

Application of diode laser with photobiomodulation in the excision of giant cell fibroma: A case report

K. V. Varshitha *, Pushpa S Pudukalkatti, Sanjeevini A Hattarki, Akanksha Bhatt and Anisha Jose

Department of Periodontology, Maratha Mandal's NGH institute of dental sciences & Research Center, Belagavi, Karnataka, India.

World Journal of Advanced Research and Reviews, 2022, 16(03), 144–148

Publication history: Received on 15 October 2022, revised on 29 November 2022, accepted on 02 December 2022

Article DOI: <https://doi.org/10.30574/wjarr.2022.16.3.1283>

Abstract

Giant cell fibroma is relatively new and rare entity, commonly seen in gingiva. It is a benign non-neoplastic lesion of oral cavity. It manifests clinically as a slow-growing, asymptomatic, sessile or pedunculated mass with a maximum diameter of 0.5 to 1 cm. These lesions commonly occurs in young individuals and have no sex predilection. Histopathological findings of giant cell fibroma show a presence of the stellate fibroblasts with multinucleated giant cells. This report is a case of giant cell fibroma, occurring on the right buccal mucosa in a 14 year old female patient. Surgical excision of the lesion was planned using a diode laser followed by photo-biomodulation. Post surgically healing was satisfactory, with no significant scar tissue formation and follow up showed no recurrence of lesion.

Keywords: Giant cell fibroma; Gingiva; Buccal mucosa; Stellate fibroblasts; Diode laser; Photo-biomodulation

1. Introduction

Giant cell fibroma is a benign oral cavity tumour. Giant cell fibroma is a rare fibrous non-neoplastic tumour seen on the oral mucosa. Of all the tumours of the oral cavity, it comprises only 2-5% of all fibrous proliferation¹.

It was in the year 1974, that Weathers and Callihan observed a new entity of fibrous hyperplastic soft tissue, thus becoming the first to describe Giant cell Fibroma. They described it to have characteristic large mononuclear as well as multinucleated giant cells thus giving name of the lesion Giant cell fibroma¹. The presence of the stellate fibroblasts with multinucleated giant cells distinguished them from the other hyperplastic lesions².

The origin of Giant Cell Fibroma was although once assumed to be viral, it is now believed to arise from a stimulus of unexplained origin. It generally presents as a reactive proliferation of fibrous tissue which is localized in nature and resembles an irritation fibroma and a papilloma due to the fibrous nature of the lesion and papillary surface³.

Here we report a case of giant cell fibroma seen on the right buccal mucosa along with its treatment management.

2. Case report

A 14-year-old female reported to the Department of Periodontology, Maratha Mandal's Nathajirao G Halgekar Institute of Dental Sciences and Research Centre, Belagavi, Karnataka, India, with the chief complaint of a swelling in the right posterior teeth region. Upon taking further history it was found that the intra oral swelling was first noticed 2 years ago

* Corresponding author: K. V. Varshitha

Department of Periodontology, Maratha Mandal's NGH institute of dental sciences & Research Center, Belagavi, Karnataka, India.

Copyright © 2022 Author(s) retain the copyright of this article. This article is published under the terms of the Creative Commons Attribution License 4.0.

and since then has grown to the present size(Figure 1). The growth was gradual in nature and asymptomatic except for some discomfort during chewing. The patient gave no medical history or any deleterious habits.



Figure 1 Preoperative intra oral view of lesion

On clinical examination, no gross asymmetry of the face, and no extraoral facial swelling were observed. The submandibular and submental lymph nodes were non-palpable and non-tender. On intraoral examination, a pale pink solitary growth was seen extending from the right buccal mucosa upto the occlusal surface's of 17 and 47. The lesion was 1.5 cm x 1.0 cm in size. On palpation, it was soft and non-tender. The lesion was fibrous with a soft pedunculated base. The mouth opening was normal but the patient had difficulty closing her mouth due to the lesion obstructing the occlusion. Upon doing the routine blood check-up, no abnormalities were detected. A differential diagnosis of irritational fibroma was given.

An excisional biopsy of the lesion was planned using a laser (ZOLAR Diode laser 810 nm). The excision was done under Local anaesthesia at 1:80000 using an 810 nm diode laser(Figure 2). The base of the lesion was tied using a black braided suture thread to demarcate the lesion and to have better access to the base of the lesion. The laser was set on a continuous mode at a power of 1 Watt to excise the lesion from the base of the stalk. This was followed by Photo-biomodulation of the excised wound site using the same laser (ZOLAR Diode laser 810 nm) at 0.1Watt power for 2 minutes(Figure 3). Post one week the site showed good healing with no complaints from the patient.



