CASE REPORT

Facial cellulitis because of Aggregatibacter (Actinobacillus) actinomycetemcomitans and Capnocytophaga species in an immunocompetent patient

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Received 3 September 2009; received in revised form 15 January 2010; accepted 24 February 2010

KEYWORDS
Aggregatibacter (Actinobacillus) actinomycetemcomitans; Capnocytophaga; Facial cellulitis; Immunocompetent

The species of Capnocytophaga and Aggregatibacter are normal flora and mostly cause periodontal diseases. The soft tissue infection caused by Aggregatibacter often is associated with Actinomycetemcomitans species. Beside, most Capnocytophaga infections are described in immunocompromised patients. We identified facial cellulitis caused by Capnocytophaga spp and Aggregatibacter (Actinobacillus) actinomycetemcomitans in a 16-year-old immunocompetent female.

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Introduction

Bacteria of the genus Capnocytophaga and Actinobacillus occur in normal oral flora and in the presence of periodontal disease.1,2 These organisms can cause periodontal infection, soft tissue abscess (often in association
with Actinomyces species), endocarditis, and systemic infection. They are also associated with sepsis, usually in immunocompromised patients. We identified facial cellulitis caused by Capnocytophaga spp and Aggregatibacter actinomycetemcomitans (formerly in the genus Actinobacillus)\(^3\) in a 16-year-old immunocompetent female.

**Case report**

A 16-year-old female noted the development of a mild tender left facial mass 1 month before presentation in our facility, in July 2008 (Fig. 1). She noted that the size of the mass increased slowly and was associated with increasing local heat and erythema. She originally sought medical attention and received an unknown antibiotic. In addition, a dental clinic diagnosed caries, but no procedure was performed. Thirty days after presentation, her symptoms were unchanged and she was admitted. She gave no history of tuberculosis, diabetes, or any other disease that might affect immunological function.

Physical examination indicated that she was apyrexial and had a 2 × 2 cm mass over the left mandibular area. The mass was smooth, fluctuant, and fixed deeply with overlying cellulitis. The parotid and mandibular ducts were normal, and no calculi were evident in the floor of her mouth. A tuberculin skin test was negative.

Incision and drainage of the mass yielded debris and a small amount of pus. A course of oral clarithromycin and amikacin was administered 6 days after hospitalization, but the mass was unchanged. A Gram stained film of the pus indicated no visible organisms, and a Ziehl-Neelsen stain was negative for acid fast bacilli. Pathology of the tissue indicated fragments of necrotic debris, neutrophil exudates, and aggregates of basophilic clumps that resembled sulfur granules (Fig. 2). A Giemsa stain indicated no bacilli and a Gram stain indicated no Actinomycosis.

A bacterial culture was negative after 48 hours, but indicated a light growth of Capnocytophaga species and gram-negative bacilli after 9 days. Identification of Capnocytophaga species was performed with the RAPID-ANA II system (Innovative Diagnostic Systems, Inc., Norcross, GA, USA). The gram-negative bacilli were identified as Aggregatibacter actinomycetemcomitans, based on conventional biochemical methods and confirmed by partial 16S rRNA sequence analysis [accession number M75039.1 (Aggregatibacter actinomycetemcomitans), identity 99% (529/530)].\(^3,4\) A disc susceptibility test indicated that both organisms were susceptible to amoxicillin/clavulanic acid, aztreonam, cefuroxime, third-generation cephalosporins (i.e. ceftazidime, ceftriaxone), pipercillin ± tazobactam, ertapenem, and ciprofloxacin, but that Capnocytophaga spp was resistant to amikacin, cefazolin, and gentamicin.

Thus, 7 days after admission, the antibiotic was changed to intravenously amoxicillin/clavulanic acid (3.6 g daily divided into 3 doses) combined with oral clarithromycin (500 mg twice a day). The patient’s symptoms improved over the next 5 days. She was nearly asymptomatic and discharged from our clinic.

**Discussion**

Anaerobic and microaerophilic bacteria that were previously considered harmless are now considered pathogenic.\(^5\) These organisms can cause severe infections, especially after solid organ or hematopoietic stem cell transplantation or if introduced into otherwise sterile sites, such as during a surgical procedure. Bacteria of the genera Capnocytophaga and Aggregatibacter can occur in normal oral flora and in the presence of periodontal disease,\(^1,2\) often in immunocompromised patients. However, Capnocytophaga infections have more recently been reported in immunocompetent patients.\(^6\) A actinomycetemcomitans is a member of the HACEK group (Haemophilus aphrophilus, Haemophilus paraphrophilus, Actinobacillus actinomycetemcomitans, Cardiobacterium hominis, Eikenella corrodens, and Kingella spp), and is one of the major agents of adult and juvenile periodontitis.\(^2\) It may occur in combination with Actinomyces spp, in particular Actinomyces israelii,\(^7\) in sulfur granules. We are unaware of any previous report that has identified Capnocytophaga spp and A actinomycetemcomitans as pathogens responsible for facial cellulitis in an immunocompetent patient.

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**Figure 1.** Clinical photograph of the left mandibular mass, about 2 × 2 cm.

**Figure 2.** Pathology of the mass, with fragments of necrotic debris, neutrophil exudates, and aggregates of basophilic clumps that resemble sulfur granules (inset).
A *Actinomycetemcomitans* is a nonspore-forming, nonmotile, small, fastidious gram-negative coccobacilli that cannot grow on MacConkey agar. It also grows slowly in broth, possibly leading to delays in identification. This species was first described in 1912 by Klinger, and its classification has changed many times. *Actinomycetemcomitans* was identified as an oral human microbe in the 1950s, and since 1962 has been considered capable of causing serious infections, such as periodontal disease, soft tissue abscess (often in association with *Actinomyces* species), systemic disease, and endocarditis.6,7 Because of its slow growth, serologic examination may be helpful for diagnosis. Significantly elevated antibody titers occur during the active stage of infection, and the titers decrease during convalescence. Serologic examination was not performed in our patient, because this test was unavailable at our hospital.

Ampicillin or penicillin, often in conjunction with an aminoglycoside, is often used to treat infection because of *A. actinomycetemcomitans*, but resistance to these antibiotics is increasingly common. Cefazolin, cefotaxime, ceftriaxone, aminoglycosides, and chloramphenicol have a high degree of *in vitro* activity against this species, so should also be considered. Therapy should be guided by clinical response and *in vitro* susceptibility testing.

The seven species in the genus *Capnocytophaga* are gram-negative, fastidious, capnophilic rods with fusiform morphology and gliding motility. Species of this genus are unusual pathogens, but can cause infections in immunocompromised hosts. Recent reports showed that species in these genera can also cause infections in immunocompetent hosts. This case report and other recent studies emphasize the need for appropriate culture techniques for these species, especially for lesions close to the oral cavity. In particular, cultures must be followed for a week or more if *Capnocytophaga* spp or *Actinobacillus* spp are to be detected.

**References**


