Peripheral Giant Cell Granuloma : A Case Report

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Abstract

The peripheral giant cell granuloma (PGCG) is a relatively common benign reactive lesion of the oral cavity, originating from the periosteum or the periodontal ligament. It occurs as a result of local trauma or chronic irritation. This article reports a case of peripheral giant cell granuloma arising at the right maxillary region in a 24- year old man. After initial periodontal treatment, excisional biopsy was performed under local anesthesia. The diagnosis of peripheral giant cell granuloma, a benign reactive gingival lesion, is confirmed by histopathologic examination The lesion was completely excised to the periosteum level and there is no residual or recurrent, swelling or bony defect apparent in the area of biopsy after a follow-up period of 1 year.

Key Words: Peripheral giant cell granuloma, epulis, giant cells

Introduction

The peripheral giant cell granuloma (PGCG) is a relatively common tumor-like growth of the oral cavity[1]. It accounts for 7% of all benign tumors of the jaw. Although PGCG is the least commonly diagnosed among the various hyperplastic gingival lesions (pyogenic granuloma, fibrous hyperplasia, peripheral ossifying fibroma), it is a common giant cell lesion found in the oral cavity[2] .It is probably a reactive lesion caused by local irritation or trauma which resulted in gingival or mucosal hemorrhage[3].

Case Report

A 20-year old man was referred by his physician to Government Dental College and Hospital, Mumbai, India to assess a nodular growth on maxillary left posterior region in relation to the molars present since 3 months. The patient reported the lesion to be asymptomatic but for bleeding tendency if accidentally bitten on during mastication. Pain is not a major complaint unless the growth is traumatized repeatedly. The medical history was not contributory and the patient was not on any medications. Intraoral examination revealed a single, smooth, shiny, errythematous, soft and fluctuant exophytic sessile nodular growth, in region of 26, 27 involving the interdental papilla. Superficial surface shows ulceration with purulent necrotic base. Growth is 2.5x 3 cm in size and roughly oval in shape non tender, slight bleeding on probing. Other oral findings include adjacent molars exhibit grade I mobility with interproximal separation, a very poor oral hygiene. Periapical radiograph revealed diffuse round radioleucency seen at periapical area of 26, 27. The differential diagnosis included pyogenic granuloma and peripheral giant cell granuloma.

The lesion was excised along with extraction of 26, 27 under local anesthesia and the area was curetted. There were no complications in the immediate post-operative period. Biopsy specimen was embedded in 10% formalin and sent to department of pathology. The specimen biopsied was processed for routine hematoxylin and eosin staining and 4-5 micron thick sections were prepared and examined under light microscope. The sections revealed well-circumscribed, unencapsulated cellular mass containing oval to spindle-shaped fibroblasts, abundant multinucleated giant cells, numerous capillaries and areas of hemorrhage. The multinucleated giant cells were of variable shapes and sizes containing open-faced nuclei ranging from 5 to 15 in number conforming to the type I giant cells described in literature. Many giant cells were found in association with and within blood vessels.

The overlying epithelium was parakeratinized stratified squamous epithelium. In addition the connective tissue revealed the presence of woven bony trabeculae deep to the foci of giant cells. Dense chronic inflammatory cell infiltrate was also noted. The histopathologic picture was diagnostic of peripheral giant cell granuloma. The patient was then referred to Department of Prosthodontics and Department of Periodontics for a new partial denture and periodontal treatment. No relapse has been observed during the 1 year follow-up.

Discussion

Jaffe first suggested the term "giant cell reparative granuloma" for the similar central lesion of the jaw bones to help differentiate them from the giant cell tumor as he believed the former lesion to represent a local reparative reaction rather than being a true neoplasm.[4,5] Bernier and Cahn proposed the term "peripheral giant cell reparative granuloma" for the lesion. The latter terminology is currently not being used as the reparative nature of the lesion has not been proved.[6] Other names of this lesion are peripheral giant cell tumor, osteoclastoma, giant cell epulis and giant cell hyperplasia of the oral mucosa.[7,8] As the term "Giant cell epulis" implies, it occurs on the gingival margins or edentulous alveolar ridge as a focal purplish nodule in either the anterior or posterior regions of the jaws but most frequently between the permanent molars and the incisors[9]. Today, the term peripheral giant cell granuloma (PGCG) is universally accepted.[10]

It is a benign hyperplastic reactive lesion occurred in response to local irritation such as tooth extraction, poor dental restorations, ill-fitting dentures, plaque, calculus, food impaction and chronic trauma.[3,7,8] A reactive nature of origin has been found in several immunohistochemical and ultrastructural studies. The histogenesis of PGCG and the nature of the lesion and the constituent cells remain controversial despite intense studies[10]. PGCG may occur at any age, especially during the first through sixth decades of life[1]. However, the highest incidence (40%) is in the fourth to the sixth decades of life. A slight female predilection has been reported in a large number of studies with the male: female ratio. 1:1.5[1].However, PGCG was more common among men (M/F 1.4:1) in a study by Zarei et al. Similar male predilections have been reported by Bhaskar SN et al.[10]

The mandible is affected slightly more often than the maxilla, the reported proportion being 2.4:1.[1] However, in our case the lesion was found in the maxillary arch.

