

## The Ossifying Epulis Accompanying Multi-Nucleated Giant Cells in a Dog

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An epulis was occurred on gingiva of 11-year old female dog, Yorkshire terrier. Our case had feature of ossifying epulis but there were a few multi-nucleated giant cells (MGCs). MGCs had osteoclast-like appearance and giant cell epulis usually appears at the site of tooth extraction. Therefore, we suggest that appearance of MGCs in our case may be due to phagocytosis pre-formed osteoid/bone or our case may be mixed epulides of ossifying and giant cell epulis by mixed stimulation of chronic gingivitis and trauma and in inflammation by tooth extraction. Thus, MGCs have possibility enough to appear in ossifying epulis, but ossifying epulis accompanying MGCs has not been reported. Therefore, our case may deserves an attention as an unique case and will be helpful to study pathogenesis of giant cell containing lesion of the jaw.

**Key words :** Epulis, multi-nucleated giant cell, osteoclast

### Introduction

Epulides can be classified into four types on the basis of histologic appearance: Fibromatous, ossifying, acanthomatous and giant cell [1,3]. The fibromatous epulis is composed of an expansile mass of stellate fibroblasts surrounded by various amount of densely packed and fibrillar collagen [9]. The ossifying epulis has all of features of a fibromatous epulis but in addition contains either irregular islands of osteoid or mineralized bone or acellular eosinophilic cementum or dentin-like material [9]. The acanthomatous epulis also has features of a fibromatous epulis but contains broad sheets and cords of stratified squamous epithelium with prominent intercellular bridgestypical of stellate reticulum [9]. The giant cell epulis is regarded as a hyperplastic or granulomatous lesion and has occurred at the site of tooth extraction [1]. There are vascular gingival masses composed of large numbers of multi-nucleated giant cells (MGCs) in background of mononuclear stromal cells. Areas of hemorrhage and hemosiderosis are common [11].

Here we report a case of epulis that shows all features of fibromatous, ossifying and giant cell epulis simultaneously. The fibromatous, ossifying and giant cell epulides are thought to be developmental, inflammatory and hyperplastic lesion [1]. In addition to the fibromatous and ossifying epulides occurred in close association with chronic gin-

givitis due to dental plaque deposition [4] and usually fibromatous and ossifying epulides is referred to multiple epulides [2]. However strictly speaking, multiple epulides is an ossifying epulis. Therefore, our case can be referred to ossifying epulis accompanying MGCs.

### Materials and Methods

An 11-year old female dog, Yorkshire terrier, presented to local animal hospital for general physical examination, proliferative mass was observed on gingiva of which tooth was absent since it had been extracted. No other specific lesions were observed. The mass was oval shape with whitish brown color (1x 1.8x 0.8 cm) and resected and fixed in 10% neutral buffered formalin and then sections of paraffin-embedded tissues were stained with hematoxylin and eosin and applied for histopathological analysis.

### Results

Microscopically, the mass was oval shape and nonencapsulated. Epithelium was hyperplasia and dense collagenous tissue with stellate cells was found in the submucosa proliferating strands of overlying epithelium. The center area of the mass was full of white adipose tissues that were surrounded by osteoid/bone (Fig. 1). Osteoid/bone formation was constituted brightly eosinophilic material that was occasionally mineralized and were observed as differentiation from spindle-shaped fibroblasts in the

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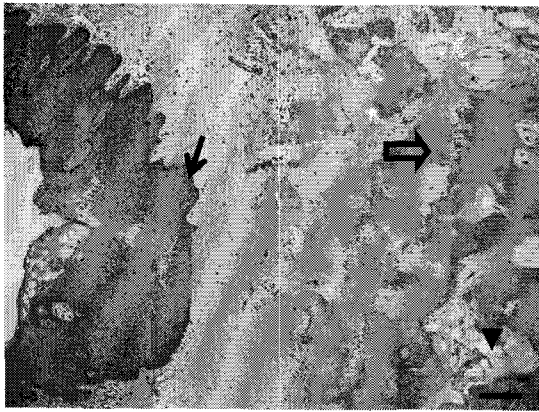


Fig. 1. Epithelium (arrow) is hyperplasia and dense collagenous tissue with stellate cells is found in the submucosa proliferating strands of overlying epithelium. The center area of the mass is full of white adipose tissue (arrow head) that is surrounded by osteoid/bone (open arrow). bar=400  $\mu$ m.

