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Case Report

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Peripheral Giant Cell Granuloma, Diode Laser Surgical Treatment: A Case Report

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Abstract

Background: Peripheral giant cell granuloma is a tumour-like lesion arising on the mucosa of the adherent vestibular or lingual gingiva, or edentulous alveolar ridge mucosa. This lesion is often misdiagnosed because it is clinically mistaken for a pyogenic granuloma. This work aims to present a case of peripheral giant cell granuloma and its surgical laser excision.

Methods: A 62-year-old female patient of Dominican origin came to the Oral Medicine of our institution for clinical evaluation of oral conditions. Physical examination revealed an exophytic lesion of the gingival mucosa with dimensions of 10 x 14 mm in 2.1-2.2 vestibular gingival area. The primary clinical diagnosis was gingival hypertrophy associated with gingival epulis. The patient underwent laser-assisted excisional biopsy and subsequent histopathological analysis. A radiological check-up with orthopantomography and Cone Beam CT was required to evaluate the surgical site and to assess any residual of the lesion.

Results: The histopathological examination described mucosa fragments with chorion, containing spindle and rounded fibrous cells, and giant multinucleated cells, associated with aspecific chronic inflammation and focally covered by normal-appearing squamous epithelium. The morphologial features were compatible with peripheral giant cell granuloma of the oral cavity. No laser sample damage was observed. Subsequent diagnostic images showed no evidence of residual or recurrence of the lesion.

Conclusions: Laser-assisted biopsy is effective in excising the lesion, does not prevent the histopathological analysis of the taken sample and can allow a complete excision. Strict collaboration with the anatomic pathologist is suggested to get a correct diagnosis.

Keywords: Biopsy; Diode laser; Gingival diseases; Giant cell granuloma; Oral; Oral surgery.

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Introduction

Peripheral giant cell granuloma (PGCG), previously known as giant cell epulis, is a typically benign reactive lesion of the oral cavity in areas subjected to local irritation or chronic trauma [1]. This lesion has been considered for years a "reparative granuloma" with a reaction of the periosteum to an insult or trauma. Instead, current thinking considers it a tumour-like neoformation without an identifiable etiology. The peculiar histological feature of this lesion is the presence of multinucleated giant cells immersed in a connective and vascular stroma with spindle fibroblasts and abundant extravasation of red blood cells, hence the common red-blue color [2]. The lesion is a relatively frequent lesion often misdiagnosed because it is usually confused with epulis. It occurs between the ages of 40 and 70 years, with a slight predilection for women [3,4]. On physical examination, the lesion generally appears as a red and sometimes red-blue nodular mass, usually less than 2 cm in diameter, but larger and voluminous lesions may also occur, affecting only the gum and edentulous alveolar mucosa and arising from the periosteum. The base of insertion on the alveolar tissues can be pedunculated or sessile and it is not uncommon to highlight a region of persistent ulceration in one pole of the lesion. Recently some authors reported the appearance of this lesion in correspondence with dental implants [5]. On radiographic examination, although it is a characteristic lesion of the soft gingival or alveolar tissues, it is often associated with an underlying area of peripheral erosion that extends from the base of the lesion towards the underlying bone [6].

In the literature, the advantages of laser-assisted surgery for the treatment of soft tissues are extensively described as reduction in surgery time, absence of bleeding, and the possibility of avoiding both anesthesia by infiltration and sutures, good patient compliance, and better and faster healing of the treated site [11,12]. From the patient's point of view, laser-assisted surgery allows to minimize intra and post-operative pain, and also to limit the use of analgesic, anti-inflammatory, and antibiotic therapies during the follow-up, since neither edema nor infections develop, due to the characteristics of the laser application at low potency [13]. The CO_2 laser was the first used in dentistry, given its excellent cutting ability, and is still widely used and considered very efficient. In fact, it is currently used mainly for its advantages in terms of correct tissue incision, hemostatic capacity, and postoperative benefits [14]. The diode laser was subsequently introduced and used extensively, thanks to the reduced size of the machine and greater ease of use, for minor soft tissue surgery. Based on its photobiomodulation effect, it is used for the exeresis of small lesions of the oral mucosa, by excision or vaporization [15,16].

