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Case Report

Diode laser for excisional biopsy of peripheral ossifying fibroma

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ABSTRACT

Peripheral Ossifying Fibroma is one of the commonest occurring reactive lesions on gingiva. It is associated with local irritational factors and often interferes with speech, mastication and maintenance of oral hygiene, in addition to being aesthetically unpleasant. It is usually treated with surgical excision using scalpel and removal of irritational factors, often resulting in mucogingival defect. Other modalities such as radiosurgery and electrocautery have also been used for its management, but they cause changes in microarchitecture of biopsy specimen, altering the histologic picture for true diagnosis. We are presenting a case of excisional biopsy of this lesion in an adult female using a diode laser with excellent post-operative results, without affecting microarchitecture of biopsy specimen. The patient is being followed for last 1 year and no sign of recurrence has been found. A diode laser may offer a good alternative modality for management of such cases.

Key Words: Biopsy, diode laser, peripheral ossifying fibroma

INTRODUCTION

Focal overgrowths of gingiva are a common occurrence, and mostly represent non-neoplastic, reactive lesions including pyogenic granuloma, peripheral giant cell granuloma, fibrous hyperplasia and peripheral ossifying fibroma (POF). These are usually associated with local irritational factors, such as plaque and calculus, poorly contoured dental restorations, poorly fitting prostheses and removable appliances.[1,2]

POF is one of the commonest reactive lesions on gingiva. It usually occurs in 2nd and 3rd decades of life, and 2/3rd of all cases have been reported in females, with a predilection for anterior maxilla.[3,4] It is slow growing in nature and causes difficulties in speech and mastication as well as being aesthetically unpleasant. Although pathogenesis of POF is not completely understood, it has been suggested that it originates from cells of periodontal membrane perhaps because it is found exclusively on gingiva. Oxytalan fibers have been reported in some lesions and fibrocellular response is similar to other reactive lesions of periodontal origin.[1] Irritation to gingiva from subgingival plaque or calculus, poorly finished restorations or foreign bodies in the gingival sulcus results in excessive proliferation of mature fibrous connective tissue. Chronic irritation of periodontal membrane causes metaplasia of connective tissue and consequent deposition of mineralized products.[5]

POF has been known by various names like peripheral cemento-ossifying fibroma,[6] peripheral cementifying fibroma,[6] peripheral odontogenic fibroma with cementogenesis,[1] and calcifying fibroblastic granuloma.[7] Variations in nomenclature have caused much confusion about true characteristics of the lesion.

Bhaskar and Jacoway suggested that POF represents a separate clinical entity rather than a transitional form of pyogenic granuloma, peripheral giant cell granuloma or irritation fibroma.[8] Gardner stated that cellular connective tissue of POF is so characteristic that a histologic diagnosis can be made with confidence, regardless of the presence or absence of calcification.[9]

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Diagnosis of POF can be confirmed by histopathologic evaluation of biopsy specimen. Stratified squamous epithelium that may be intact or ulcerated, benign fibrous connective tissue with numerous fibroblasts, sparse to profuse endothelial proliferation, foci of mineralized material and presence of acute or chronic inflammatory cells are common findings in POF.[1,5]

Radiographic features of POF may vary in different cases. Foci of calcification are found to be scattered in central area of the lesion. However, not all lesions demonstrate this feature on radiograph. POF may cause superficial erosion of bone, but this is very rare.[5]

POF has been treated successfully by conservative surgical excision. However, it often results in mucogingival defects.[10] Other modalities such as radiosurgery and electrosurgery have been used for treatment, but often cause alterations in microarchitecture of biopsy specimens.

Lasers have the advantage of clear surgical field offering better visualization, faster healing, less postoperative pain and scarring as well as better patient acceptance.[11] Diode laser, in particular, have been used successfully for excision of soft tissue proliferations of oral cavity. In this article, we aim to highlight an alternative treatment modality i.e. diode laser for treatment of POF, with good post-operative results and better patient acceptance, without disturbing the microarchitecture of the biopsy specimen.

