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PERIPHERAL GIANT CELL GRANULOMA: A BRIEF OVERVIEW

Periodontology

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ABSTRACT

Peripheral giant cell granuloma (PGCG) is a reactive hyperplastic lesion of the oral cavity that seems to arise from the periodontal ligament or periosteum and affects mainly the gingiva or alveolar mucosa of dentate and edentulous person. From other reactive hyperplastic lesions PGCG can differs in the presence of multinucleated giant cells of unknown origin. Surgical excision followed by an additional therapy such as curettage or peripheral osteotomy should be the first choice of treatment of PGCG.

KEYWORDS

Peripheral Giant Cell Granuloma, Peripheral Osteotomy, Sclerotherapy And Laser.

INTRODUCTION

Peripheral giant cell granuloma (PGCG) is a reactive hyperplastic lesion of the oral cavity that seems to arise from the periodontal ligament or periosteum and affects mainly the gingiva or alveolar mucosa of dentate and edentulous person. The term peripheral giant cell granuloma was first coined by Bernier and Cahn.[1] The lesion is non-neoplastic in nature. From other reactive hyperplastic lesions PGCG can differs in the presence of multinucleated giant cells of unknown origin.[2,3] Peripheral giant cell granuloma are reactive lesion that do not represent the intraosseous counterpart of central giant cell granuloma. PGCG to dental implant is associated as a very infrequent peri-implant soft tissue complication.[4]

ETIOLOGY

The etiology of PGCG is unknown. It has been suggested that trauma or injury to the periodontal ligament and gingiva initiating a reactive hyperplastic response in the periosteum play an important role.[2] Among other hyperplasia, PGCG may be an excessive exuberant local response of tissue to injury.[5] Certain hormones such as estrogens or progesterone, has been implicated in the development of PGCG.[6]

ETIOPATHOGENESIS

The initial trauma or injury stimulates the formation of granulation tissue consisting of proliferating endothelial cells, a rich capillary bed, chronic inflammatory cells and fibroblast.[7] A granulation tissue becomes covered with stratified squamous epithelium. Bhaskar et al[8] suggested that injury or trauma to the soft tissue resulting into haemorrhage that causes the development of these lesions. Bernier and Cahn[1] suggested that a phagocytic response to haemorrhage in pre-existing connective tissue is the presence of multinucleated giant cells. PGCG is reactive hyperplastic inflammatory lesion arising from the pluripotent cells of the periodontal ligament.

ETIOPATHOGENESIS IN DENTAL IMPLANT PATIENTS

PGCG in patients with dental implant is associated with chronic local irritation acting upon adjacent gingival tissue. The local irritating factors such as the accumulation of dental plaque, calculus or the presence of foreign materials such as possible traces of dental cement may provoke an inflammatory response around dental implant.[9] Bone loss resulting into the exposure of the rough portion of the implant neck, which in turn would exert a chronic irritating effect on the adjacent gingival tissue.[10] Relapse or recurrence appears to be more frequent when PGCG is associated with dental implant.

CLINICAL FEATURES

It is moderately soft and spongy and under mild digital pressure it blanches.[11] The lesions appears to be smooth or lobulated with dark red or bluish cyanotic appearance caused by rich vascularity. A lesion are sessile or pedunculated base and clinically asymptomatic. PGCG shows a more predilection for female than male.[12,13] A lesion were more prevalent in the mandible than maxilla.[2,13] Highest incidence in the fourth to six decades of life.[2] 26 to 28% cases of PGCG demonstrated superficial erosion and local bone resorption.[14]

DIFFERENTIAL DIAGNOSIS

Differential diagnosis of PGCG includes pyogenic granuloma, fibrous hyperplasia, peripheral ossifying fibroma[15] fibrous epulis, peripheral odontogenic fibroma, papilloma, hemangioma, lymphangioma and other inflammatory hyperplastic lesions.[16]

HISTOLOGICAL FEATURES

PGCG is described as a non-encapsulated mass of granulation tissue; containing numerous osteoclast-like multinucleated giant cells lying in a cellular and vascular stroma.[16] the lesion covered by parakeratinized stratified squamous epithelium containing hyperplastic granulation tissue with numerous multinucleated giant cells dispersed throughout a fibro vascular stroma. Extravaseted erythrocytes with deposit of hemosiderin granules also present, together with chronic inflammatory cells. Histological, the presence of multinucleated giant cells is characteristics of this lesion and various stages are involved in giant cell evolution from formation to degeneration.[8, 17] From the stroma components of the PGCG, multinucleated giant cell may represent a reaction to unknown stimuli.[18]

TREATMENT

Treatment Of Peripheral Giant Cell Granuloma Includes:

1. **Topical Therapy:** by Sclerotherapy.
2. **Surgical Excision:** by laser therapy and conventional techniques by scalpel.
3. **Correction Of Soft Tissue Defects In Esthetic Zone:** by periodontal plastic surgery
4. **Correction Of Soft Tissue Defects:** by guided tissue regeneration.

