

## Nonsurgical Management of Rapidly Recurrent Gingival Pyogenic Granuloma: A Case Report and Review of Literature

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### Abstract

Pyogenic granuloma is a prevalent non-neoplastic reactive lesion in the oral cavity. The gingiva is the most common area affected by PG, consisting of 75% of the cases. PG might be treated by conservative excision. In addition, the local factor of irritation or the trauma source should be eliminated to minimize the risk of recurrence. Despite such treatment modalities, recurrence is not uncommon and a recurrence rate of 16% has been reported after excision. Gingival cases exhibit a high rate of recurrence compared to other areas of the oral cavity. The aim of this article was to report our experience in relation to the treatment of a recurring case of PG, which recurred rapidly 3 times after surgical excision, non-surgically through a strict periodontal supportive care program and review the literature in this field.

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### Introduction

Pyogenic granuloma [PG] is a prevalent non-neoplastic reactive lesion in the oral cavity and is classified in the tumor-like lesions group.<sup>1</sup> It was first described in 1844 by Hüllihen.<sup>2</sup> The term pyogenic granuloma or granuloma pyogenicum was introduced in 1904 by Hartzell.<sup>3</sup> This term might be considered a misnomer because the lesion neither produces pus nor is a real granuloma histologically.<sup>4,5</sup> Clinically, PG is a nodule or papule, which is sessile or pedunculated, erythematous, resilient, and exophytic with a smooth or lobular surface and bleeds easily.<sup>6-8</sup> The gingiva is the most common area affected by PG, consisting of 75% of the cases.<sup>4,8</sup> Other areas of the oral cavity that might be affected are the tongue, lips, the buccal mucosa and the palate.<sup>9</sup>

This lesion typically affects the interproximal area and covers the adjacent teeth by an increase in its size. The involvement of the

maxilla, especially in the anterior region, is more common. The facial gingiva is more frequently affected than the lingual gingiva and in a small number of cases both the buccal and lingual surfaces are affected.<sup>10</sup>

The clinical development of the lesion is usually slow, asymptomatic and painless; however, it might develop very rapidly, too.<sup>11</sup> PG might occur at any age, but it most commonly occurs in the second decade of life in females, which might be attributed to the vascular effect of female hormones.<sup>8,12</sup>

In the majority of cases, PG is induced by trauma or long-term irritation by calculi or a foreign body in the gingival sulcus. Stimulation of the fibrovascular connective tissue results in the extensive proliferation of granulation tissue.<sup>13</sup>

Considering its clinical view, the following lesions are considered in the differential diagnosis of PG: peripheral ossifying fibroma, peripheral giant cell granuloma, peripheral odontogenic fibroma, hemangioma, Kaposi's sarcoma, metastasis of malignant tumors, fistula, conventional granulation tissue inflammatory gingival hyperplasia, angiosarcoma and non-Hodgkin lymphoma.<sup>4</sup> The final diagnosis is reached based on its biopsy.<sup>14</sup>

PG might be treated by conservative excision. In addition, the local factor of irritation or the trauma source should be eliminated to minimize the risk of recurrence. Other treatment

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modalities that have been used include cryosurgery<sup>15</sup> and injection of pure ethanol and sodium tetradecyl sulfate.<sup>16-18</sup> Some researchers have used intra-lesion injection of corticosteroids in order to treat PG, especially in cases with a high rate of recurrence. Despite such treatment modalities, recurrence is not uncommon and a recurrence rate of 16% has been reported after excision.<sup>19</sup> In addition, gingival cases exhibit a high rate of recurrence compared to other areas of the oral cavity.<sup>20</sup>

Here we report our experience in relation to the treatment of a recurring case of PG, which recurred 3 times after surgical excision. The case was treated non-surgically through a strict periodontal supportive care program. We have also reviewed the literature in this field.

### Case report

Before writing this case report the informed consent has been obtained from the patient that was a 17-year-old female presented to the Department of Periodontics, Faculty of Dentistry, Qazvin University of Medical Sciences, with a chief complaint of a swelling on the facial and lingual gingiva of permanent mandibular right lateral, canine and first premolar. According to the patient, she had undergone excisional surgery of the lesion twice and the lesion had recurred rapidly in less than one month. Previous histological analysis of the lesion had confirmed a diagnosis of pyogenic granuloma. The patient was healthy systemically and did not take any specific medications. Clinical examination of the patient did not reveal any cervical lymphadenopathy.

