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Bacteremia Due to *Actinomyces naeslundii* in a T cell Lymphoma Child; a Case Report

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ABSTRACT

Actinomyces naeslundii is one of the normal flora of human oral cavities and is associated with oral plaque. This organism is not virulent and is recognized as a saprophyte organism however it seems that the identification of a primary or secondary immunosuppressant plays a critical role in the etiology of bacteremia. That is, whether *A. naeslundii* is the causative agent of malignancy or not needs further studies in future.
We report a case of *A. naeslundii* bacteremia in an 11 year-old boy with persistent fever for two weeks prior hospital admission. He was finally diagnosed with malignant T cell lymphoma. Isolation of this bacterium from the blood culture of our patient can serve as an important warning indicating that incuriosity about fastidious and not easily grown bacteria isolated from clinical samples may lead to misinterpretation and misdiagnosis.

Keywords: Actinomyces; T cell lymphoma; Bacteremia; Actinomyces naeslundii

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Implication for health policy/practice/research/medical education:
The case being investigated has an important warning indicating that curiosity about not easily grown bacteria (fastidious bacteria) isolated from clinical samples may lead to misinterpretation by clinical microbiology technicians. Thus, we need technicians who are expert in the isolation and identification of bacteria to improve acknowledgment of the implications of heretofore seemingly innocuous bacteria strains.

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1. Introduction

The genus of *Actinomyces* is common saprophyte bacteria in nature but in certain conditions, they may be pathogenic (1). Bucal and gastrointestinal cavities are mainly selected as the natural habitat for these organisms (2, 3). *Actinomyces* spp. is characterized as Gram-positive rod shape, asporogenous, and anaerobic bacteria with or without branching filamentous. Frequency distributions of *Actinomyces* spp. have been reported by Clarridge (4). They distinguished 91 strains and clustered them into 18 major and 3 minor genogroups. *A. naeslundii* are recognized as one of the important early colonizers in oral biofilm and primary *Actinomyces* spp. in the infants' mouths (5). In spite of low virulence, they may act as pathogenic organisms (6-8). We isolated this organism from the blood culture of an 11- year- old boy diagnosed with T cell Lymphoma.

2. Case History

The 11 year-old boy admitted to the pediatric ward of Namazi Hospital Shiraz, southern Iran in November 2010. He was the first child of unrelated parents with no remarkable past history. Since two weeks prior to hospital admission, he developed limping and local pain in lower limbs and lumbosacral spine with decreased proximal muscular power and persistent fever. The patient was referred to the ward for acute decreased muscular power. Upon examination, he was ill with 39˚C fever, local tenderness and reduced range of motion in lumbosacral joint, deep tendon reflex was 3/4 and symmetric but lower and upper muscular powers were reduced to 2/5 equal in both limbs.

Peripheral blood smear showed mild leukopenia, anisocytosis and mild thrombocytosis. Spine and limbs were normal by magnetic resonance imaging. Bone marrow aspiration and biopsy were performed that revealed severe necrosis and fine fibrosis suggesting malignant T cell lymphoma. Laboratory findings were: white blood cell (WBC) 4800 cell/mm3, haemoglobin (Hb) 11.5 g/dl, platelets 530,000 cell/mm3, erythrocyte sedimentation rate (ESR) 83/hour, c-reactive protein (CRP) three plus, lactate dehydrogenase (LDH), creatine phosphokinase (CPK), calcium (Ca), phosphorus (P) and alkaline phosphatase (Alph) were within normal range. Liver function tests were normal as well. Febrile agglutination tests for brucellosis and typhoid were negative, anti-nuclear antibody (ANA), double strand deoxyribonucleic acid (ds DNA) were negative and urine culture revealed no growth. The patient was transferred to hematological ward for complementary treatment following appropriate diagnosis.