Upon palpation, one may note a lesion that is either soft or hard, depending on the composition of collagen and/ or inflammatory components. The consistency of lesions was dependent on the age of lesions because as time passes, maturation of lesions (increasing in collagen fibers) occurs and consistency shifts from soft to firm.[7]

The size of the lesion is usually smaller than 2 cm in diameter, although larger ones may be seen occasionally; a diameter as large as 5 cm has been reported.[1] Gradual growth in some cases produces an important tumor mass that adversely affects normal oral function. The maximum capability of PGCG to expand is unknown. It is likely that expansion of PGCG is a relatively slow process and that most lesions are diagnosed and surgically removed before they reach their full growth potential. Lesion growth in most cases is induced by repeated trauma[8]. The size of the lesion in the given case is within the above mentioned range. PGCG varies in appearance from smooth, well demarcated regularly outlined mass to irregularly shaped, multilobulated protruberance with surface indentation[11]. Ulceration of the margin is occasionally seen, secondary to trauma which may give the lesion a focal yellow zone as a result of the formation of a fibrin clot over the ulcer.[6,12] The color can range from dark red to purple or blue[13]. The lesion appears blue-purple in color due to extensive hemorrhagic areas and hemosiderin deposition at the periphery.[1]

Radiographic evaluation of any gingival lesion, including the PGCG, is prudent in order to determine the extent and origin of the lesion[2]. Larger lesions exhibit a superficial

erosion of the cortical bone surface[9] and in addition, a widened periodontal ligament space is associated frequently with tooth mobility but may represent lesion extension around the root[2]. In edentulous areas, the cortical bone exhibits a concave area of a resorption beneath the lesion, often referred to as "saucerisation".[9]

In rare instances, PGCG is an oral manifestation of hyperparathyroidism without obvious central bony involvement. While this is an unusual initial presentation, hyperparathyroidism should be considered when multiple lesions are found or if repeated recurrences are documented despite adequate treatment. A parathyroid tumor or chronic renal disease may result in excess production of the parathyroid hormone that stimulates the formation of a giant cell lesion. In addition, children with X-linked hypophosphatemic rickets, a condition that is associated with subclinical hyperparathyroidism, are at increased risk for developing this entity. Laboratory studies including serum calcium, phosphate, alkaline phosphatase and parathyroid hormone are required to exclude hyperparathyroidism.[2]

There are no pathognomonic clinical features whereby these lesions can be differentiated from other forms of gingival enlargement including pyogenic granuloma, fibrous epulis, peripheral ossifying fibroma, inflammatory fibrous hyperplasia, peripheral odontogenic fibroma, hemangioma cavernosum and papilloma.[1,6] The pyogenic granuloma may be difficult to differentiate from the PGCG based on clinical features alone. In general the pyogenic granuloma presents as a soft, friable nodule that bleeds freely with minimal manipulation. Unlike the PGCG, displacement of teeth and resorption of alveolar bone are not observed.[2] Another erythematous nodule of the gingiva is the parulis, which is associated with an entrapped foreign body, a gingival pocket and/or a nonvital tooth. Pain and the expression of a purulent exudate with fluctuation in lesion size help to differentiate this inflammatory disease from the PGCG. The peripheral ossifying fibroma is a reactive gingival growth that shares similar clinical features as the PGCG. Although this reactive lesion is often ulcerated and inflamed, it lacks the purple or blue discoloration that is commonly associated with the PGCG. Identification of small flecks of calcification within the tumescence on a radiograph aids in diagnosing the peripheral ossifying fibroma, when present. The final consideration based on the red or blue discoloration of the soft tissue nodule is a hemangioma. Although many hemangiomas are congenital lesions, some vascular malformations increase in size during childhood. Brisk bleeding, increased warmth of the tissue and blanching upon palpation are characteristic of this vascular entity.[2,14,15] Microscopic examination is required for definitive diagnosis.[6]