CASE REPORT

A 32-year-old healthy female reported with the chief complaint of a growth in relation to upper front teeth. It had been present for the last 1 year. Initially, the lesion appeared as a small swelling on the gums, and slowly grew to its present size. There was no history of pain but patient reported difficulties in speech and bleeding on brushing. She was very much concerned about her aesthetics due to unpleasant appearance of gums. She also reported history of cleft lip repair at the age of 10 years.

Extra-oral clinical examination revealed no evidence of lymphadenopathy or other pathosis. There was a scar present on the upper lip due to cleft lip repair. Intraoral examination revealed poor oral hygiene and an erythematous growth present on the labial and palatal aspect of maxillary central incisors. The lesion appeared exophytic and nodular. The surface was irregular on palatal aspect and smooth on labial aspect. It was pinkish red in color, sessile and firm in consistency [Figures 1 and 2].

Intraoral periapical radiograph was obtained of teeth #11 and #21. It revealed crestal bone resorption between central incisors and between right central and lateral incisors [Figure 3]. Complete blood counts were obtained and found to be within normal limits. The differential diagnosis consisted of irritation fibroma, pyogenic granuloma and peripheral giant cell granuloma.

Treatment

An excisional biopsy of the lesion was planned, using a diode laser, under local anesthesia, after obtaining informed consent from the patient. Protective eyewear was used by the operator, assistant and patient. Full mouth scaling and root planing was done. The area surrounding the lesion was infiltrated with local anesthetic (Lignocaine 2%

Figure 1: Pre-operative labial view of the lesion. Surface appeared smooth and pinkish red, covering parts of labial surfaces of both maxillary central incisors

Figure 2: Pre-operative palatal view of the lesion appeared nodular and corrugated

with adrenaline 1 : 80,000). The lesion was removed using diode laser (Picasso, AMD LASERS®, Indianapolis, USA) with 810 nm wavelength in contact mode and pulse of 30 ms duration and 30 ms interval with initiated tip at 2.0 Watts power [Figure 4]. Excised lesion was put in 10% formalin and sent for biopsy [Figure 5]. Adjacent root surfaces of central and lateral incisors were planed using Gracey curette #1-2. The operative field was irrigated with sterile normal saline [Figures 6 and 7]. Patient was advised to avoid hot and spicy foods for 3 days. No medications were prescribed.

Histopathologic examination

On Hematoxylin & Eosin staining, hyper parakeratinized epithelium was observed with cellular stroma composed of plump fibroblasts, loosely arranged collagen fibres and varying sized blood capillaries engorged with erythrocytes. Small basophilic areas of calcifications were present in the centre of specimen suggestive of POF [Figures 8-10].

Follow-up

Patient was recalled after 1 week for post-operative evaluation. She did not report any discomfort at the operated site. No scar was observed, and healing was satisfactory. No tenderness was observed on palpation. After 1 year of follow up, there has been no complication or recurrence of the lesion [Figures 11 and 12].

DISCUSSION

A reactive proliferative gingival lesion commonly occurs due to irritation by various local factors. These lesions can be differentiated on the basis of their histologic features. Most commonly, these include Peripheral

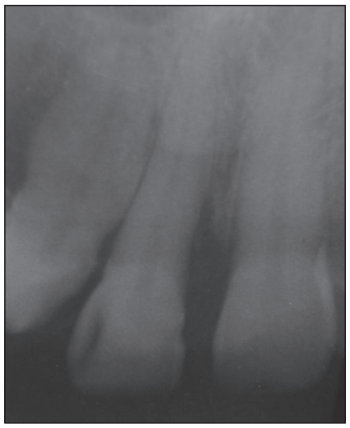

Figure 3: IOPA radiograph revealed crestal bone loss between the maxillary central incisors