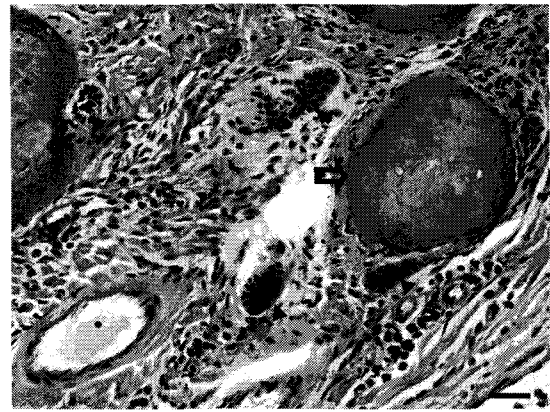


Fig. 3. MGCs (arrow head) appear a few near the osteoid/bone formation and have eosinophilic cytoplasm. Some osteoid/bone (open arrow) appear multifocally surrounded foci of dense. Many mononuclear cells seem to be like assembling for syncytium to form MGCs around the osteoid/bone foci. H&E, bar=100  $\mu$ m

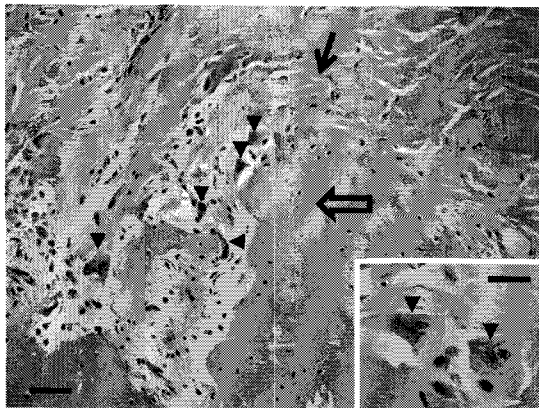


Fig. 2. Osteoid/bone formation (open arrow) is in the submucosal stromal component and brightly eosinophilic material is mineralized and are observed as differentiation from spindle-shaped fibroblasts (arrow). Some MGCs (arrow head) which have similar appearance with osteoclasts are observed around osteoid/bone (inset). H&E, bar=100  $\mu$ m (Inset, H&E, bar=50  $\mu$ m).

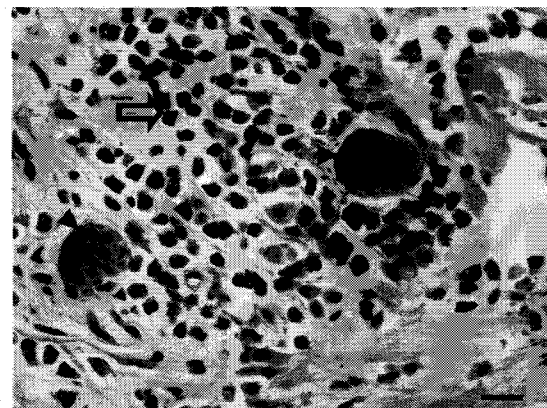


Fig. 4. Some MGCs (arrow head) appear at fibromatous lesion and have eosinophilic cytoplasm. MGCs are surrounded by many plasma cells admixed with fewer macrophages and lymphocytes (open arrow). H&E, bar=50  $\mu$ m

submucosal stromal component. Some MGCs which had similar appearance with osteoclasts were observed around osteoid/bone (Fig. 2). Some osteoid/bone appeared multi-focally surrounded foci of dense and some MGCs appeared near the osteoid/bone formation and had eosinophilic cytoplasm. Many mononuclear cells seemed to be like assembling for syncytium to form MGC around the osteoid/bone foci (Fig. 3). Some MGCs appeared at fibromatous lesion and they were usually surrounded by many plasma cells admixed with fewer macrophages and lymphocytes (Fig. 4).