Case description and results

A 62-year-old patient of Dominican origin presented herself at the Department of Pathology and Oral Medicine of the Department of Odontostomatology and Maxillofacial Surgery of the Ospedale Maggiore Policlinico Fondazione IRCCS Ca 'Granda in Milan, for clinical follow-up and evaluation of oral health conditions. During the collection of anamnestic data, the patient referred that she was suffering from type II diabetes and did not have any type of voluptuous habit; she also referred mild hypertension treated with atenolol and the use of cholecalciferol to prevent osteoporosis. On physical examination, a red, exophytic, non-removable, painless nodular lesion of 10 x 14 mm appeared in correspondence of the vestibular gingival mucosa of elements 2.1-2.2. The primary clinical diagnosis was gingival hypertrophy associated with gingival epulis (Figure 1). There were no elements that could traumatize the affected mucosa, nor did the patient report having had trauma in the area. We then proceeded with an excisional biopsy intervention by photoablation with a diode laser (Raffaello® DMT, Lissone MB, Italy) fibre 300 um wavelength 980 nm with continuous emission and 3W power, after local anaesthesia for infiltration with mepivacaine with OGNA® vasoconstrictor (adrenaline 1: 100,000) (Figure 2). Hemostasis was performed by compression with gauze and tranexamic acid and subsequent vaporization by diode laser (Raffaello® DMT, Lissone MB, Italy) fibre 300um wavelength 980 nm with continuous emission and power 2.5W (Figure 3). The biopsy sample was fixed in 10% formalin, using the pre-dosed containers, and delivered to the Pathological Anatomy Unit of our hospital for histopathological analysis.

The patient was scheduled for subsequent appointments for a further clinical check-up, 7 days after excision, for the evaluation of the healing of the surgical site and the delivery of the histopathological report after 15 days. She was discharged with complete haemostasis, and the indication of using non-steroidal anti-inflammatory drugs (paracetamol) as needed, maximum twice a day for the next 48 hours and observing a soft and cold diet. As home therapy, it was recommended to use gel with 0.20% chlorhexidine, twice a day for 7 days and then replace it with mouthwash rinses with 0.20% chlorhexidine twice a day for 10 days. At the end of therapy with chlorhexidine, the daily use of salivary substitutes in the form of mouthwash was recommended (Biotene®, Biopharm, Italy). At the check-up seven days after the biopsy, the patient presented regular healing of the surgical site, there were no evident local signs of inflammation or edema and reported lack of post-operative ain, so she has not needed to take painkillers (Figure 4). Two brownish tissue fragments of 0.8 cm and 1 cm bisected reach the U.O.C of Pathological Anatomy of our institution. Microscopically, the tissue consisted of chorion with spindle and rounded fibrous cells, multinucleated giant cells, ectatic vessels, blood extravasations and minute fragments of bone trabeculae associated with aspecific chronic inflammation, and partially covered with squamous epithelium. No mitotic figures or necrosis were observed. The histopathological diagnosis was compatible with peripheral giant cell granuloma. Subsequently, the patient went to clinical observation for follow-up 15 days after surgery and control of oral conditions; on the loco-regional clinical-objective examination, the lining mucous membranes appeared to be normal, salivation was normal and oral hygiene was sufficiently controlled. There was no evidence on physical examination of the presence of residual or recurrence of the lesion (Figure 5). In the same session, the patient received a copy of the histopathological report.

A stomatological check-up was recommended and scheduled at the Oral Pathology and Medicine Outpatient Department after about two months and the patient was also referred to the Periodontology Outpatient Clinic for evaluation of periodontal status and appropriate treatment. The patient was also advised to carry out radiological investigations using orthopantomography and Cone Beam CT to evaluate any residual or recurrence of the lesion. At the follow-up check set after two months, the patient came to visit with the required radiological investigations, both

orthopantomography and Cone Beam CT showed no signs of either bone resorption or relapse.

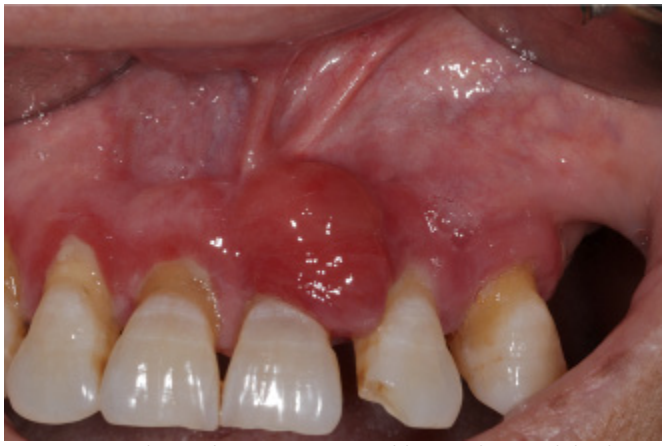

Figure 1: A red, exophytic, non-removable, painless nodular lesion appears in correspondence with the vestibular gingival mucosa of elements 2.1-2.2 with dimensions of about 10-14 mm in diameter.

