

Posthaste Outgrow of Lip Pyogenic Granuloma after Diode Laser Removal

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Abstract:

Introduction: Pyogenic granuloma (PG) is one of the inflammatory hyperplasia seen in the oral cavity. It is a reactional response to minor trauma or chronic irritation and also might be related to hormonal changes. Rarely, PG occurs extralingually. The most common treatment of PG is surgical excision but alternative approaches such as laser excision have also been proposed.

Case report: Herein, we present a case of lip pyogenic granuloma in a 15-year-old male whom had been under orthodontic treatment. The lesion was first excised with diode laser as a conservative method, but the lesion had immediately recurred and was excised with surgical blade as the traditional method. No recurrence or scarring was observed in 6 months follow-up.

Results and conclusion: Although the use of laser as modern medicine offers a new tool for treatment of oral lesions, scalpel (blade) surgical excision still seems to be the successful treatment of choice in minimizing the recurrence of lesion especially when exacerbating factors such as hormonal imbalances exist.

Keywords: pyogenic granuloma; hyperplasia; diode laser; recurrence

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Introduction

Pyogenic granuloma (PG) or granuloma pyogenicum is a relatively common, benign, non-neoplastic mucocutaneous lesion which is thought to represent an exuberant tissue response to local irritation or trauma¹⁻³.

Clinically, PG is manifested as a sessile or pedunculated exophytic lesion with smooth or lobulated surface which is usually hemorrhagic and compressible^{1,2}. Development of the lesion is usually slow, asymptomatic and painless but it may also grow rapidly¹. Gingiva is the most commonly affected site by PG, accounting for 75% of all cases. Uncommonly it can occur on the lips, tongue, buccal mucosa and palate¹⁻⁴. The peak prevalence is in teenagers

and young adults with a female predilection of 2:1¹⁻⁴.

Since PG is non-neoplastic, excisional therapy is the treatment of choice. After excision, recurrence occurs in up to 16% of the lesions. Recurrence is believed to result from incomplete excision, failure to remove etiologic factors or re-injury of lesions. It should be emphasized that gingival cases show a much higher recurrence rate comparing to other oral mucosal sites¹.

Also some alternative approaches such as cryosurgery, excision by Neodymium-Doped Yttrium Aluminium Garnet (ND-YAG) laser, flash lamp pulsed dye laser have also been reported to be effective¹⁻⁵.

Some anecdotal reports of successful treatment of mucosal PG with diode laser have been recently presented⁵.

Case report

A 15-year-old male was referred to the Oral and Maxillofacial Medicine Department of Shahid Beheshti Dental School, presenting with a chief complaint of a swelling on left side of upper lip. He declared that the lesion first appeared two weeks ago which gradually increased in size. His parents also mentioned that the teenager frequently manipulated the lesion. The patient was on orthodontic treatment for 2 months. Clinical examination revealed an erythematous sessile round papule which was 0.6 × 0.5 cm in diameter and located on the vermillion border of left side of the upper lip. The lesion was soft to firm in consistency, nontender, non-compressible and no pulsation was seen. It also bled on touch and was resilient to palpation (Figure 1).

The diagnostic hypotheses were PG and hemangioma. The hook of the metal orthodontic bracket on upper left canine also seemed to irritate the area.

Based on clinical findings and history, the case was provisionally diagnosed as pyogenic granuloma.

Written informed consent was obtained from the patient's parents for excising the lesion. The patient and the whole staff were asked to wear protective glasses. After application of local anesthesia, Diode laser (Doctor Smile Diode Laser, Italy) at the wavelength of 810 nm and continuous wave mode at a power output of 3 watt with a 0.4-mm diameter fiber tip was set for excising the lesion⁶. The tip was directed at an angle of 10 to 15 degrees, moving around the base of the lesion with a circular motion. It took 3 minutes to complete the procedure. Also 30 seconds of low level laser was applied to improve healing and reduce post-operative pain. The diode laser provided an optimum combination of clean cutting of the tissue and hemostasis (Figure 2).

A piece of dental rose wax was given to the patient

to cover the metal bracket on canine. The patient was discharged with necessary post-operative instructions for protecting the area from additional irritation. No additional analgesic or antibiotic was recommended.

The specimen was taken for histopathological examination and the microscopic analysis showed a soft tissue fragment covered by Para keratinized stratified squamous epithelium which was ulcerated and replaced by fibrinoleukocyter membrane. Proliferation of endothelial cells with multiple blood vessel formation, hemorrhage and inflammatory cell infiltration was also seen in the connective tissue (Figure 3).

The characteristics confirmed the diagnosis of PG. In a 5 day visit immediate recurrence of the lesion was observed (Figure 4).

On clinical examination an oval mass of 0.5 × 0.7 cm in diameter with a crusted surface and in some parts covered with fibrinoleukocyter membrane was observed and the patient was scheduled for the second visit to excise the lesion with surgical blade, but the patient neglected to attend. In 15 days the patient attended the clinic again and the lesion had dramatically increased in size (Figure 5).

