Journal of Dental Sciences (2013) xx, 1–4

Available online at www.sciencedirect.com
SciVerse ScienceDirect
journal homepage: www.e-jds.com

CASE REPORT

Pyogenic granuloma associated with *Actinomyces israelii*

Kayo Kuyama [a,b*], Kenji Fukui [b], Eriko Ochiai [b], Masanobu Wakami [c], Hirotaka Oomine [d], Yan Sun [a], Miyuki Morikawa [a], Kimiharu Iwadate [b], Hirotsugu Yamamoto [a]

[a] *Department of Oral Pathology, Nihon University School of Dentistry at Matsudo, Chiba, Japan*
[b] *Department of Forensic Medicine, The Jikei University School of Medicine, Minato-ku, Tokyo, Japan*
[c] *Department of Crown and Bridge Prosthodontics, Nihon University School of Dentistry at Matsudo, Chiba, Japan*
[d] *Department of Maxillo-Facial Orthodontics, Nihon University School of Dentistry at Matsudo, Chiba, Japan*

Received 19 March 2012; Final revision received 13 September 2012

Available online ■ ■ ■

KEYWORDS
Actinomyces israelii;
actinomycosis;
DNA sequence;
nested PCR;
pyogenic granuloma

Abstract Peculiar findings of orofacial actinomycosis mimicking the clinical appearance of a tumor of the upper gingiva are reported. An 83-year-old man with bleeding of the gingiva visited our hospital. The clinical diagnosis was a benign gingival tumor, and the lesion was surgically removed. Histologically, the excised specimens showed an ulcerative granuloma lesion covered by bacterial colonies consisting of club-shaped filaments. DNA samples were extracted from paraffin sections and examined by polymerase chain reaction (PCR) for *Actinomyces* species. The PCR products examined by direct DNA sequencing demonstrated the presence of *Actinomyces israelii*. Finally, a pathological diagnosis was made of a pyogenic granuloma associated with actinomycosis. The PCR method aided the early and exact diagnosis of the paraffin-embedded sample of oral mucosal infectious diseases including actinomycosis.

Introduction

Pyogenic granulomas are a form of nonneoplastic inflammatory hyperplasia that respond to various stimuli such as chronic local irritation, trauma, and hormonal changes.[1] A case of infection of *Actinomyces israelii* with associated pyogenic granuloma formation is described.

* Corresponding author. Department of Oral Pathology, Nihon University School of Dentistry at Matsudo, 2-870-1, Nishi-Sakae cho, Matsudo City, Chiba Prefecture, Japan.
E-mail address: kuyama.kayo@nihon-u.ac.jp (K. Kuyama).

1991-7902/$36
http://dx.doi.org/10.1016/j.jds.2012.09.026

A diagnosis of actinomycosis is commonly made by histological examination that reveals a characteristic picture of sulfur granules. A polymerase chain reaction (PCR) and DNA sequencing enable the identification of bacterial species and strains that are difficult or even impossible to grow in artificial culture. This case was diagnosed by histopathological findings and DNA analyses.

The clinical appearance of a benign tumor of the upper gingiva is reported clinically and histopathologically with a review.

Case report

An 83-year-old Japanese man who suffered from bleeding of the buccal gingiva around the maxillary right second premolar was referred to Nihon University School of Dentistry at Matsudo Hospital (Matsudo, Japan). The first time the patient had noticed bleeding from a swelling with erosive surface by tooth brushing was 1 month previously. Although there was no spontaneous bleeding, the lesion caused the patient discomfort.

An oral examination revealed an elevated, pedunculated tumorlike lesion of 1.5 × 2.0 cm with a hemorrhagic surface of the buccal gingiva around the maxillary right second premolar. It was deep red, without spontaneous pain and had a rather soft consistency. The patient was not clear about the development time. There were no dental prostheses in that area or any indications of persistent infection. Dysplastic/malignant findings were not observed as a result of exfoliative cytology. Under a clinical diagnosis of a benign gingival tumor, an excision biopsy was performed.