Treatment Of Peripheral Giant Cell Granuloma With Topical Therapy (sclerotherapy)

Table Number-1 Study On Treatment Of Peripheral Giant Cell Granuloma With Topical Therapy (Sclerotherapy)

Study	Study Design	Patient And Method	CONCLUSION
Said Ahmed 2016[19]	Case series	24 patients presenting with PGCG more than 2 cm in diameter were included. Definitive diagnosis was confirmed after histopathological examination of an incisional biopsy. **Treatment :** .5% Ethanolamine Oleate was injected once in a week into each lesion. Repeated injection were done if needed	Complete remission in 20 patients (83.3%), moderate improvement in 3 patients (12.5%) and no clinical improvement in 1 patient. (4.2%) EO injection offers an alternative to conventional methods for the treatment of PGCG. Well tolerated by patients with a high success rate and low chance of recurrence.

PGCG- Peripheral Giant Cell Granuloma, EO- Ethanolamine Oleate.

Sclerotherapy is the treatment of a vascular lesion by injecting a sclerosing agent which causes permanent damage to the endothelial vessels resulting in necrosis.[20] The commonly used sclerosing agents includes, sodium tetradecyl sulfate, ethanolamine oleate, 5% sodium

morrhuate, sodium psylliate, 1% polidocanol and hypertonic saline.[21] when injected in lesion the main effects of EO is fibrosis of endothelium of blood vessels. Recurrent PGCG after surgical excision require more aggressive curettage and may involved extraction of teeth to avoid recurrence. However, complete remission of PGCG occurred without recurrence even without extraction of involved teeth with injection of ethanolamine oleate.[19] Sclerotherapy is simple, minimally invasive, minimal blood loss and less surgical expertise is required. There were minimal postoperative complications with no postoperative dressing or specific care and patient can resume his daily activities immediately.[22]

Treatment Of Peripheral Giant Cell Granuloma With Laser Therapy

Table Number-2 Different Studies On Treatment Of Peripheral Giant Cell Granuloma With Laser Therapy

STUDY	STUDY DESIGN	PATIENT AND METHOD	CONCLUSION
G. Palaia et.al. 2012[23]	Case Report	65 year old female patient, with PGCG located at the anterior portion of edentulous maxilla. **Treatment :**Complete surgical excision of the lesion by using 808 nm diode lasers.	Laser surgery of PGCG reduces postoperative complications, also increasing patient's compliance.
Vikas Dhir 2014[24]	Case Report	62 year old female patient presented with localized gingival overgrowth in lower anterior region. **Treatment :** Complete surgical excision of gingival overgrowth was performed by using 810 nm diode lasers.	3 years follow-up no recurrence reported by the patient.

PGCG- Peripheral Giant Cell Granuloma

Clinical observation demonstrates that excision of gingiva with laser enhances access due to minimal intraoperative bleeding in operating field, Sealing of capillaries and lymphatic during laser irradiation resulting into a minimal inflammatory response and thereby patient experiences less post-operative swelling and pain. [25,26] However, clinicians must have excellent knowledge of specific characteristics of laser irradiation and their interaction with the tissue. [25, 26] Surgical resection by laser, has many advantages; it causes less intraoperative bleeding, sterilizes the wound, requires no suturing and enhance post-operative patient comfort and patient compliance. However, when thorough curettage is necessary, especially when the lesion is close to the bone laser treatment is contraindicated. [27]

Treatment Of Peripheral Giant Cell Granuloma With Conventional Surgical Therapy.

Table Number-3 Different Studies On Treatment Of Peripheral Giant Cell Granuloma With Conventional Surgical Therapy.

STUDY	STUDY DESIGN	PATIENT AND METHOD	CONCLUSION
Penarrocha-Diago et al. 2012[28]	Case Report	A 54 year old woman presented with a swelling of alveolar margin in lower right region at the level of the second premolar and first molar in relation to a fixed prosthesis cemented over implants. **Treatment :**Complete resection of the lesion from its base, with adequate curettage of the underlying alveolar bone followed by implantoplasty of the exposed implant threads.	After 12 month of follow-up, no evidence of recurrence was reported.
Tandon et al.2012[29]	Case Report	A 22 year old female patient with a single, diffuse swelling was seen on the attached gingival in anterior region of maxilla. **Treatment :**Complete surgical excision of the lesion to the periosteum level.	6 month follow- up no recurrence of lesion was reported.
Nekouei et al.2016[30]	Case Report	4 year old boy presented with pedunculated, lobular soft-tissue mass of the left anterior maxillary gingival. **Treatment :**Surgical excision. The lesion was excised down to the periosteum.	No sign of recurrence of the lesion observed during nine months follow-up.
Alekhya et al. 2017[31]	Case Report	A 34 year old female patient presented with swelling in lower left back teeth region along both the buccal and lingual sides of the mandibular premolar region. **Treatment :** Complete surgical excision of the lesion.	Recurrence of the lesion was observed after 3 months follow-up.

