

## *Staphylococcus lugdunensis*에 의한 봉소염이 동반된 급성 림프절염

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### Acute Lymphadenitis with Cellulitis Caused by *Staphylococcus lugdunensis*

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Although coagulase-negative staphylococci (CNS) have been considered part of the resident flora on the human skin, *Staphylococcus lugdunensis* is an unusually virulent CNS and can cause many types of infection. We report a rare case of acute lymphadenitis with cellulitis in the right infraauricular region caused by *S. lugdunensis*. A 62-yr-old woman visited the Department of Otolaryngology of Busan Paik university hospital. She had a palpable mass and swelling in the right infraauricular region and complained of aggressive pain and a febrile sensation in the region for 5 days. On the suspicion of abscess with infection, percutaneous aspiration was performed and smooth, flat, white, opaque colonies grew on a blood agar plate as a pure culture. The biochemical test results showed the organism to be catalase positive, tube coagulase negative, ornithine decarboxylase positive, slide coagulase positive, and latex agglutination tests for coagulase positive. The API Staph Kit was used to identify the isolate to the species level as *S. lugdunensis* with a 64.6% probability (profile 6716152). We confirmed the species identification of this strain by 16S rDNA sequence analysis. The patient's clinical condition improved with appropriate antimicrobial therapy and pus drainage. (*Korean J Lab Med* 2008;28:196-200)

**Key Words :** Lymphadenitis; Cellulitis; *Staphylococcus lugdunensis*; 16S Ribosomal RNA

## INTRODUCTION

*Staphylococcus lugdunensis* is a member of the coagulase-negative staphylococci (CNS) first described by Freney

et al. in 1988[1]. Although CNS have been considered part of the resident flora on the human skin, *S. lugdunensis* is unusually virulent and can cause many types of infection, ranging from superficial skin lesions to life-threatening endocarditis[2-6]. We report what appears to be very rare case of acute lymphadenitis with cellulitis in the right infraauricular region caused by *S. lugdunensis*, yielding a pure culture of the organism that was definitely identified by 16S rDNA sequencing.

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## CASE REPORT

A 62-yr-old woman visited the Department of Otolaryngology of Busan Paik university hospital. She had a palpable mass and swelling in the right infraauricular region and complained of aggressive pain and a febrile sensation in the region for 5 days. She had no history of skin injury in the affected region of the head and neck. She had a medical history of palpebral hordeolum and osteoarthritis of both knees. The physical examination revealed a mass about 20×10 mm with erythema and swelling in the right infraauricular area. Purulent discharge was exuded when pressure was applied to the lesion. The rest of the physical examination was unremarkable.

On the suspicion of abscess with infection, percutaneous aspiration was performed, and the aspirated pus specimens were inoculated to sheep blood agar, chocolate agar, and thioglycollate broth media and cultured in 5% CO<sub>2</sub> at 35°C for 48 hr. Fine-needle aspiration of the mass for histopathology examination and a computed tomography (CT) scan of the neck were performed to rule out malignancy and to assist in definitive diagnosis. Because a bacterial infection was suspected, the physician administered cef-

podoxime and ampicillin/sulbactam empirically with consideration of the patient's state, and he removed all purulent discharge by aspiration and pressing.

Smooth, flat, white, opaque colonies grew on a blood agar plate as a pure culture, and these were gram-positive cocci on Gram stain. The biochemical test results showed the organism to be catalase positive and tube coagulase negative, so the isolate was reported as CNS without definitive identification. It was resistant to penicillin and oxacillin and susceptible to ciprofloxacin, clindamycin, erythromycin, gentamicin, co-trimoxazole, tetracycline, and vancomycin. The histopathologic review revealed inflammatory cells and exudate on a hemorrhagic background. The CT scan showed an ill-defined contrast-enhancing lesion of about 20×8 mm attached to the right parotid gland in the infraauricular area (Fig. 1). Pus drainage and wound dressing was performed every day for a week. The amount of discharge was remarkably decreased after 7 days of treatment. The swelling was down and the discharge was nearly resolved 2 weeks later. The local findings had stabilized, and the general condition of the patient was in good.