Copious amounts of endothelial cells and small dilated capillaries were observed in the connective tissue (Fig. 1). Erythrocytes or blood plasma ingredients filled many of the enlarged capillaries (Fig. 2). There was a moderately intense infiltration by polymorphonuclear neutrophils, lymphocytes, and plasma cells, bleeding, and proliferation of fibroblasts. The lesion was ulcerated and covered with thick fibrous exudates. Additionally, vast numbers of bacterial colonies positive for hematoxylin surrounded the periphery of the uppermost surface of the ulcerated lesion

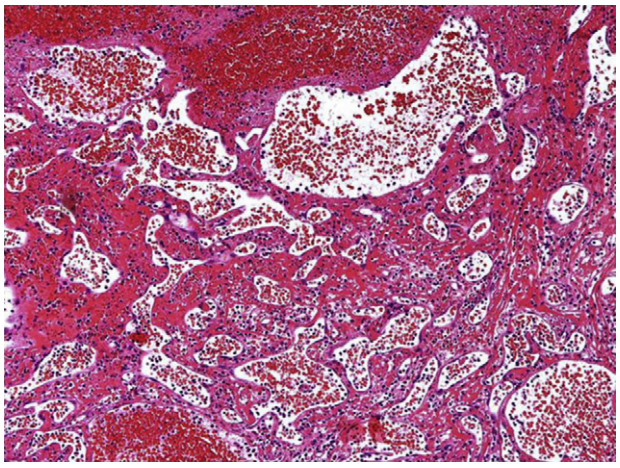

Figure 2 Demonstration of inflammatory granulation tissue composed of numerous endothelial cells lining enlarged capillary blood vessels, as well as inflammatory cells and fibroblasts.

(Fig. 3). Under high-power magnification, colonies were composed of a meshwork of filaments that stained with hematoxylin such as the so-called "ray fungus".

Because actinomycosis was suspected histopathologically, bacterial DNA was analyzed. Serial paraffin sections (10 μm thick) were cut from formalin-fixed and paraffin-embedded tissues of the excised specimen. Three sections were treated using DEXPAT® (Takara Bio, Kyoto, Japan) for DNA extraction. A nested PCR and DNA sequencing were carried out to detect *A. israelii*. The oligonucleotide primers used in this study are summarized in Table 1.[2] The PCR products were resolved by 2% agarose gel electrophoresis, and amplified bands were confirmed (Fig. 4). Direct DNA sequencing of the PCR products was performed using a BigDye® Terminator v3.1 Cycle Sequencing Kit (Life Technologies Corporation, Carlsbad, CA, USA). DNA sequences were compared to the 16S ribosomal RNA gene of *A. israelii* (GenBank accession no. X82450.1). This molecular biological evidence indicated that tumorlike granulation tissue was infected with *A. israelii*.

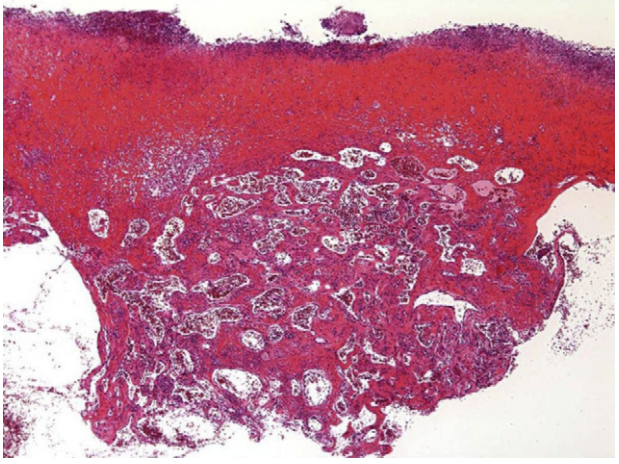

Figure 1 Vascularity of the connective tissue was obvious at low-power magnification.

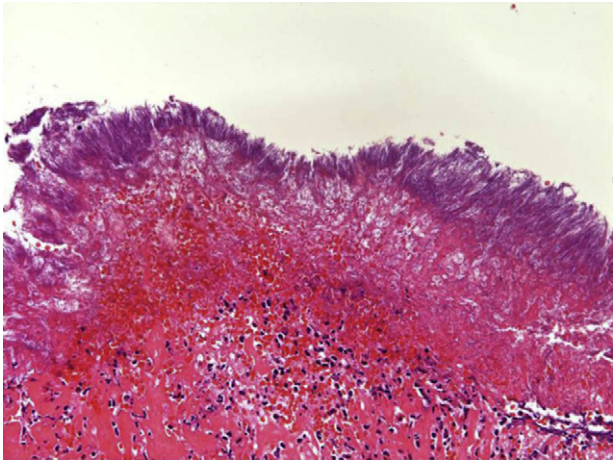

Figure 3 Colonies composed of a meshwork of filaments that stained with hematoxylin like the so-called "ray fungus".

Please cite this article in press as: Kuyama K, et al., Pyogenic granuloma associated with *Actinomyces israelii*, Journal of Dental Sciences (2013), http://dx.doi.org/10.1016/j.jds.2012.09.026