Clinical examination of the patient revealed an ulcerated exophitic sessile mass which was 0.9 × 1.4 cm in diameter. The lesion was rubbery in consistency with a crusted red and yellowish surface. It was completely excised with a no.15 blade up to the base of the lesion and a single interrupted suture with 3/0 silk was used to close the area precisely. Also the bracket on left upper canine was removed. The specimen was re-sent for histological analysis and the diagnosis of PG was reaffirmed. The patient was visited in 5 days and the suture was removed. The patient was monitored on a weekly schedule postoperatively for 1 month and no scarring or recurrence was observed (Figure 6). In the 6th month recall there was also no sign of recurrence.



Figure 1. Clinical view at first visit



Figure 2. Immediately after diode laser removal

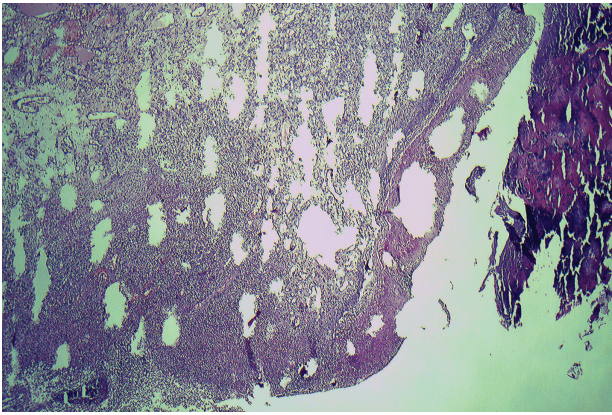


Figure 3. Histopathological view indicating pyogenic granuloma



Figure 4. 5 days after diode laser removal



Figure 5. 15 days after diode laser removal



Figure 6. Visit in 1 month

Discussion

The incidence of PG has been described as between 26.8% and 32% of all reactive lesions. In oral cavity, pyogenic granuloma shows striking predilection for gingiva accounting for 75% of all cases, where they are presumably caused by calculus or foreign material within the gingival cervix¹. In majority of cases minor trauma and chronic irritation are cited in the etiopathogenesis of PG^{1-3, 7}. In the present case local irritation of the orthodontic bracket and manipulation of the lesion by the patient seem to be the initiating factor. A similar case of PG of the lower lip was described by Al Shahrani et al in a 22-year-old male which had occurred as a result of frequent lip biting and irritation by orthodontic bracket⁸.

Although the conventional treatment of pyogenic granuloma is surgical excision, recurrence rate of 16% has been reported. Recurrence is believed to be the result of incomplete excision, failure to remove the etiologic factor or re-injury of the area¹. Recently angiopoietin 1, 2 and ephrin b2, agents in other vascular tumors such as *Bartonella henselae*, *B. Quintana* and human

herpes virus 8 have been postulated to play a part in recurrent pyogenic granuloma. Viral oncogens, hormonal influences, microscopic arteriovenous malformation along with inclusion bodies and gene depression in fibroblasts have also been implicated as causes of recurrence of PG^{5, 9}. It should be emphasized that gingival cases show a much higher recurrence rate than lesions of other oral mucosal sites^{1, 4, 10}. In the present case recurrence of the lesion could have been related to the incomplete omission of the bracket as the initiating factor at the first session, because of the parents request. Also hormonal imbalances due to puberty could have exacerbated the condition. Hormonal stimulation such as seen in puberty and pregnancy may mediate exuberant endothelial proliferation via angiogenic factors and result in higher recurrence rate^{1, 4}.

Although several treatment options such as cryosurgery, sclerotherapy with sodium tetradecyl sulfate, monoethanolamineoleate ligation and laser therapy have been proposed, the conventional treatment for PG is simple surgical excision^{1, 5, 11}.

In comparison with conventional scalpel, laser has

many benefits, such as ease of soft tissue ablation, hemostasis, instant sterilization, reduced bacteremia, little wound contraction, reduced edema, minimal scar, no or few sutures and increased patients acceptance. Thus different dental lasers are being widely used for soft tissue procedures such as benign tumor removal¹².

Diode lasers have shown excellent results in removal of cutaneous PG with only minimal pigmentary and textural complications. Rai et al also postulated that diode laser may be a good therapeutic option for intra oral pyogenic granuloma⁵.

Also Kreisler M et al demonstrated in vitro cellular effect of soft tissue laser irradiation on connective tissue proliferation. They stated that considerably higher proliferative activity especially on fibroblasts was evident after low level laser irradiation¹³.

Removal of the lesion by diode laser in the patient seemed to have satisfactory results at first sight but immediate recurrence of the lesion could have been related to the high proliferative activity after laser application (low level laser therapy to improve healing and reducing pain) which was combined with hormonal imbalances and also the failure of incomplete omission of the bracket as the initiating factor, which ultimately resulted in the problematic outgrow of the lesion.

Conclusion

Although the use of laser as a great technology offers a new tool for treatment of oral lesions, scalpel (blade) surgical excision still seems to be the successful treatment of choice in minimizing the recurrence of lesion especially when exacerbating factors such as hormonal imbalances exist.

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