Microscopically, the lesion arises from, or is at least attached to the periodontal ligament or mucoperiosteum.[6] The most characteristic histologic features included a non-encapsulated highly cellular mass with abundant giant cells, inflammation, interstitial hemorrhage, hemosiderin deposits, mature bone or osteoid. Fibroblasts are the basic element of peripheral giant cell granulomas. Scattered among the plump, young fibroblasts are numerous multinucleated giant cells with abundant eosinophilic cytoplasm which appear to be non-functional in the usual sense of phagocytosis and bone resorption.[12] Two types of giant cells are mainly found, one representing metabolically active cells and the other representing dying cells. The origin of these cells has not been defined yet. However, a striking similarity between these cells and osteoclasts does exist. The prevalent of the two consists of multiple large, ovoid, vesicular, somewhat translucent nuclei with prominent nucleoli and the nuclear chromatin was located peripherally on distinct nuclear membrane. These cells are termed type I and vary in size, often exceeding 100µ in diameter. The type II giant cells are fewer in number, have smaller and more irregular nuclei than type I giant cells. The nucleoli are not easily seen and the cytoplasm stains deeply eosinophilic and granular than the cells of type I. Despite ultrastructural studies, the true nature of the giant cells in PGCG remains debatable. Some believe them to show immunohistochemical features of osteoclasts, while others suggest them to arise from mononuclear phagocyte system. The most recent study by Bo Liu et al, concluded that RANKL, OPG and RANK expressed in these lesions may play important roles in the formation of multinucleated giant cells[9]. Other possible sources include osteoblasts, endothelial cells and spindle cells. PGCG seems to be influenced by hormonal stimulus, especially estrogen.

Inflammation is a constant finding but is varied not only in degree but also in location. The inflammatory cells consist primarily of lymphocytes, plasma cells, histiocytes and occasional polymorphonuclear cells.[3] A "clear zone" of dense fibrous connective tissue usually separates the giant cell proliferation from the mucosal surface.[1,3]

The treatment of PGCG comprises surgical resection with elimination of the entire base of the lesion and suppression of the etiologic factor. If resection is only superficial, the growth may recur.[7,12] When the periodontal membrane is affected, extraction of the adjacent teeth may prove necessary to insure full resection though this is initially contraindicated.[1,7,16] Exposure of all bony walls following thorough surgical resection responds satisfactorily most of the time.[4,17] Recurrence rate of 5.0-70.6% (average 9.9%) has been reported in various epidemiologic studies (Mighell et al). A recurrence rate of 5% has been reported by Giansanti and Waldron while a study by Eversole & Rovin showed a recurrence of 11%. Aggressive tendencies or malignant transformation of these lesions has never been reported.[3] PGCG lesions are self-limiting. The 1 year follow-up has shown no recurrence indicating that the given treatment along with maintenance of a good oral hygiene is sufficient to treat PGCG.

In conclusion, the early and precise diagnosis of PGCG, allows conservative management with a less risk for teeth and adjacent bone.[7]

References

For a complete list of references are available on request, please mail us **editor@healtalkht.com**

Legends

Fig. 1 : Clinical appearance of the lesion involving palatal gingiva 26, 27.
Fig. 2 : Clinical appearance of the lesion.
Fig. 3 : Intraoperative photograph showing extraction of 26, 27 along with excision of the lesion.
Fig. 4 : Periapical radiograph showing radiolucency with 26, 27.
Fig. 5 : A "clear zone" of dense fibrous connective tissue usually separates the giant cell proliferation from the mucosal surface
Fig. 6 : Multinucleated giant cells diffusely scattered along with hemorrhagic areas.
Fig. 7 : Multinucleated giant cells diffusely scattered fibrocellular stroma.

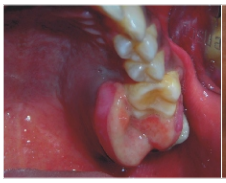
Fig. 1

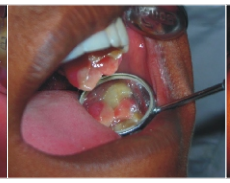
Fig. 2

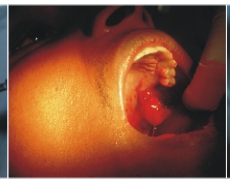
Fig. 3

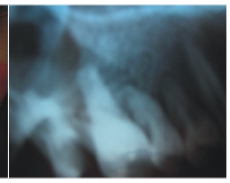
Fig. 4

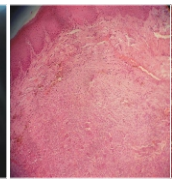
Fig. 5

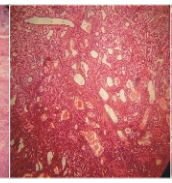
Fig. 6

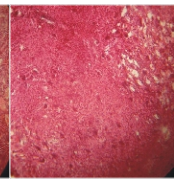
Fig. 7

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