Figure 2 Excision of lesion using Diode laser



Figure 3 Immediate post operative view

On further evaluation, after one month the site healing was satisfactory, with no significant scar tissue formation (Figure 4). The excised tissue was sent for biopsy.



Figure 4 One month post operative view

2.1. Histopathological evaluation

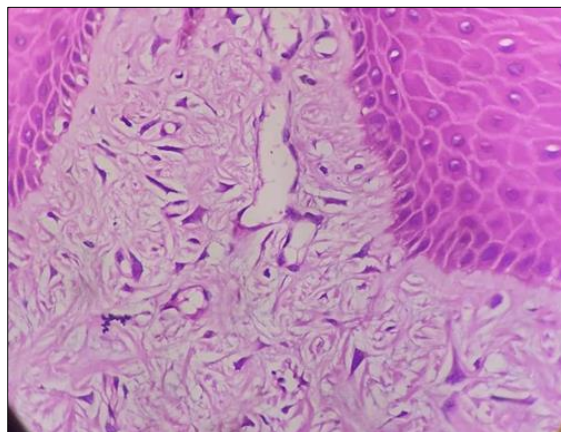


Figure 5 Photomicrograph of the hematoxylin and eosin-stained tissue sections of the lesion

The H and E stained sections revealed a stratified squamous para keratinized epithelium with mild hyperplasia. Elongated rete ridges overlying the fibro cellular stroma were also observed. The Stroma showed a loose arrangement of collagen just below the epithelium with stellate-shaped giant fibroblasts with short dendritic processes and hyperchromatic nucleus and multinucleation. A deeper stroma showed haphazardly arrange collagen fibres. Endothelial lined blood vessels with extravasated RBCs were also observed in the overall stroma (Figure 5).

3. Discussion

Numerous fibrous growths can be found in the oral cavity, among them, Giant cell fibroma is one of the rare fibrous hyperplastic lesions, forming just around 2-5% of all the fibrous proliferation of the oral cavity.

The age group specified by Weathers and Callihan that is affected by the lesion was wide and varied, 17% of the cases occurred in the first decade and 61% of the cases occurred in the third decade.¹ The mean age was reported in a study conducted by Kuo. et al on 24 patients was 29 years⁴. Sex predilection is not significant but occurrence of percentage is slight more in females than males. Caucasians were seen to have a more frequent occurrence than the other races¹.

Giant cell fibroma is generally asymptomatic and patients have no discomfort due to which they report late to the dental office. It can be a pedunculated or sessile fibrous lesion. The colour of the lesion is usually the same as that of the normal mucosa and they generally measure around 0.5-1 cm in size and often have a pebbly surface, but sometimes ulcerations can be observed on the surface due to trauma. It was seen that the lesion is most common to appear on the mandibular gingiva, then maxilla followed by the tongue and it was least commonly found on the buccal mucosa⁵. The lesion in this case report was found on the right buccal mucosa.

The clinical appearance is identical from any other hyperplastic or reactive lesion in the oral cavity. The diagnosis is based on histological features that are specific to this lesion. The presence of distinctive stellate fibroblasts, particularly in the lamina propria adjacent to the epithelium, is a diagnostic sign⁶. Histological findings of our case were similar to the previously published reports.

A hyperplastic reaction to trauma or prolonged irritation has been proposed as the cause of Giant cell fibromas. These reactions cause fibroblastic cells to modify their function⁶.

A few investigations also imply that giant cell fibroma is not caused by prolonged inflammation⁷. However the existence of few inflammatory cells lends support to the idea of irritation as an instigating factor. The origin of the massive cells has also been disputed. These cells appear to be fibroblastic in origin. These cells have more microfibrils, according to ultrastructural research⁸. A myofibroblastic origin for these fibroblasts was also proposed⁹, but given the negative alpha-smooth muscle actin reactivity, this appeared improbable¹⁰. Vimentin and prolyl 4-hydroxylase markers were found to be positive, indicating a fibroblast lineage. These cells are thought to be of the macrophage monocytic lineage¹¹. Regezi et al. discovered that these cells are mesenchymal cells with characteristics of both macrophages and fibroblasts¹².

