Submasseteric Abscess Caused by *Mycoplasma Salivarium*

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ABSTRACT

*Mycoplasma salivarium* preferentially resides in the human oral cavity. Unlike other *Mycoplasma* species, *M. salivarium* has not been regarded as a pathogen, although one case of *M. salivarium* caused arthritis in a patient with hypogammaglobulinaemia has been reported. We describe the first case of submasseteric abscess caused by *M. salivarium*. 
CASE REPORT

An 84 year old woman presented with a few weeks history of left buccal pain and swelling, trismus and had increasing difficulties to swallow. She had a complicated past medical history of pulmonary embolism two months before admission, diabetes mellitus type 2 and arterial hypertension. Physical examination of the afebrile patient was unremarkable except painful swelling of the left masseteric area with tenderness on palpation and trismus. Blood tests revealed an elevated white cell count of $29.3 \times 10^9/L$ with 93.6% neutrophils, an elevated C-reactive protein level of 305 mg/L and a haemoglobin level of 9.6 g/dL. The patient was started on empiric antibiotic therapy of amoxicillin-clavulanic acid (3x 2.2g i.v. daily). After four days she developed dysarthria. Magnetic resonance imaging of the brain was negative for an acute ischemic lesion. Therefore extensive left buccal swelling was considered causative.

Computed tomography (CT) scan showed abscess formation over the left Ramus mandibulae 5 cm x 2.8 cm x 6.7 cm in size, which seemed to involve the mandibular joint, and diffuse inflammatory thickening of the left masseter muscle, compatible with myositis (Fig. 1). The CT scan also showed periodontal osteolysis at the second premolar of the left mandible 1.4 cm in diameter which could have been the etiological cause for abscess formation.

Puncture fluid from the left submasseteric abscess was obtained for cytopathological and microbiological testing. Neutrophilic granulocytes and macrophages, but no malignant cells were identified in cytology. After four days of incubation in the microbiological laboratory very small (<1mm), convex, limpid colonies were seen only on the Schaedler agar, incubated under anaerobic conditions at 37°C, but gave a negative result in the gram stain. Therefore 16S rRNA gene analysis was carried out using eubacterial universal primers. Subsequently, a BLAST search of the obtained 16S rRNA gene sequence (665 bp) was performed, using the
A taxonomy browser of the National Center for Biotechnology Information (http://www.ncbi.nlm.nih.gov) and retrieved from the GenBank. Homology of 100% was achieved for *M. salivarium*, with the accession number AF125583.1. Subcultured onto A7 agar (bioMerieux, Marcy l’Étoile, France) under CO\textsubscript{2}-enriched atmosphere for 48 hours, colonies showed characteristic fried egg appearance under the light microscope at 10x magnification. Resistance testing was performed with the Etest method (10). *M. salivarium* revealed susceptibility for ciprofloxacin (CIP), levofloxacin (LVX), moxifloxacin (MXF) and tetracycline (TET), with minimal inhibitory concentrations (MIC’s) obtained were \leq 0.002\,\mu\text{g/mL} (CIP, LVX, MXF), \leq 0.016\,\mu\text{g/mL} (TET). MIC’s for Penicillin (PEN) and amoxicillin-clavulanic acid (AMC) were \geq 32 \, \mu\text{g/mL} (PEN) and \geq 256 \, \mu\text{g/mL} (AMC), respectively.

Left submasseteric abscess caused by *M. salivarium* was diagnosed. The antibiotic regimen was changed to Moxifloxacin (400mg p.o. daily) for a 3-week treatment course. After one week a confined mass developed in the left oral vestibulary region, which produced abundant pus after incision via an intraoral approach. Presuming *M. salivarium* as causative organism, no additional material was sent for microbiology testing. The patient’s condition thereafter improved, dysarthria resolved, blood tests normalized and the patient was discharged without further complaints.