Figure 4: Lesion was excised using a diode laser in contact mode

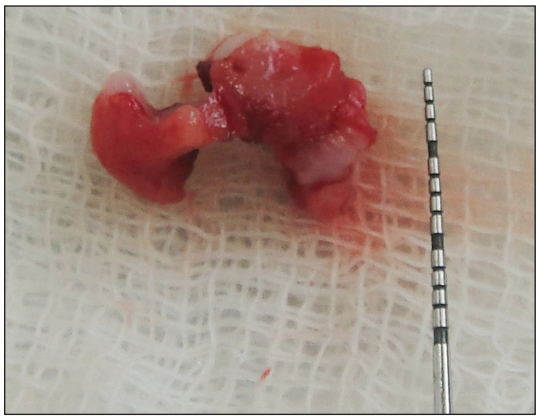

Figure 5: Excised lesion with labial and palatal parts on left and right, respectively

Figure 6: Immediate post-operative view of the area (labial aspect)

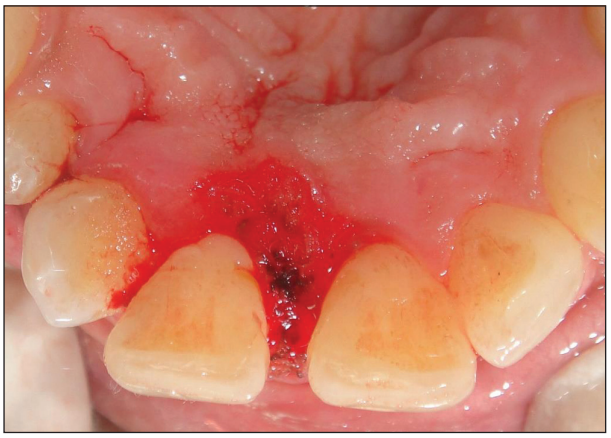

Figure 7: Immediate post-operative view of the area (palatal aspect)

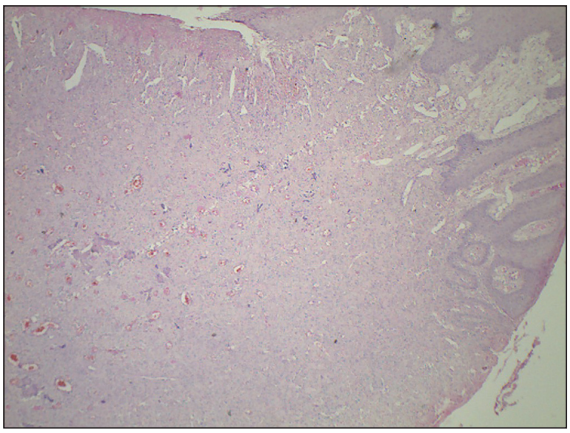

Figure 8: Histological picture showing hyperparakeratinized epithelium with cellular stroma composed of plump fibroblasts, loosely arranged collagen fibres, and varying sized blood capillaries engorged with erythrocytes (H&E stain, 4×)

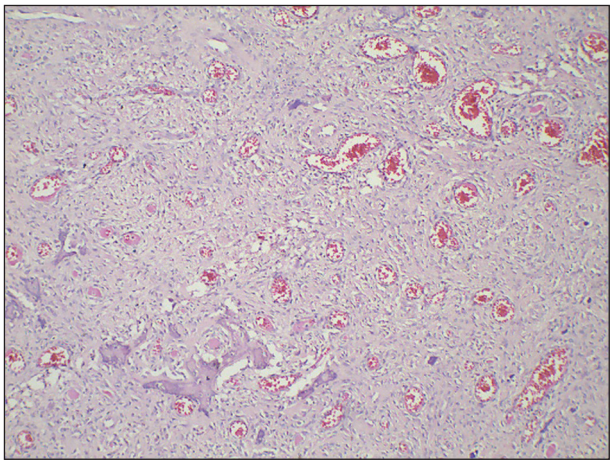

Figure 9: Histological picture showing small basophilic areas of calcification (H&E stain, 10×)