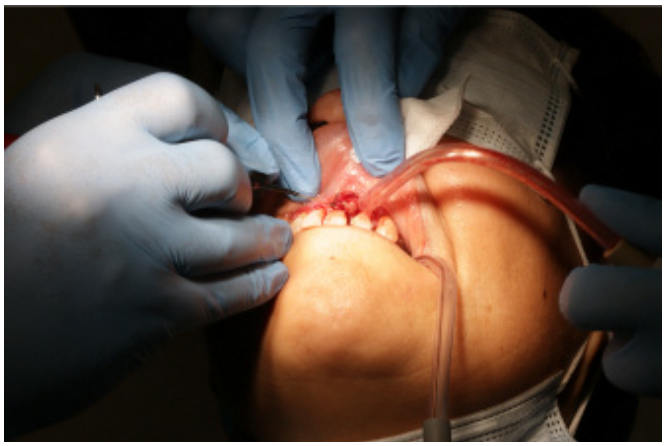

Figure 2: Excisional biopsy intervention by photoablation with diode laser. Intraoperative view.

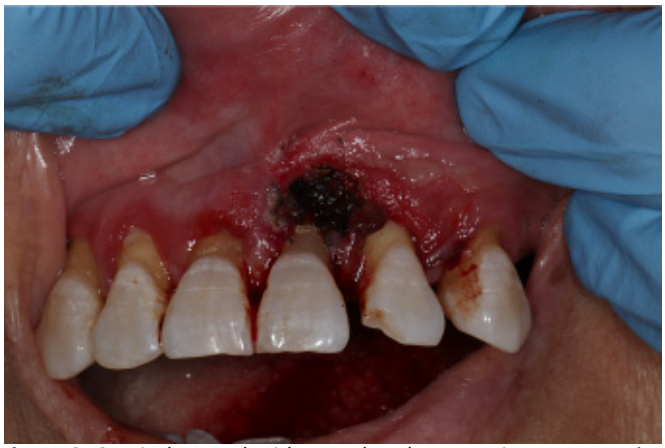

Figure 3: Surgical wound with complete hemostasis. Postoperative view.

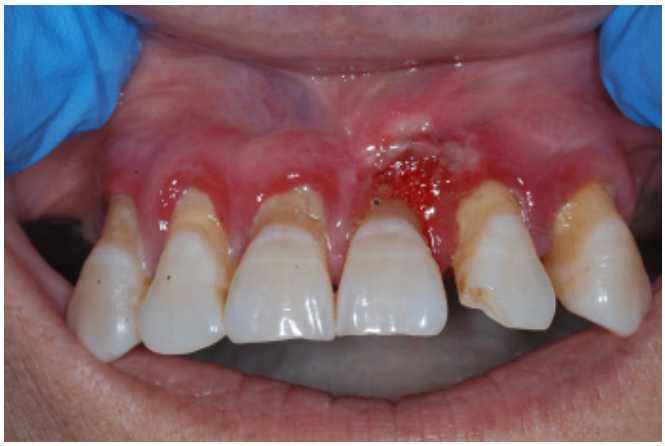

Figure 4: Seven days after the biopsy, the patient presents a regular healing of the surgical site, there are no evident signs of inflammation or edema.

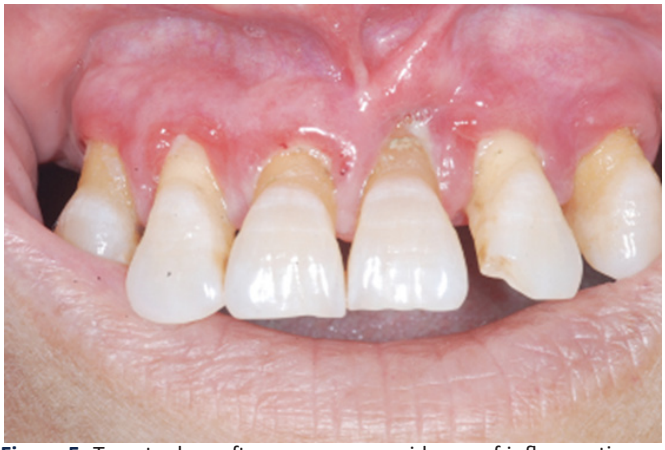

Figure 5: Twenty days after surgery, no evidence of inflammation or recurrence of the lesion.