Later, we performed ornithine decarboxylase, slide coagulase and latex agglutination tests for coagulase (Staphaurex; Murex Diagnostics Ltd., Dartford, UK) as additional biochemical tests, and the results were positive. The API Staph Kit (bioMérieux, Marcy-l'Étoile, France) was used to identify the isolate to the species level as *Staphylococcus lugdunensis* with a 64.6% probability (profile 6716152). We confirmed the species identification of this strain by 16S rDNA sequence analysis.

## DISCUSSION

The genus *Staphylococcus* is currently divided into more than 30 species. *Staphylococcus aureus* is one of the most common causes of human infections, whereas CNS in clinical specimens are often discounted as contaminants or colonization except in special specimens and conditions.

*S. lugdunensis* is a member of the CNS that was first described by Freney et al. in 1988[1] and has been isolated as part of the resident flora on the human skin in the ingui-

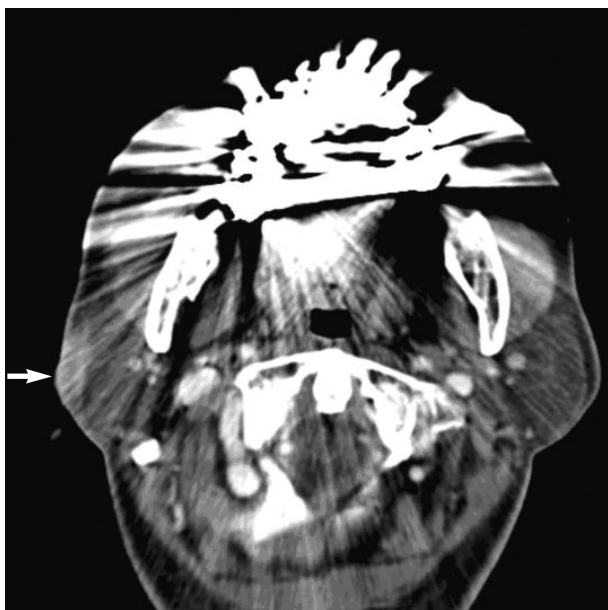


Fig. 1. The CT scan showed an ill-defined contrast-enhancing 20 × 8 mm lesion (arrow) attached to the right parotid gland in the infraauricular area.

nal area[2]. However, *S. lugdunensis* is rarely a contaminant and has been associated with serious infections, including endocarditis, bacteremia, abscesses, and wound infections[3–5, 7, 8]. Many of these reports highlight the aggressive nature of *S. lugdunensis*, considering this species more pathogenic than the other non-aureus staphylococci. The infections typically resemble *S. aureus* infections in terms of the virulence of the organism and the clinical course, which often is highly destructive[4]. The aggressive behavior of *S. lugdunensis* is thought to be attributable in part to the production of a  $\delta$ -like toxin that shares homology with the  $\delta$ -toxin of *S. aureus*[9]. Nucleic acid sequences related to the *S. aureus* accessory gene regulator (*agr*), the major regulatory determinant of virulence, have also been demonstrated in *S. lugdunensis*[10]. So the correct identification of *S. lugdunensis* by the clinical microbiology laboratory is important for selection of appropriate treatment.

There are some problems in the correct identification of *S. lugdunensis*. These organisms are characterized by production of fibrinogen affinity factor and ornithine decarboxylase. The most important reaction in screening for *S. lugdunensis* is ornithine decarboxylase, but this reaction is not used routinely on all specimens in the clinical laboratory. In addition, an important biochemical reaction for catalase-positive cocci is a coagulase test for fibrinogen affinity factor. We used tube coagulase as the key reaction to differentiate *S. aureus* from CNS, and the *S. lugdunensis* was classified as CNS in this situation. However, if we had used a commercial clumping factor, the isolate would have been identified as *S. aureus*. Moreover, *S. lugdunensis* is not included in the database for strain identification of the VITEK system (bioMérieux) that is commonly used in the clinical laboratory for the identification of bacteria. So, there is a strong possibility of inaccurate identification of *S. lugdunensis*.

Ordinarily, we do not make an attempt to identify CNS from clinical isolates except in some special specimens. So we identified this strain solely as CNS and reported it as resistant to oxacillin. Recently, the Clinical and Laboratory Standard Institute (CLSI) guideline for oxacillin for *S. lug-*

*dunensis* was excluded from the CNS guidelines and included in those of *S. aureus*[11]. Moreover, CLSI guidelines for disk diffusion prescribe that only the cefoxitin disk test be used for *S. lugdunensis* isolates, and we confirmed oxacillin susceptibility results based on the cefoxitin result. These facts enable accurate identification and antibiotic susceptibility results for *S. lugdunensis*.