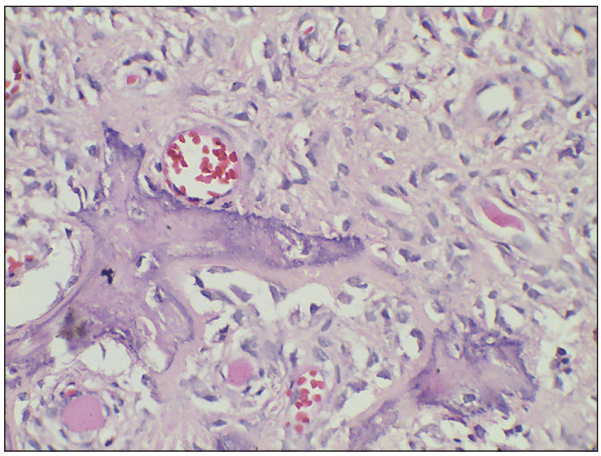

Figure 10: Histological picture showing small basophilic areas of calcification (H&E stain, 40×)

Figure 11: Labial view 1 year after treatment

Figure 12: Palatal view 1 year after treatment

Giant Cell Granuloma, Pyogenic Granuloma, Fibrous hyperplasia and POF.[12] POF, as we found in the present case, is composed of a cellular fibroblastic connective tissue stroma with foci of mineralization.[12,13]

Removal of irritant factors and excisional biopsy, along with removal of adjacent periodontal ligament

and periosteum has been established as a treatment for POF and been conventionally performed using scalpel and curettes.[4] However, it causes significant intraoperative bleeding, postoperative pain and sometimes loss of keratinized gingival tissue, resulting in soft tissue defect and root exposure that later requires plastic surgery.[10] Additionally, with conventional treatments, recurrence of the lesion is not uncommon, as reported in literature varying from 8.9%[7] to 20%.[2]

Electrosurgery and radiosurgery though offer better hemostasis when compared to scalpel, regressive tissue changes due to thermal injury and delayed healing make them unsuitable for excisional biopsy of reactive gingival lesions.[14]

For excisional biopsy, a diode laser with a wavelength of 810 nm was used, as it has been reported to be effective for excision of intraoral soft tissue lesions, and mucogingival surgeries.[11,14] It offers many advantages over conventional modalities, like minimal intraoperative bleeding thus offering a clear surgical field and reduced surgery time, disinfection of surgical site, faster healing without scarring, and minimal or no post-operative pain.[15,16]Another important reason to use a diode laser for excision was that it causes little alterations in microarchitecture of biopsy specimen as reported in literature. Janda *et al*. compared histological effects of Ho:YAG, Nd:YAG, and two diode lasers with wavelengths of 830 and 940 nm. Low thermal effects were found in depth of tissue with Nd:YAG and diode lasers as large carbonization zones at the surface resulted in high power loss.[17] Capodiferro *et al*. noted that regressive tissue changes due to thermal cut of diode lasers are usually negligible, thus allowing adequate histological examination and correct diagnosis.[18] Suter *et al*. evaluated histopathological characteristics and suitability of diode and CO_2 lasers for performing excisional biopsies of oral mucosal lesions, and concluded that both the lasers can be used successfully.[15] Diode laser is however, comparatively cost effective and easy to operate.

The laser was used in pulse mode, as it has been reported to cause less thermal damage in biopsy specimen as compared to continuous mode.[15] Therefore, in this case, no apparent thermal damage was observed in biopsy specimen. Another advantage of diode laser was that no soft tissue defect was observed and healing was uneventful after excision. Normal contour of gingiva was established after complete healing.

Although, variable recurrence rates have been reported in literature,[2,7] no sign of recurrence was observed in this case one year postoperatively.

Thus, diode laser may offer a promising alternative to conventional surgical excision, with better patient acceptance, ease of application, better healing and restoration of aesthetics, without compromising on the histological diagnosis of the lesion. However, clinical trials with longer follow up are required to evaluate the long-term results including the recurrence, following excision with diode laser.

CONCLUSION

Diode laser can be used successfully for excision of reactive gingival lesions such as POF, without impairing the biopsy specimen for correct histological diagnosis. It is advantageous in comparison to conventional surgical modalities in terms of patient acceptance and treatment outcome.

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