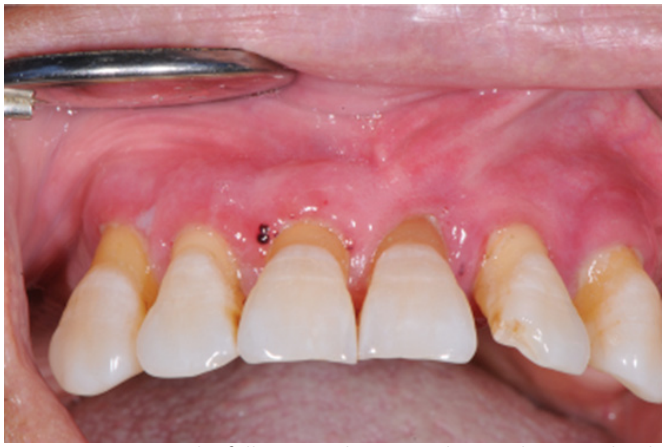

Figure 6: Two months follow up. The surgical wound is completely healed and there are no signs of recurrence.

Discussion

PGCG is a reactive hyperplastic lesion involving the gingiva or alveolar mucosa consisting of proliferating fibroblasts, multinucleated giant cells, and endothelial cells, organized in a rich capillary network, usually with associated chronic inflammation. Many oral lesions should be included in the differential diagnosis such as central giant cell granuloma, epulis, peripheral ossifying fibroma, and pyogenic granuloma. Specifically, central giant cell granuloma is a rapid-growth formation, frankly more aggressive and expansive, that arises exclusively in the maxilla from an osteoclastic and non-soft tissue, differently from PGCG. But analogously, it is not related to the epulis. Therefore, the differential diagnosis is easy, but in the case of bone resorption, the diagnosis can be more complicated. In particular, the presence of a giant cell lesion on histological examination must be interpreted by the pathologist based on strict clinico-pathological correlation [8]. In general, classic epulis affects more upper maxilla than mandible, unlike PGCG. In our case, the red color, the superficial bone erosion, and the absence of clear irritative and traumatic causes, as often happens in the case of epulis, were considered by the clinician against this diagnostic possibility [7]. In addition, peripheral ossifying fibroma resembles epulis, but differs because it affects younger subjects, with dental elements present, and has calcifications inside due to the origin of pathological cells from the periodontal ligament [9,10]. Finally, pyogenic granuloma is a reactive lesion caused by chronic irritation, almost always of traumatic origin or in association with pregnancy, that, in addition to the gingival mucosa, can also involve the tongue, lips and vestibular mucosa, unlike PGCG. Histologically, it appears as a cluster of lobulated vessels similar to granulation tissue often associated with an inflammatory infiltrate consisting of neutrophils, lymphocytes and plasma cells. Furthermore, if the lesion persists for a long time, it is possible to observe a transformation of the granulation tissue into fibrous tissue [10].

After complete surgical removal of PGCG, about 10% of cases recur and an esthetic and functional soft tissue defect may occur [18]. Therefore, treatment of PGCG requires a wide excision of the lesion to minimize a possible recurrence [17-19]. In the literature, there are reported many cases of PGCG surgical excision with a scalpel and subsequent haemostasis using an electrosurgical unit or hemostasis by compression followed by application of sutures [17-19]. At present, there are no studies that specifically focus on the surgical technique of this type of lesion, but the most practiced treatment uses a surgical scalpel to remove the lesion.

Some authors suggest a treatment that includes grafting a subepithelial connective tissue graft [17,18] covered by the surrounding gingiva, to preserve periodontal integrity and, at the same time, eliminate the gingival defect, especially when the lesion is in a particular aesthetic area [18]. To our knowledge, this is the first report in literature where a diode laser has been used to perform surgical excision of a PGCG. Numerous studies in the literature demonstrated the advantages of the laser on soft tissue, leading to no post-operative pain and bleeding, minimal discomfort, and optimal healing by the second intention. Furthermore, the antimicrobial and biostimulation effect of the tissues that are specific of the application of the diode laser must also be considered [11-14].

During the surgery, our patient declared the absence of pain and discomfort. The site of the lesion, although extensive, showed no signs of bleeding, without suturing. During the follow-up, the patient did not need painkillers and the use of antibiotics was not recommended, since there was no evidence of edema or infection during the control visits. Despite the use of diode laser, the sample had minimal areas of carbonization that did not compromise the histological diagnosis. The final aesthetic result of the healed surgical site was optimal, without evident signs of the treatment or of the previous lesion. To date, there are no signs of recurrence.