We obtained a pure culture of the isolate, and there was no growth in anaerobic culture. The identity of the organism from our patient was confirmed by sequencing the 16S rDNA, which was amplified with the universal bacterial primers 27F (5'-AGA GTT TGA TYM TGG CTC AG-3') and 1492R (5'-ACC TTG TTA CGA CTT-3'). Purified DNA from the PCR was sequenced with a Big Dye Terminator Cycle Sequencing kit (Applied Biosystems, Foster City, CA, USA) and ABI PRISM 3130xl genetic analyzer (Applied Biosystems). The primers for sequencing were 27F (5'-AGA GTT TGA TYM TGG CTC AG-3'), 515R (5'-TTA CCG CGG CKG CTG GCA C-3'), 536F (5'-CAG CAG CCG CGG TAA TAC-3'), and 926F (5'-AAA CTY AAA KGA ATT GAC GG-3'), and 1492R (5'-ACC TTG TTA CGA CTT-3'). All sequences were compared with similar sequences of the reference organisms using Basic Local Alignment Search Tool (BLAST; a genome database of the National Center for Biotechnology Information). Our sequences showed 99.9% conformity with the 16S rDNA sequences of *S. lugdunensis* (GenBank accession number AB009941).

Acute lymphadenitis, which is an acute inflammatory and infectious process of lymph nodes, is a common clinical occurrence. It may be restricted to a localized group of nodes draining an anatomic area or be generalized during a systemic infection[12]. Acute suppurative lymphadenitis is far more common in children than in adults, but this case occurred in an older patient. Also, in our case, even after a detailed search, we were not able to find any predisposing factors to determine clearly how the microorganism could have reached the affected area. *S. aureus* or *Streptococcus pyogenes* is the frequent etiologic agent in acute lymphadenitis, whereas CNS are rare as a cause of acute lymphadenitis[12]. We could find only one report of acute lymphadenitis with cellulitis caused by *S. lugdunen-*

sis in the literature[13]. This report therefore is, as far as we know, the first case of acute lymphadenitis with cellulitis caused by *S. lugdunensis*, showing pure culture growth in Korea.

Pus discharge from the lesion and bacterial culture of the pus may support the diagnosis of suppurative infection. Needle aspiration of the gland is the best method to identify the causative organism. A CT scan is an important tool in the diagnosis of tumors and for detection of suppuration. We could make a diagnosis of acute lymphadenitis with cellulitis by the presence of purulent discharge, pain, and radiographic evidence observed on CT scan and confirmed by bacterial culture and identification. The patient recovered with pus drainage and antibiotic therapy.

The GenBank accession number for the 16S rDNA sequence of the strain of *S. lugdunensis* identified in the present study is AY903257.

## 요 약

대부분의 CNS가 인체 피부의 상재균으로 여겨지는 것과는 달리 *Staphylococcus lugdunensis*는 병인성으로 다양한 감염을 유발할 수 있다. 이에 저자들은 우측 귓바퀴아래 부위에 발생한 *S. lugdunensis*에 의한 봉소염이 동반된 급성 림프절염 1예를 경험하여 보고하고자 한다. 62세 여자환자로 우측 귓바퀴아래 부위에 만져지는 덩이와 종창을 주소로 부산백병원 이비인후과를 내원하였으며 5일간 지속되는 극심한 통증 및 열감을 호소하였다. 감염이 동반된 농양의 의심하에 경피하흡입이 시행되었고 혈액찬천 배지에서 순수집락으로 부드럽고 편평하며, 흰색의 불투명한 집락이 증식하였다. 이 균주는 생화학 검사결과 catalase 양성, tube coagulase 음성, ornithine decarboxylase 양성, slide coagulase 양성 및 coagulase시험을 위한 라텍스 응집시험 양성이었다.

종의 동정을 위해 API Staph Kit가 이용되었고 64.6%의 확률로 *S. lugdunensis* (profile 6716152)가 의심되었다. 저자들은 상기 균주에 대해 16S rDNA 염기서열분석을 시행하여 균종 동정을 최종 확인하였다. 환자의 임상양상은 적절한 항균제 치료 및 농의 배출로 호전되었다.

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