid fish). The bacterial conversion of histidine to histamine results in symptoms that include the acute onset of facial flushing, nausea, vomiting, diarrhea, hives and generalized pruritus that subsides in a few hours.

To date, 16 cases of R planticola human infection have been reported in the literature. Initially described in patients with sepsis (2), infection has since been described in a variety of settings. In 2012, Olson et al (3) published a case of cystitis caused by R planticola and, within the article, summarized 10 previous cases of R planticola infection. Since this publication, five additional cases of R planticola infection have been reported (4–7). Of the 16 cases, three cases occurred after surgical interventions (open reduction and internal fixation for rib fracture, mitral valve replacement, coronary artery bypass graft), two cases followed skin trauma, and two cases after endoscopic retrograde cholangiopancreatography (ERCP).

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R. planticola bacteremia may occur following consumption of seafood. Puerta-Fernandez et al (5) described a 63-year-old man with abdominal pain and fever after consuming poorly prepared fish. Blood cultures grew a cephalosporin-susceptible R. planticola and the patient was treated with 10 days of intravenous cefotaxime (5). Neither our patient nor the aforementioned case report exhibited signs of scombroid-like poisoning.

In contrast to this previously reported case (5), our patient had several risk factors that may have increased the likelihood of developing R. planticola bacteremia. First, our patient had received chemotherapy two weeks before presentation. Of the 16 documented infections, an underlying malignancy was present in five cases (4,7-9), two of which had received recent chemotherapy (7,8). Although our patient did not have febrile neutropenia, the history of receiving pemetrexed chemotherapy likely contributed to the bacteremia, either by myelosuppression or via disruption of gastrointestinal mucosa. Hematological and gastrointestinal toxicities are common adverse effects associated with pemetrexed monotherapy in non-small cell lung cancer (10). Our patient had a more delayed onset of symptoms (three days) compared with the previous seafood-related case (5), in which the patient became symptomatic within hours of ingestion. This may be explained by a smaller number of ingested bacteria.

REFERENCES

SUMMARY
We present a case of R. planticola bacteremia following recent seafood consumption. The clinical presentation was consistent with cholangitis and, in contrast to previous case reports, was not associated with recent ERCP. Immunosuppression, proton pump inhibitor use and altered biliary flow secondary to hepatic metastases may have been contributing factors to the pathogenesis of disease.

**TABLE 1**
*In vitro susceptibility profile of the Raoultella planticola isolate using VITEK-2*

<table>
<thead>
<tr>
<th>Antimicrobial agent</th>
<th>MIC (mg/L)</th>
</tr>
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<tbody>
<tr>
<td>Amoxicillin</td>
<td>16</td>
</tr>
<tr>
<td>Amoxicillin/clavulanic acid</td>
<td>≤2</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>≤1</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>≤0.25</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>≤1</td>
</tr>
<tr>
<td>Tobramycin</td>
<td>≤1</td>
</tr>
<tr>
<td>Piperacillin/tazobactam</td>
<td>≤4</td>
</tr>
<tr>
<td>Trimethoprim/sulfamethoxazole</td>
<td>≥16/304</td>
</tr>
</tbody>
</table>

*bioMérieux, France. MIC Minimum inhibitory concentration*