2.1. Microbial Examination

Three mililiter blood sample from the patient inoculated to blood culture bottle (BD, BACTEC TM, peds plus /F, Ireland) in completely sterile conditions. Once positive growth was shown by BACTEC instrument, one droplet of blood culture media was inoculated on sheep's blood agar and brucella blood agar (Merck, Germany) by a sterile needle. Then, both were incubated in two different aerobic and micro aerobic situations in ambient air, in 6% carbon dioxide adjusted by anoxomat system (Mark II, Mart microbiology BV, Netherlands) at 37˚C. Single colonies isolated from agar media were stained by Gram and partial acid fast staining and Gram staining on blood sample was done as well.

Single colonies were tested by catalase and oxidase reactions. On the basis of the growth preference bacteria in micro aerobic than in aerobic condition and bacterial morphology, complementary identical tests performed using identification API 20 A Kit (BioMérieux, France), according to the manufacturer's instruction.

Following 48 hours, fine, barely visible small rough colonies appeared on the incubated agar plates in ambient air, in 6% carbon dioxide which had irregular surfaces and non-pigment gradually becoming opaque. When the colonies sub-cultured on sheep blood agar in strictly anaerobic condition, the organism exhibited slower growth than when in micro aerobic condition. Gram staining revealed filamentous branching gram positive rods. They were not partial Acid fast. Oxidase and catalase tests were also negative. All the biochemical reactions by api 20A strip were read, according to the manufacturer's protocol and then were identified as *A. naeslundii* with a high acceptable level by software program.

2.2. Antimicrobial Tests

Antimicrobial susceptibility evaluations were performed according to the Kirby Bauer disk-diffusion method on brain heart infusion agar (Merck, Germany) plates. Bacterial suspension was prepared at high concentration equivalent to 4.0 of Mac Farland tube standard in api 20 A suspension medium (demineralized water), and then incubated in micro aerobic jar containing 6% carbon dioxide adjusted by Anoxomat system at 37˚C temperature for at least 48 hours. All the antibiotic disks were purchased from (Mast diagnostics Co, UK).

The isolated strain illustrated wide spectrum sensitivity to a large group of antibiotics such as penicillin, cephalosporin, penems, carbapenems, linezolide, tetracycline, erythromycin and chloramphenicol unlike ciprofloxacin and other quinolones *in vitro* condition. This indicates that the isolated organism was resistant to quinolones.

3. Discussion

A. naeslundii is one of the inhabitants of human oral cavity and together with different bacteria species existing in mouth, can form oral plaque ((5), (6, 7). It has been

recognized as an opportunistic bacterium that in some conditions, including low oral hygiene, trauma or tooth extraction, can play a role in periodontal diseases (9, 10). Although *A. israilli* is recognized as the main cause of Actinomycosis in most cases, another species such as *A. naeslundii* may be involved as well (11). In spite of low pathogenicity of *A. naeslundii*, its role as the etiology of oral and cervicofacial disease has been proven (10).

There are different reports on the etiological role of *A. naeslundii* in some diseases. Coleman *et al.* reported *A. naeslundii* as an agent of human actinomycosis (12). Although the main related sites of infection are the gallbladder and pelvic area (13-15) there are other reports due to pathogenic role of *A. naeslundii* in a patient with an infection of a hip prosthesis and another one with septic arthritis (16-18). In our case, we could not find any typical actinomycetic lesions therefore we proposed periodontal origin as the source of organism. Accordingly, A. naeslundii is an opportunistic organism that requires disruption of mucosal barriers to cause disease. In cases that immunity is compromised or barriers are broken like malignancy or primary or secondary immunodeficiency, bacteremia is suspected. Therefore, this could be also the case with our patient and we started a suitable treatment as 40 mg/kg per day clindamycin intra venous at eight hour intervals for two weeks and referred him to oncology ward for complementary treatment.

We can conclude that delay in isolation and characterization of fastidious organisms which is a time consuming task could lead to misdiagnosis or false interpretation as contamination. Therefore, it is important to be very careful about the bacteria which are not easily isolated from the clinical samples. Future studies are needed to investigate whether *A. naeslundii* is the causative agent of malignancy.

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Authors' Contribution

None declared.

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