Brevibacterium Bacteremia in the Setting of Pyogenic Liver Abscess: A Case Report with Accompanying Literature Review

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Background
Brevibacterium are short coryneforms species found in dairy products, poultry and known colonizers of human skin. Early in its life cycle, Brevibacterium exhibits typical features of coryneform bacteria. However, as they mature, they take on an appearance similar to cocci or cocccobacilli. The most common species isolated from humans is Brevibacterium casei, which appears as a coccobacillus, non-spore forming, short, club-shaped rod on gram stain. Most commonly, bacteremia is associated with indwelling intravascular catheters in the immunocompromised. However, there are rare cases leading to meningitis, cholangitis, salpingitis, peritonitis, endocarditis, and osteomyelitis. The treatment of choice for serious infections is vancomycin as the bacteria shows some resistance to B-lactams, fluoroquinolones, clindamycin, and macrolide antibiotics.

Case Presentation
A 71-year-old Pakistani man with history of CAD s/p PCI/DES x1 in 6/2018 and balloon angioplasty x2 in 2011, poorly controlled T2DM, HTN, and HLD presented for worsening mental status over the last seven days. Family endorsed worsening mental status, decreased oral intake, and worsening abdominal pain over that time. The patient was fully functional at baseline and non-compliant with his medications, including long-acting insulin. He did travel to Pakistan and Dubai within the last year but denied any sick contacts. In the ER, the patient was found to be febrile to 101.8°F, tachycardic to 128, normotensive, tachypneic to 20, and saturating 99% on room air. On exam, he was disoriented and confused, speaking incoherently in one-word sentences, had poor dentition with dry mucous membranes, tachycardia, and diffuse abdominal tenderness to minimal palpation, worst in the right upper quadrant but without rebound or guarding. WBC was 12, HGB 8.3 (baseline of 12), MCV normal liver enzymes. CT abdomen and pelvis with intravenous contrast showed collections in hepatic segments 4A and 4B, 6cm in size in greatest axial diameters. There are several smaller, localized satellite lesions. Findings are highly suspicious for a liver abscess.

Table 1: Selected Clinical Summaries of Brevibacterium Bacteremia Case Reports (4 out of 18)

<table>
<thead>
<tr>
<th>Author (year)</th>
<th>Sex</th>
<th>Age</th>
<th>Brevibacterium Species</th>
<th>Underlying Condition</th>
<th>Clinical Course</th>
<th>Treatment Regimen (Duration)</th>
<th>Indwelling Catheter Present?</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iandå et al (2003)³</td>
<td>M</td>
<td>34</td>
<td>Casei</td>
<td>Acquired Immunodeficiency Syndrome (AIDS)</td>
<td>CD4&lt;50, known CMV retinitis, oropharyngeal candidiasis, neutropenic fever, malaise</td>
<td>IV vancomycin for 8 days, cefazidime (s topped); TLC² removed</td>
<td>Yes - Hickman® catheter for long-term gancyclovir infusion</td>
<td>Survived</td>
</tr>
<tr>
<td>Ulrich et al (2006)³</td>
<td>F</td>
<td>62</td>
<td>Casei</td>
<td>Severe pulmonary hypertension</td>
<td>Flu-like symptoms, productive cough, chills, fever, hypoxemia, CRP 38 mg/dL</td>
<td>IV vancomycin for 10 days, then moxifloxacin for 20 days, TLC² removed</td>
<td>Yes - TLC² for iroprost infusion</td>
<td>Survived</td>
</tr>
</tbody>
</table>

Case Presentations:
- McCaughhey et al (1991): Male, 40 years old, presented with Zollinger-Ellison Syndrome. The patient had a history of gastrointestinal symptoms and was found to have recurrent duodenal ulceration. Treatment included erythromycin and TLC² removal. The patient had an indwelling sclavain TL C² for TPN³ and survived.
- Kaukoranta-Tolvainen et al (1993): Female, 56 years old, presented with Non-Hodgkin Lymphoma. The patient had fever and pancycopenia with a CR P 42mg/dL. Treatment was not specified, and the patient had an indwelling catheter for chemotherapy. The patient survived with recurrence.
- Iandå et al (2003): Male, 34 years old, presented with Acquired Immunodeficiency Syndrome (AIDS). The patient had CD4<50, CMV retinitis, oropharyngeal candidiasis, neutropenic fever, and malaise. Treatment included IV vancomycin for 8 days, cefazidime (s topped), and TLC² removal. The patient had a Hickman® catheter for long-term gancyclovir infusion and survived.
- Ulrich et al (2006): Female, 62 years old, presented with Severe pulmonary hypertension. The patient had flu-like symptoms, productive cough, chills, fever, hypoxemia, and CRP 38 mg/dL. Treatment included IV vancomycin for 10 days, then moxifloxacin for 20 days, and TLC² removal. The patient had an iroprost infusion and survived.

Legend: TLC² = triple lumen catheter; TPN³ = total parental nutrition, CRP² = reactive protein, ANC² = absolute neutrophil count; PPN² = partial parental nutrition, WBC = white blood cell, STEE = transesophageal echocardiogram

Discussion
To date, there are only 18 publications mentioning Brevibacterium bacteremia, with 16 of those cases published as case reports. From these reports, 11 specified Brevibacterium casei, 1 Brevibacterium epidemis, 1 Brevibacterium paucivorans, 1 Brevibacterium massiliense and 2 were not specified. 7 patients had underlying malignancy, 2 had AIDS, 5 had chronic medical co-morbidities, 1 had a congenital abnormality of metabolism, and 1 was not mentioned. 13 patients had some form of indwelling catheter, 2 were not specified, and 1 had no indwelling catheter present. The majority of patients were given broad-spectrum antibiotics, including vancomycin, teicoplanin, aminoglycosides, extended-spectrum beta lactams, and/or fluoroquinolones. 14 patients improved, 6 patients had recurrence, and 2 patients died. More specifically, we describe a patient with pyogenic liver abscess found to have concomitant Brevibacterium bacteremia. To our knowledge, this is the first instance of such a phenomenon and one of the only cases without central-line associated infection. It is unclear if our patient had bacterial translocation from colonic diverticula leading to hepatic abscess. Another potential source is yogurt and cheese consumed by the patient while abroad in Pakistan or Dubai, which is a common delicacy with most meals. Our patient improved after tight glycemic control, abscess drainage and treatment with intravenous Unasyn. Despite prior notions that Brevibacterium species pose little to no harm clinically, evolving evidence points towards the contrary. Given the severity of bacteremia cases in the immunocompromised, Brevibacterium can function as a serious and deadly causative opportunistic agent. Utilization and maintenance of long-term indwelling catheters requires close adherence to sterile technique. Earlier case reports highlight non-specific symptomatology, with an often indolent presentation, which later manifests into florid septicemia. For these reasons, prompt initiation of broad-spectrum, empiric antibiotics can be lifesaving.

References
2. Contact Repository Only!, 2015, Pages I1-I120, ISBN 9781455748013
3. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases (Eighth Edition)