



# *Actinomyces neuii* subsp. *neuii* Isolated from Perineal Abscess; Case Report

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## ABSTRACT

*Actinomyces* are gram positive bacilli which generally colonize in mouth, colon and vagina. The members of genus *Actinomyces* are facultative anaerobic or microaerophilic organisms and have a branching filamentous structure. They cause classical actinomycosis. Among the *Actinomyces* species; *A. israelii*, *A. viscosus*, *A. naeslundii*, *A. odontolyticus*, *A. bovis* and *A. neuii* are the mostly isolated organisms from clinical cases. A rarely encountered member of this group, *Actinomyces neuii* does not show branching and is catalase and CAMP positive and is a coryneform shaped bacillus. Although *Actinomyces* is mostly found as contaminating organism, in some cases it is reported as a pathogen. *Actinomyces neuii* has been reported in chorioamnionitis, neonatal sepsis, vertebral osteomyelitis, cervical lymphadenitis, breast abscess, fatal bacteremia and postoperative endophthalmitis. In our case, *A. neuii* was isolated from a perineal abscess and it was not previously reported. In our case, *Actinomyces neuii* was identified by commercial identification systems. For this purpose; VITEK MS and VITEK<sup>®</sup>2 Compact (both by bioMérieux, France) were used in the clinical microbiology laboratory and then this identification was confirmed as the *Actinomyces neuii* subsp. *neuii* by the 16S rRNA sequencing. Also, the positivity of CAMP was demonstrated in the laboratory. As in the cases of other actinomycosis, the treatment of the abscess caused by the *Actinomyces neuii* is through the surgical debridement. The antimicrobial susceptibility testing is not performed since the organism is reported to be susceptible to common antibiotics. Beta lactam antibiotics are acknowledged as the proper selection for antibiotic treatment.

**Keywords:** *Actinomyces neuii* subsp. *neuii*, perineal abscess, *Actinomyces*

## Introduction

As member of the oral flora, actinomyces are organically anaerobic or microaerophilic and sporless microorganisms. These bacteria with difteroid basil morphology that do not react to acid-fast stain and do not show motility are gram positive bacteria and show branching (1). *A. israelii*, *A. viscosus*, *A. naeslundii*, *A. odontolyticus*, *A. bovis* and *A. neuii* are species isolated from many clinical cases among *Actinomyces* species.

*Actinomyces neuii* is aerobic and catalase positive member of this family. *A. neuii* was involved in the CDC coryneform group 1 bacteria until 1994. In a study by Funke et al. (2) on the metabolic and cellular fatty acid pattern of bacterium and 16S ribosomal

RNA (rRNA) sequence; bacteria were defined as *Actinomyces neuii* subsp. *neuii* and *Actinomyces neuii* subsp. *Anitratus*.

*A. neuii* was previously isolated as an infection agent in soft tissue in a study conducted by Gomez-Garces et al. (3). In our study, *A. neuii* was first isolated from a perineal abscess sample in our country.

## Case Report

Fifty-two-year-old male patient was admitted to urology outpatient clinic with tenderness and swelling in the groin. He had scrotal lesions for 20 years and he said that these lesions merged and pain increased for one week. In addition, it was learned that he

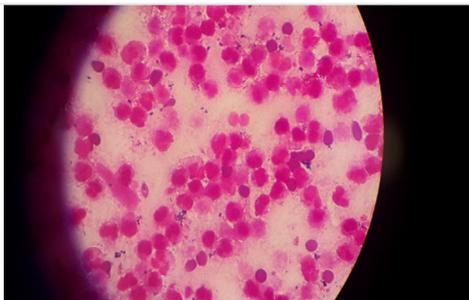
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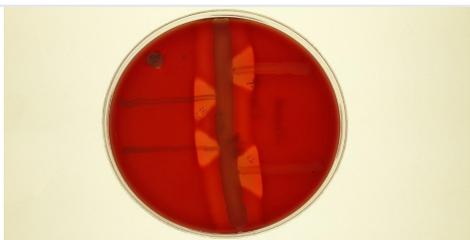
had type 2 diabetes mellitus, which was not regulated for 5 years and he was followed up with hypertension. Physical examination revealed a fever of 37.2°C and a swelling in 4x4 cm dimensions, stretching from perineum to scrotum, giving perineal induration and suggesting abscess. The number of leukocytes in the complete blood count was  $18.5 \times 10^3/\mu\text{L}$ , CRP was 4.36 mg/dL (<0.5) and glucose was 4+ in complete urine examination. The surface tissue ultrasonography revealed a heterogeneous hypochoic collection with dense content and thickening of subcutaneous tissue which was 35x16 mm in diameter, partially extended from the posterior of the scrotum to the perineum, and had debris and septations within the thick wall. The contents of the 30 cc abscess were completely drained with 1 cm incision from the apse surface and sent to the microbiology laboratory. The patient was hospitalized and started empirically intravenous ceftriaxone 2x1 g/day and gentamicin 3x3 mg/kg/day. In addition, antidiabetic treatment for blood sugar regulation was started. In the first follow-up day, mild serous drainage was observed and no collection was observed in the abscess area of the patient with flow in the incisions during the day. Control leukocyte count was  $11.8 \times 10^3/$