*Mycoplasma* species (*Mycoplasma* spp.) are the smallest self-replicating bacteria and generally commensal parasites in humans. Some species are real pathogens and capable of causing a wide variety of diseases (2). The most common *Mycoplasma* spp. of the oral cavity are *M. salivarium* and *M. orale* (4). *M. salivarium* preferentially resides in dental plaques and gingival sulci (4). *M. salivarium* is usually found in 60-80% of throat specimens from adults and is also frequently found in inflamed tonsils (13). Normally it is not regarded as a
pathogen.\textsuperscript{12}  

Reports of \textit{M. salivarium} infections are rare and only one case of a proven infection has been found in the literature. In 1983 \textit{M. salivarium} caused arthritis in a patient suffering from hypogammaglobulinaemia. Spurious contamination was not likely in this reported case because isolation from synovial fluid of the patients knee was made on three separate occasions months apart (12). Contamination of the bacterial culture in this described case of submasseteric abscess is extremely unlikely, because cultures of the submasseteric abscess material were incubated for a total of 14 days under aerobic and anaerobic conditions, but beside the numerous growth of \textit{M. salivarium}, no additional growth of microorganisms could be observed.

\textit{M. salivarium} is considered to participate etiologically in some cases of oral infections, including periodontal disease, based on the incidence and viable counts of the organism in the normal and pathological human oral cavity or gingival crevice, antibody response to the organism, and its biological and immunological activities (4, 11, 14). A variety of biochemical activities of \textit{M. salivarium} are considered to facilitate both, the attack of host tissues and escape from phagocytosis. \textit{M. salivarium} stimulates human peripheral blood mononuclear cells and human gingival fibroblasts to induce interleukin (IL)-6, IL-8, IL-1\textbeta and tumor necrosis factor \alpha (TNF\alpha) production (8, 11).

In a previous controlled study it was shown that both the incidence of \textit{M. salivarium} in the oral cavity and the metabolism-inhibitory (MI) antibody titers to the organism were significantly higher in subjects with arthrosis temporomandibularis (AT). Nine out of 14 subjects with AT were positive for MI antibodies to the organism (14). In another study \textit{M. salivarium} has been detected in synovial fluids from 22 out of 33 patients with pain in or anterior disc replacement of the temperomandibular joint (15).

A recent study showed that synovial fluid samples of 2 out of 10 patients with
osteoarthritis were positive for *M. salivarium*. Even higher detection rates were found in patients with traumatic osteoarthritis; 5 out of 9 orthopaedic patients with radiological changes consistent with at least mild osteoarthritis had infections caused by *M. salivarium* versus 0 out of 4 patients in an orthopaedic control group (6).

All these findings were quite surprising because, unlike other *Mycoplasma* spp., *M. salivarium* has not been regarded as a pathogen (12).

Infection by some *Mycoplasma* spp. has been suggested as a cofactor in the acceleration of immunodeficiency in HIV-infected patients (5). However, when compared, the detection rates of *M. salivarium* and *M. orale* were similar in HIV-positive and HIV-negative subjects (3).

Submasseteric abscess is a rare infection between the masseter muscle and the mandible (7). Diagnosis of submasseteric abscess frequently eludes the clinician. Patient’s history and clinical examination may be helpful, but as demonstrated in our case, CT scan serves as an important additional diagnostic modality (7, 9). Infection usually arises from posterior migration of organisms from an infected mandibular third molar (14).

Our CT scan findings suggest that osteolysis of a premolar most likely was the route of infection in the case described here. As in our case, the key to resolve the infection is surgical intervention to evacuate the pus, either via an intraoral approach or an extraoral incision for drainage (1, 9).

This is the first report of a submasseteric abscess caused by *M. salivarium* and one of the few reports of infection associated with this micro organism. We conclude that *M. salivarium* should be considered as a rare cause of oral and joint infections.
REFERENCES:


LEGEND TO THE FIGURE

CT scan image showing abscess formation over the left Ramus mandibulae, 5 cm x 2.8 cm x 6.7 cm in size, diffuse inflammatory thickening of the left masseter muscle.