Although various treatment modalities can be employed for the excision of the fibroma including surgical excision, electrosurgical excision, as well as laser excision. The most common treatment modality employed is the surgical excision of the lesion. For our case, we did a diode laser excision followed by photobiomodulation of the lesion due to the young age of the patient and the apprehension of the patient to a surgical procedure as it is a less painful but more precise technique¹³. The usage of diode laser leads to a more bloodless and comparatively less patient discomfort than the other procedures as it causes less damage to adjacent tissues. This was followed by photobiomodulation using 0.1 Watt, a low-intensity diode laser that has been shown to enhance the healing process along with added benefits of pain control and anti-inflammatory actions, increased fibroblastic proliferation, and collagen synthesis was seen after its usage¹⁴. After one month of follow-up, the patient responded well surgically and had no recurrence.

4. Conclusion

In our daily clinical practice, soft tissue lesions of large sizes are a rare encounter. While most of the large lesions have a similar clinical presentation, the only definitive distinguishing difference between each of them is their histopathological presentation, making the histological evaluation of such lesions of utmost importance. With the advent of lasers into the field of surgery the primary challenges that were once faced by the surgeons of pain and discomfort along with large wound sites and scar tissue formation, have been addressed with the added benefit of faster

wound healing with the use of Photobiomodulation. Thus an accurate diagnosis helps in planning an appropriate treatment plan for the patient.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

Statement of informed consent

Informed consent was obtained from the participant included in the study.

References

- [1] Weathers DR, Callihan MD. Giant-cell fibroma. *Oral Surg Oral Med Oral Pathol* 1974, 37:374-84
- [2] Jimson S, Jimson S. Giant cell fibroma: a case report with immunohistochemical markers. *J Clin Diagn Res*. 2013 Dec, 7(12):3079-80.
- [3] Antony VV, Khan R. "Giant cell fibroma" – A case report. *IOSR J Dent Med Sci*. 2013, 6:117–9.
- [4] Kuo RC, Wang YP, Chen HM, Sun A, Liu BY, Kuo YS. Clinicopathological study of oral giant cell fibromas. *J Formos Med Assoc* 2009, 108:725-9.
- [5] Sabarinath B, Sivaramakrishnan M, Sivapathasundharam B. Giant cell fibroma: A clinicopathological study. *J Oral Maxillofac Pathol*. 2012, 16:359-62
- [6] Reddy VK, Kumar N, Battepati P, Samyuktha L, Nanga SP. Giant cell fibroma in a paediatric patient: a rare case report. *Case Rep Dent* 2015, 2015:240374.
- [7] Nikitakis NG, Emmanouil D, Maroulakos MP, Angelopoulou MV. Giant cell fibroma in children: report of two cases and literature review. *J Oral Maxillofac Res* 2013, 4(1):e5.
- [8] Weathers DR, Campbell WG. Ultrastructure of the giant-cell fibroma of the oral mucosa. *Oral Surg Oral Med Oral Pathol* 1974, 38(4):550-61.
- [9] Reibel J. Oral fibrous hyperplasias containing stellate and multinucleated cells. *Scand J Dent Res* 1982, 90(3):217-26.
- [10] Kulkarni S, Chandrashekar C, Kudva R, Radhakrishnan R. Giant-cell fibroma: Understanding the nature of the melanin-laden cells. *J Oral Maxillofac Pathol* 2017, 21(3):429-433.
- [11] Odell EW, Lock C, Lombardi TL. Phenotypic characterisation of stellate and giant cells in giant cell fibroma by immunocytochemistry. *Journal of Oral Pathol Med*. 1994, 23:284-87.
- [12] Regezi JA, Zarbo RJ, Tomich CE, Lloyd RV, Courtney RM, Crissman JD, et al. Immunoprofile of benign and malignant fibrohistiocytic tumors. *J Oral Pathol* 1987, 16:260–5.
- [13] Pai JB, Padma R, Malagi S, Kamath V, Shridhar A, Mathews A. Excision of fibroma with diode laser: A case series. *Journal of dental lasers*. 2014 Jan 1, 8(1):34.
- [14] Bakshi PV, Setty SB, Kulkarni MR. Photobiomodulation of human gingival fibroblasts with diode laser - A systematic review. *J Indian Soc Periodontol*. 2022 Jan-Feb, 26(1):5-12. doi: 10.4103/jisp.jisp_90_21. Epub 2022 Jan 1.