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 coccobacillili[1]. The most common species isolated from humans is Brevibacterium casei[2], which appears as a catalase positive, non-spore forming, short, club-shaped rod on gram staining. Most commonly, bacteremia is associated with indwelling intravascular catheters in the immunocompromised[3]. 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[4].

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 101.8ºF, 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 63.1, Na 124, HCO3 18, glucose 399 (acetone negative), AG 18 (lactate 3.5), HbA1c 12.2, procalcitonin 8.16, CRP 50, negative cardiac enzymes, and normal liver enzymes. CT abdomen and pelvis with intravenous contrast showed a 6cm by 4.6cm rim-enhancing lesion with surrounding satellite lesions, likely representing a liver abscess. Aggressive intravenous fluid resuscitation, morphine, and intravenous Flagyl and cefepime were started. Vancomycin was later added to his regimen to cover for enterococcal coverage but later discontinued. COVID19 testing, interferon-γ release assay, Entamoeba histolytica, and Echinococcus serologies were all negative. Abscess drainage was performed by IR x2 with JP drain placed. Two sets of body fluid cultures grew gram-positive cocci in pairs and chains but could not be speciated. Blood cultures eventually speciated Brevibacterium x2. ID was consulted, and the patient was transitioned to Unasyn with improvement in condition and was safely discharged to SAR.

Conclusion

Brevibacterium infection is an uncommon but potentially fatal cause of bacteremia in the immunocompromised. This risk is increased with prolonged use of indwelling catheters and implanted devices. Infections are often indolent initially but can rapidly escalate if left untreated. Treatment typically requires broad-spectrum antibiotics and often has favorable outcomes. Our report hopes to provide further insight into the management of Brevibacterium bacteremia, specifically in the setting of pyogenic liver abscesses, for which there are no documented cases.

Table 1: Selected Clinical Summaries of Brevibacterium Bacteremia Case Reports (4 out of 16)

Author (year)	Sex	Age	Brevibacterium Species	Underlying Condition	Clinical Course	Treatment Regimen (Duration)	Indwelling Catheter Present?	Outcome
McCaughey et al (1991)[8]	M	40	Epidermiis	Zollinger-Ellison Syndrome	Vomiting, weight loss, recurrent duodenal ulceration, pyloric outflow obstruction	Erythromycin, TLC[a] removal	Yes- indwelling subclavian TLC[a] for TPN[b]	Survived
Kaukoranta-Tolvanen et al (1995)[11]	F	56	Casei	Non-Hodgkin Lymphoma	Fever, pancytopenia, CRP[c] 42mg/dL	Not specified	Yes- TLC[a] for chemotherapy	Recurrence; survived
Janda et al (2003)[7]	M	34	Casei	Acquired Immunodeficiency Syndrome (AIDS)	CD4<50, known CMV retinitis, oropharyngeal candidiasis, neutropenic fever, malaise	IV vancomycin for 8 days, ceftazidime (stopped); TLC[a] removed	Yes- Hickman® catheter for long-term gancylovir infusion	Survived
Ulrich et al (2006)[3]	F	62	Casei	Severe pulmonary hypertension	Flu-like symptoms, productive cough, chills, fever, hypoxemia, CRP[c] 38 mg/dL	IV vancomycin for 10 days, then moxifloxacin for 20 days, TLC[a] removed	Yes- TLC[a] for iloprost infusion	Survived

Legend: [a]TLC=triple lumen catheter; [b]TPN=total parenteral nutrition, [c]CRP=c-reactive protein, [d]ANC=absolute neutrophil count, [e]PPN=partial parenteral nutrition, [f]WBC=white blood cell, [g]TEE=transesophageal echocardiogram

Figure 1: Computed tomography of abdomen and pelvis with intravenous contrast in transverse and coronal section showing rim-enhancing fluid-filled collections in hepatic segments 4A and 4B, 6cm by 4.6cm in size in greatest axial dimensions. There are several smaller, localized satellite lesions. Findings are highly suspicious for a liver abscess.

Discussion

To date, there are only 18 publications mentioning Brevibacterium bacteremia, with 16 of those cases published as case reports[5]. From these reports, 11 speciated Brevibacterium casei, 1 Brevibacterium epidermidis, 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 immunosuppressed, 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.

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