Corynebacterium Pseudodiphtheriticum Bacteremia in an Immunocompetent Adolescent: A Case Report and Review of Literature

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Corynebacterium pseudodiphtheriticum may be found as part of the normal oropharyngeal flora in humans but is recognized as a pathogen in both immunocompromised and immunocompetent host. Infections caused by this organism include endocarditis, pneumonia, exudative pharyngitis, tracheitis and tracheobronchitis (1-12). To our knowledge, *C. pseudodipheriticum* has never been reported as a cause of persistent bacteremia in an immunocompetent host. We describe a patient who presented with fever without an identifiable focus of infection and repeatedly positive blood cultures for *C. pseudodiphtheriticum.*

Case report

A 17-year-old male, recent immigrant from Peru was admitted to the hospital with a history of fever for 3 days. The temperature ranged between 39 to 40 ^{0}C and was remittent. There was associated headache and malaise. There was no history of cough, breathlessness, weight loss, joint pain, vomiting or loss of appetite. Physical examination was unremarkable except for fever. The laboratory investigations showed a WBC count of 6,600/ mm^3 with 65% segmented neutrophils, 5% bands, 28% lymphocytes, and 2% monocytes. Measurements of hematocrit, platelets, and routine serum chemistries were normal. Erythrocyte sedimentation rate (ESR) was 80 mm/ hr (Westergren). The liver enzymes were elevated (ALT= 236 U/L and AST = 189 U/L). Serology for Hepatitis A, B, and C, Cytomegalovirus and Epstein-Barr virus was negative. The Widal test was negative. Anti-nuclear antibody (ANA) titre was 1:160. Rheumatoid factor and anti-deoxy-ribonucleic acid (anti-DNA) antibody were negative. A chest X-ray and a 2-D echocardiogram were normal. HIV-1 RNA by reverse transcriptase polymerase chain reaction and HIV-antibody were negative. A PPD test was negative. The peripheral blood smear was negative for malaria. A total of five serial blood cultures over a period of 2 weeks grew *C. pseudodiphtheriticum*. The isolated organisms were sensitive to ciprofloxacin and rifampicin. He was initially treated with intravenous ceftriaxone for 1 week, then ciprofloxacin for 3 weeks, followed by rifampicin and ciprofloxacin orally for another two weeks. The patient was discharged after 4 weeks of hospitalization and three consecutive negative blood cultures.

After 3 weeks, he was re-admitted with a one-day history of high fever associated with chills and sweating. The blood cultures on the first day of re-admission grew *C. pseudodiphtheriticum*. During this admission, physical examination was again unremarkable except for fever. T cell lymphocyte subsets were normal. Serum total globulin was 3 g/dl (normal value, 2.3 to 3.5 g/dl) and immunoglobulin subtypes were within the normal range. A computed tomography scan of head, abdomen and pelvis was normal. A chest X-ray and a transesophageal echocardiogram were normal. A whole body bone-scan was normal. A stool culture for Salmonella, Campylobacter, and Shigella was negative. The ESR was 69 mm/hr (Westergren) initially and subsequently became normal. Blood cultures grew the same organism on three separate occasions during first 6 weeks of admission. The patient was started on intravenous chloramphenicol for 2 weeks. However, due to persistent fever he was subsequently treated with ciprofloxacin and vancomycin for the following two weeks with clindamycin being added through the last week. The patient continued to be febrile. Investigations for *Bartonella quintana* (trench fever), *Bartonella henselae* (cat-scratch fever), *Bartonella bacilliformis (*orroya fever), *Borrelia hermsii* (endemic tick-borne or epidemic louse borne form of relapsing fever), *Borrelia burgdorferi* (Lyme disease), *Coxiella burnetti* (Q fever), and brucellosis were negative. Urine cultures, throat cultures, and blood cultures for fungus were negative. The antibiotics were finally changed to ticarcillin and clavulanate, which was given intravenously for a period of 2 weeks. The patient was discharged after three consecutive negative blood cultures and remained afebrile. The patient was lost to follow-up.

Discussion

The corynebacteria are widely distributed in nature and are commonly found in soil and water. They also reside on the skin and mucus membranes of humans and other

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animals. Except for *C. diphtheriae*, Corynebacterium species are usually considered to be contaminants when recovered in the clinical laboratory. On the other hand, the repeated isolation of corynebacterium species from normally sterile sites suggests that the organism may be the cause of an infectious process.

C. pseudodiphtheriticum, is best known as a cause of endocarditis, and is commonly encountered in the normal flora of the human nasopharynx (1-2, 13). Recently, the clinical and microbiologic features of several patients with respiratory tract infections (including necrotizing tracheitis, tracheobronchitis, or pneumonia) involving *C. pseudodiphtheriticum* have been reported (3-12).

In our patient, there was no predisposing risk factor for bacterial infection. Although, *C. pseudodiphtheriticum* is frequently isolated as a commensal from the nasopharynx, the throat cultures were negative in our patient. The source of bacteremia was not determined in spite of multiple investigations. The blood cultures during two separate prolonged febrile episodes were repeatedly positive for *C. pseudodiphtheriticum*. In the presence of continuous bacteremia we speculate the source could be endocarditis or endovascular infections. Although the sensitivity of echocardiography in children approaches 80%, it is not 100%. Therefore a negative echocardiogram does not rule out endocarditis.

The isolated organisms were sensitive to ciprofloxacin, ofloxacin, rifampicin, tetracycline, and chloramphenicol and resistant to penicillin, ampicillin, oxacillin, clindamycin, erythromycin, and trimethoprim-cotrimoxazole. The sensitivity pattern remained the same for all the strains that were isolated during both admissions. The previously reported cases of respiratory tract infections involving *C. pseudodiphtheriticum* have shown uniform sensitivity to ß-lactam antibiotics such as penicillin, ampicillin, and cefazolin (1, 14-17). In contrast to previous reports, the *C. pseudodiphtheriticum* isolated in our case were resistant to ß-lactam antibiotics, and mostly susceptible to quinolones (ciprofloxacin, ofloxacin), and rifampicin. The strain variation and susceptibility to antimicrobial agents are sufficiently high that antimicrobial susceptibility testing of isolates is recommended to guide the clinician in the selection of antibiotics for the treatment of individual patients. This case report demonstrates that *C. pseudodiphtheriticum* can be an uncommon pathogen even in a healthy individual.

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