Intraoral examinations revealed a large, pink pedunculated, lobulated mass, with a soft-to-firm consistency, mainly in the lingual area and also on the buccal gingiva of permanent mandibular right lateral, canine and first premolar, which bled spontaneously or with minor irritation (Figure 1-3). A large amount of supragingival and subgingival plaque and some calculus were detected in the area. The permanent mandibular right canine exhibited first-degree mobility based on Miller index.<sup>21</sup> The lesion was painless but caused discomfort and bleeding, especially during toothbrushing and eating food. A periapical radiograph showed minor crestal resorption in the areas of permanent mandibular right lateral, canine and first premolar (Figure 4).



Figure 1. Buccal View of the Lesion.



Figure 2. Lingual View of the Lesion.

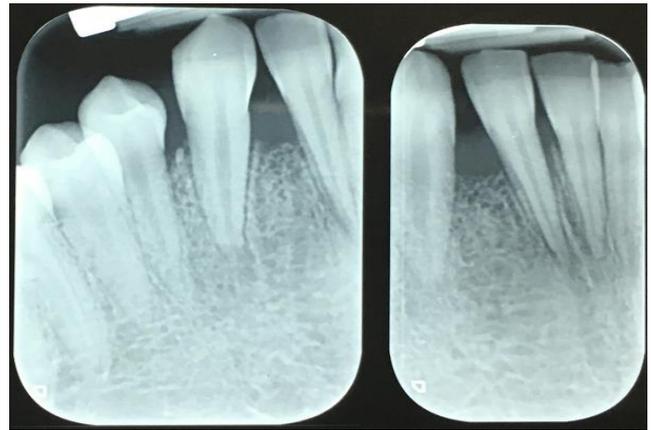


Figure 3. Occlusal View of the Lesion.

One week after scaling and removal of supragingival deposits, excisional surgery of the lesion was carried out with the use of a scalpel blade with a 2-mm periphery from its clinical limits up to the periosteum. The sample was placed in 10% formalin and sent for histopathological evaluation. At the same time, thorough scaling and root planning was carried out on the teeth adjacent to the lesion. Oral hygiene instructions were provided for the patient

with the use of a soft brush using the rolling technique and also with the use of an interdental brush twice a day. Chlorhexidine mouthwash was administered twice a day for two weeks. Histological examination using hematoxylin and eosin staining revealed parakeratinized stratified squamous epithelium. In addition, the surface of the lesion was injured in some areas and covered with a fibrino-leukocytic membrane. In the underlying connective tissue, the blood vessels exhibited different sizes and in some cases erythrocytes, a small number of inflammatory cells and bundles of collagen fibers were evident. A diagnosis of PG was reached histologically. One week after surgery, rapid recurrence of the lesion was detected in the area in the form of small pink papules (Figure 5). A thorough gingival curettage was carried out in the area. A clinical examination after one week again revealed formation of pink inflammatory tissue in that area. The treatment plan suggested by the oral and maxillofacial surgeon at that time was extraction of permanent mandibular right lateral, canine and first premolar.

Considering the history of rapid recurrent of the lesion after surgical removal, the patient underwent strict periodontal supportive care. To this end, deplaquing of the teeth was carried out with the use of an ultrasonic scaler twice a week during the first month and weekly during the second month. After the first month, the lesion improved significantly. In addition, the patient's ability to clean the teeth adjacent to the lesion improved significantly due to a decrease in bleeding during toothbrushing. At the same time, the patient was instructed in toothbrushing using the modified Bass technique. At the end of the second month, the lesion disappeared completely. Supportive treatment continued monthly in the form of deplaquing with the use of an ultrasonic scaler and reinforcement of oral hygiene instructions. No recurrence was noted in the 13-month follow-up (Figures 6 and 7)



**Figure 4.** Periapical Radiograph of the Permanent Mandibular Right Lateral, Canine and First Premolar.



**Figure 5.** Buccal view of recurrent lesion.



**Figure 6.** 13-month follow-up (buccal view).



**Figure 7.** 13-month follow-up (lingual view).

## Discussion

Pyogenic granuloma is an inflammatory hyperplasia of oral tissues.<sup>4</sup> This lesion is normally painless and asymptomatic; however, minor trauma results in its bleeding. PG might also result in functional problems in relation to deglutition, mastication, articulation and esthetics.<sup>22,23</sup> Depending on the age of the lesion, the color changes from pink to red to purple.<sup>24</sup>