## Discussion

Presumably our case can be thought to be giant cell epulis or peripheral ossifying fibroma or pyogenic granuloma, because of the common pathoetiology of these lesions and such lesions are traditionally diagnosed according to the dominant tissue type. However, in our case, a few MGCs and fibromatous and ossifying lesions are main features, and there is no feature of granuloma, we can't refer to giant cell epulis or pyogenic granuloma. Lastly, ossifying fibroma is well demarcated from surrounding resident bone. The tumor is seen as trabeculae and/or oval (spherical) islands distributed in a relatively uniform pat-

tern throughout the lesion [8]. Conclusively ossifying fibroma is replaced by a fibroosseous stroma from normal bone [9]. Therefore, our case is ossifying epulis accompanying MGCs.

We can discuss why MGCs appear in ossifying epulis and may be possible to arise with two reasons. First, the origins of the MGCs are assumed to arise from syncytial fusion of mononuclear preosteoclasts of bone marrow origin [6]. MGCs were not the proliferating tumor cells and represented only reactive component [6]. MGCs were present in a fibrillar connective tissue stroma containing two types of mononuclear cell, which include spindle-shaped mononuclear cells and round mononuclear cells [6]. Osteoid/bone formation can often be seen in these giant cell-containing lesions and the spindle-shaped mononuclear cells may be responsible for osteoid/bone formation because they express genes associated with the osteoblastic phenotype and synthesized certain matrix protein associated with bone [7]. And then they release RANKL (receptor activator of NF-kappaB ligand). Giant cells and round mononuclear stromal cells release RANK. RANKL/RANK ligation induces the bone-resorbing function [6]. Therefore, MGCs in these lesion show osteoclasts phenotype and their presence may be responsible for the osteolytic destruction [6]. Therefore the MGCs in ossifying epulis may appear to phagocytosis pre-formed osteoid/bone. Second, our case may be simply thought mixed form with features of ossifying epulis and giant cell epulis. Ossifying epulis usually occurs in association with chronic gingivitis and the origin of giant cell epulis is triggered by trauma or inflammation [10], usually occurs at the site of tooth extraction [1]. Therefore our case may be occurred by mixed stimulation of chronic gingivitis and tooth extraction.

In conclusion, we can suggested that MGCs have possibility enough to appear in ossifying epulis but ossifying epulis accompanying MGCs has not been reported, moreover, the incidence of the giant cell epulis is very low [10-12] and the pathogenesis of giant cell containing lesion of the jaw is uncertain [5]. Therefore, our case may deserves

an attention as an unique case and will be helpful to study pathogenesis of giant cell containing lesion of the jaw.

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**초록 : 개에서 발생한 거대세포 출현을 동반한 골화성 치은종**

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11살된 암컷 개, 요크셔 테리어의 발치된 잇몸에서 치은종이 관찰 되었다. 치은종은 조직병리학적 특징에 따라 섬유소성, 골화성, 극세포성 그리고 거대세포성 치은종으로 나눌 수 있으며, 본 증례의 경우 광학현미경학적 관찰 결과 골화성 치은종으로 진단되었다. 그러나 특이하게도 골화성 치은종 병변과 함께 몇몇의 거대세포가 관찰 되었다. 거대세포는 파골세포와 유사한 형태를 가지고 있으며, 더욱이 거대세포성 치은종의 경우 발치한 잇몸에서 주로 발생하는 것으로 보고되고 있다. 그러므로 골화성 치은종에 발생한 거대세포의 출현이유를 두 가지로 제시 할 수 있겠다. 하나는, 치은종의 섬유모세포가 분화되어 형성된 골 성분을 거대세포가 파골세포처럼 탐식하기 위해 출현한 것으로 가정할 수 있으며, 다른 한편으로는 골화성 치은종의 주요 발생원인인 만성 치은염과 발치로 인한 손상 및 염증 등의 거대세포성 치은종의 발생 원인이 복합적으로 작용하여 발생한 혼합 치은종으로 판단할 수 있겠다. 이와 같은 이유로 거대세포가 골화성 치은종에 출현할 가능성이 있다고 판단되어지지만 현재까지 이와 같은 보고는 없었으며, 또한 턱에서 발생하는 거대세포를 포함하는 병변의 발병기전은 아직까지 불분명한 상태이므로 본 증례가 발병기전 연구에 도움이 될 것으로 사료된다.