Conclusions

Laser-assisted excisional biopsy has proven effective in the excision of a PGCG. Diagnostic images showed no residual or recurrence of the lesion. Excision by photoablation with a diode laser can be indicated for surgical sites in an aesthetic area or those that are difficult to access, since it does not require the subsequent application of sutures, which are difficult to manage, nor it does cause edema of the surrounding mucous membranes. Collaboration with the pathologist is recommended for formulating a correct diagnosis and establishing a correct treatment plan.

Declarations

Acknowledgments and disclosure statements: The authors report no conflicts of interest related to this study.

Consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal.

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References

1. Tchernev G, Kandathil LJ, Oliveira N. Giant cell epulis. Wiener Medizinische Wochenschrift. 2021.
2. Sarode SC, Sarode GS. Cellular cannibalism in central and peripheral giant cell granuloma of the oral cavity can predict biological behaviour of the lesion. J Oral Pathol Med. 2014; 3: 459-63.
3. Volpato LE, Leite CA, Anhesini BH, Aguilera JM, Borges AH. Peripheral Giant Cell Granuloma in a child associated with ectopic eruption and traumatic habit with control of four years. Case Rep Dent. 2016; 2016: 6725913.
4. Mighell AJ, Robinson PA, Hume WJ. Peripheral giant cell granuloma: a clinical study of 77 cases from 62 patients, and literature review. Oral Dis. 1995; 1: 12-9.
5. Peñarrocha-Diago MA, Cervera-Ballester J, Maestre-Ferrin L, Peñarrocha-Oltra D. Peripheral giant cell granuloma associated with dental implants: clinical case and literature review. J Oral Implantol. 2012; 38: 527-32.
6. Lester SR, Cordell KG, Rosebuch MS, Palaiologou AA, Maney P. Peripheral giant cell granulomas: a series of 279 cases. Oral Surg Oral Med Oral Pathol Oral Radiol. 2014; 118: 475-82.
7. Bhaskar SN, Jacoway JR. Pyogenic granuloma – clinical features, incidence, histology, and result of treatment: report of 242 cases. J Oral Surg. 1966; 24: 391-8.

8. Waldron CA, Shafer WG. The central giant cell reparative granuloma of the jaws. An analysis of 38 cases. Am J Clin Pathol. 1966; 45:437-447.

9. Carrera-Grañó I, Berini Aytés L, Escoda CG. Peripheral ossifying fibroma. Report of a case and review of the literature. Med Oral. 2001; 6: 135-41.

10. Salum FG, Yurgel LS, Cherubini K, De Figueiredo MA, Medeiros IC, Nicola FS. Pyogenic granuloma, peripheral giant cell granuloma and peripheral ossifying fibroma: retrospective analysis of 138 cases. Minerva Stomatol. 2008; 57: 227-32.

11. Vescovi P, Del Vecchio A, Manfredi M, Fornaini C, Tenore G, Romeo U. The use of laser for treatment of oral mucosal diseases. Dental Cadmos. 2009; 77: 10.

12. Fornaini C, Rocca JP. Oral Laserology. Italy: Monduzzi Editore, Bologna. 2015.

13. Fornaini C, Rocca JP, Merigo E. 450 nm diode laser: A new help in oral surgery. World Journal of Clinical Cases, 2016; 4: 253.

14. Azma E, Safavi N. Diode laser application in soft tissue oral surgery. J Lasers Med Sci. 2013; 4: 206-11.

15. Desiate A, Cantore S, Tullo D, Profeta G, Grassi FR, Ballini A. 980 nm diode lasers in oral and facial practice: current state of the science and art. Int J Med Sci. 2009; 6: 358-64.

16. Sotoode SM, Azimi S, Taheri SA, Asnaashari M, Khalighi H, Rahmani S, et al. Diode Laser in Minor Oral Surgery: A Case Series of Laser Removal of Different Benign Exophytic Lesions. J Lasers Med Sci. 2015; 6: 133-8.

17. Sahingur SE, Cohen RE, Aguirre A. Esthetic management of peripheral giant cell granuloma. J Periodontol. 2004; 75(3): 487-92.

18. Lev R, Moses O, Holtzclaw D, Tal H. Esthetic treatment of peripheral giant cell granuloma using a subepithelial connective tissue graft and a split-thickness pouch technique. J Periodontol. 2010 Jul; 81(7): 1092-8.

19. Abu Gharbyah AZ, Assaf M. Management of a Peripheral Giant Cell Granuloma in the esthetic area of upper jaw: A case report. Int J Surg Case Rep. 2014; 5: 779-782.