**Figure 1.** Direct microscopic examination from the abscess sample sent to the laboratory



**Figure 2.** Colony image of abscess sample sent to laboratory and incubated in 5% sheep blood agar at 35°C for 48 hours



**Figure 3.** CAMP test performed with *A. neuii* and *Staphylococcus aureus*

$\mu\text{L}$  and CRP was 0.92 mg/dL. Due to improvement of clinical symptoms, he was discharged with 2<sup>nd</sup> generation cephalosporin on the 3<sup>rd</sup> day. On the 1<sup>st</sup> week control, the number of leukocytes and CRP levels were normal and no perineal collection was detected and antibiotic therapy was terminated. Also perineal region examination was evaluated as normal on 1<sup>st</sup> and 2<sup>nd</sup> month controls. In the Clinical Microbiology Laboratory, gram positive coryneform bacilli and leukocyte were found in direct microscopic examination of perineal abscess sample (Figure 1). Simultaneously, cultures were prepared at 5% sheep blood agar (Becton Dickinson, USA), MacConkey Agar (Becton Dickinson, USA) and chocolate agar (Becton Dickinson, USA) and they were incubated in incubator with CO<sub>2</sub> at 35°C for 72 hours. In the culture examination, round colonies of 0.5-1.5 mm diameter in white color which were opaque, smooth-shaped and non-hemolytic were produced (Figure 2). Microscopic examination of these colonies showed gram-positive, non-branching coryneform-shaped, catalase-positive, inactive and sporeless bacilli. Breeding colonies were identified with conventional methods and Vitek MS (bioMérieux, France) system as *Actinomyces neuii*. At the same time, with 16s rRNA analysis (Sentegen Biotechnology, Ankara), *Actinomyces neuii* subsp. *neuii* was confirmed. In addition, *Staphylococcus aureus* ATCC 29213 strain and CAMP formation were investigated and a relationship was found between them (Figure 3).

Since *A. neuii* is sensitive to many antibiotics, antimicrobial susceptibility tests are not performed and  $\beta$  lactam antibiotics are considered appropriate. In this case, a similar treatment regimen was given and an uncomplicated recovery was observed.

## Discussion

*Actinomyces* species have been isolated from clinical specimens such as blood, wound, bone, abscess, bronchial wash, gallbladder fluid, pleural fluid and urine (1). Although they generally show better reproduction in anaerobic conditions, some species such as *A. neuii* can be isolated under aerobic conditions and 5-10% CO<sub>2</sub> conditions.

*A. neuii* is catalase and CAMP positive and coryneform-shaped basil. These features separate it from other *Actinomyces* species. Also, *A. neuii* has a short basil appearance that does not show branching, unlike other species (2-4). It ferments glucose, maltose, sucrose, mannitol, lactose, mannose, trehalose and xylose. Negative catalase reaction of *A. neuii* has also been reported. Brunner et al. (5) defined catalase negative *A. neuii* in a patient with breast prosthesis infection.

*Actinomyces neuii*, isolated from scrotal abscess sample, is a very rare microorganism seen in the laboratory as an infection agent and was not reported as agent in our country before. This case was presented because *A. neuii* is a clinically important and rare microorganism. In the literature, it was reported as pathogenic microorganism in different clinical specimens. For example, Mann et al. (6) isolated *A. neuii* as agent in a patient with neonatal sepsis and chorioamnionitis. In various studies, *A. neuii* was reported to cause endoftalmit, bacteremia, endocarditis,

pericarditis, osteomyelitis and prostatitis (7,8). Lacoste et al. (9) isolated *A. neuii* in breast abscess.

Surgical debridement is recommended in the treatment of soft tissue infections caused by *Actinomyces species*. It is sensitive to many antibiotics and  $\beta$ -lactam antibiotics is primarily preferred (10).

*A. neuii*, isolated from perineal abscess as a pathogen agent, which was a rarely seen agent, was reported here. It is important for the prognosis to determine the appropriate treatment approach with the correct identification of species with new microbiological methods. Isolation of *A. neuii* for the first time in our country adds specificity to the study.

### Ethics

**Informed Consent:** A consent form was completed by all participants.

**Peer-review:** Externally peer reviewed.

### Authorship Contributions

Concept: B.S.G., E.A., A.C., C.E., M.Z.D., Design: B.S.G., E.A., A.C., C.E., M.Z.D., Data Collection or Processing: B.S.G., E.A., A.C., Analysis or Interpretation: B.S.G., E.A., A.C., Literature Search: B.S.G., E.A., C.E., Writing: B.S.G., E.A., C.E.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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