Treatment of PGCG is comprised of complete surgical excision of the lesion and elimination of all the possible local etiological factors. Mighell et al[32] found a 22% recurrence rate, which he stated due to incomplete removal of the lesion. When lesion re-excised to the level of the periosteum no further recurrence was noted. Flaitz et al[16] R-21 SA suggested that recurrence of growth may occur as result of superficial resection. Lack of inclusion of periosteum or periodontal ligament in the excised specimen may be resulting into a recurrence of growth. Chrcanovic et al[33]. Surgical excision followed by an additional therapy such as curettage or peripheral osteotomy should be the first choice of treatment of PGCG.

Correction Of Soft Tissue Defects In Esthetic Zone: By Periodontal Plastic Surgery

Table Number 4- Different Studies On Correction Of Soft Tissue Defects In Esthetic Zone: By Periodontal Plastic Surgery

STUDY	STUDY DESIGN	PATIENT AND METHOD	CONCLUSION
Lev et al. 2010[7]	Case Report	A 15 year female patient presented with a red, nodular asymptomatic lesion located above the maxillary left later al incisor. **Treatment:** Surgical resection of the lesion down to the underlying root resulting in 6×5 mm mucogingival dehiscence defect. Corrective surgery includes a split-thickness pouch technique + SECT.	SECT peripherally covered by the surrounding gingiva l without raising a gingival flap, successfully eliminated the gingival defect. 2 year follow-up no gingival recession and no recurrence of the les ion. 3.5 year follow-up the free gingival margin and MGJ of the treated site and neighboring toot h remain unchanged.
Gassmann et el. 2013[34]	Case Report	A 24 year female presented with a recurrent gingival lesion located at the buccal marginal gingival of the maxillary right central incisor. Histological examination confirmed PGCG. **Treatment :**MGJ defect, which occurred following the excision of the lesion, corrected by means of a modified latero-coronally positioned flap.	6 weeks re-evaluation, a stable keratinized cervical margin in t he transplantation site with 1 mm recession. Donor site showed no recession.

SECT- Sub-epithelial connective tissue graft, MGJ-Mucogingival junction, PGCG- peripheral giant cell granuloma

In esthetic zone, periodontal plastic surgery; sub-epithelial connective tissue graft + modified split –thickness pouch technique without coronally advanced flap, leaving mucogingival junction undisturbed and neighboring papilla intact resulting into optimal esthetic appearance with no gingival deformation or scaring.[7] Treating similar lesion with coronally advanced flap+ sub-epithelial connective tissue graft, resulting into recession of neighboring tooth during healing period.[35]

Correction Of Hard Tissue Defects: By Guided Tissue Regeneration.

Table Number-5 Study On Correction Of Hard Tissue Defects: By Guided Tissue Regeneration

Study	Study Design	Patient And Method	Conclusion
Genc et al. 2016[36]	Case Report	A 62 year old female patient presented with a localized mass in the attached gingival of maxillary 1sr and 2 nd molar regions with 7 mm pocket depth on the distal surface of 1 st molar. **Treatment :**Complete surgical excision of mass to the leve l of periosteum. Thorough debridement of the defect done. Xenogenic bone graft and resorable barrier membrane placed.	3 month after surgery showed no recurrence.

Different Studies On Peripheral Giant Cell Granuloma.

Table Number-6 Different Studies On Peripheral Giant Cell Granuloma

STUDY	STUDY DESIGN	MATERIAL AND METHOD	CONCLUSION
Shadman et al. 2015[37]	Review Article	123 confirmed cases of PGCG after biopsy were included for review	Women affected more than men.PGCG was seen in the mandible more than maxilla and in anterior region than in the posterior region. In less than half of the cases, there was no history of bleeding and pain was rarely reported. Calculus was the most common etiological factor.
Chrcanovic et al. 2018[33]	Review Article	2,824 PGCGs were included in the present review	The lesion was more prevalent in women than men. The highest prevalence in 5 th decade of life. The lesions were more prevalent in the mandible than maxilla. Presenting erosion of the subjacent bone in almost 1/3 cases. Surgical excision alone recurrence -16%. Surgical excision+currettege recurrence-2.8%. Surgical excision +peripheral osteotomy recurrence – 0% surgical excision followed by an additional therapy-curettage or peripheral osteotomy should be the first choice of treatment of PGCG.

PGCG- Peripheral Giant Cell Granuloma.

CONCLUSION

Although peripheral giant cell granuloma is a non-neoplastic growth in the oral cavity, correct diagnosis and proper treatment planing is an important. Regardless of the surgical technique employed, successful treatment involves complete excision of lesion to its base with elimination of all local etiological factors and to examine the tissue histologically for confirmation.

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