Generally, it is believed that this lesion is due to the exaggerated local reaction of the connective tissue to minor traumas or any background irritation.<sup>25</sup> These irrational factors might consist of poor oral hygiene, calculus, overhanging restorations, cheek biting, etc. Due to these irritations, the underlying connective tissue becomes hyperplastic and granulation proliferation is induced, resulting in the development of a pyogenic granuloma.<sup>12</sup> Pyogenic granulomas in the oral cavity have rarely been reported to be present with Sturge - Weber syndrome.<sup>26</sup>

PG mostly occurs during the second decade of life in female subjects, which might be attributed to the vascular effects of female hormones.<sup>27</sup> Study by Zain on a Singaporean population showed the highest prevalence of PG during the second decade of life<sup>28</sup> and the presented case was a 17-year-old female subject.

Krishnapillai reviewed 215 cases of oral PG in south Indian Teaching Hospital, which showed a mean age of 34.27 year and a peak

prevalence rate during the third decade of life. PG was more prevalent in females and more common in the maxilla [50.23%]. Irritation and gingival inflammation resulting from poor oral hygiene were the major predisposing factors.<sup>29</sup>

Clinically, PG presents as an exophytic, pedunculated or sessile lesion, with a lobulated or smooth surface, with its size varying from a few mm to a few cm; however, it rarely becomes >2.5 cm. Many cases of PG grow rapidly and become large in size.<sup>11</sup> Its existence might lead to complications such as secondary infections or diastema formation.<sup>30</sup>

Based on a study by Vilman, the majority of PG cases occur in the marginal gingiva and only 13% occur in the alveolar region.<sup>20</sup> In some cases, local bone loss might occur due to the pressure exerted by the lesion.<sup>31</sup> In our case, too, minor crestal bone loss was detected in the areas of permanent mandibular right lateral, canine and first premolar.

PG might be treated in different ways; however, conservative surgical excision and elimination of irritating factors are the frequently used treatment option.<sup>13,14</sup> In order to treat gingival lesions, excision should be deep, extending up to the periosteum of the adjacent teeth to eliminate the irritating agent and prevent recurrence of the lesion.<sup>14</sup>

Other less invasive techniques, too, have been introduced for the treatment of this lesion, with limited advantages, including cryotherapy, cauterization with silver nitrate, sclerotherapy with sodium tetradecyl sulfate and injection of pure ethanol.<sup>4</sup>

Chandrashekar used a minimally invasive approach for the treatment of PG, which consisted of scaling and root planing in association with the curettage of the area affected. Oral hygiene instructions, in the form of toothbrushing and use of chlorhexidine mouthwash twice a day, were administered. After one week, a gradual decrease was detected in the lesion size. Subsequently, scaling and thorough curettage of the lesion were carried out weekly for 4 consecutive weeks and the patient was encouraged to observe oral hygiene by brushing and flossing the teeth twice daily. After 4 weeks, the lesion resolved completely and no recurrence was noted at 6-month follow-up.<sup>32</sup>

In rare cases, PG recurs after surgical excision and re-excision should be carried out. A recurrence rate of up to 16% has been reported

after excision.<sup>4</sup> Repeated recurrence has been reported in rare cases.<sup>14</sup>

A retrospective study reported a recurrence rate of 15.8% in the evaluation of 242 cases. The recurrence of the lesion has been reported more commonly after removal of gingival lesions compared to extra-gingival lesions.<sup>17</sup> In the presented case, too, the lesion was in the gingiva and high and rapid recurrence was noted after surgical excision.

Incomplete excision, failure to eliminate the etiologic factors and repeated traumas are etiologic factors for the recurrence of these lesions.<sup>4,13</sup> Recently angiopoietin 1, 2 and ephrin b2, agents involved in other vascular tumors such as human herpes virus-8, B. Quintana and Bartonella henselae have been shown to have a role in the recurrence of this lesion. Hormonal influences, viral oncogenes, microscopic arteriovenous malformations, inclusion bodies and gene expression in fibroblasts have been reported as factors for the recurrence of PG.<sup>17,20,33</sup> Some other factors responsible for the induction of this lesion are physical trauma,<sup>13</sup> minor chronic trauma,<sup>14</sup> hormonal factors,<sup>34</sup> bacteria and viruses<sup>35</sup> and some specific drugs.<sup>36</sup> Vilman et al.<sup>20</sup> emphasized on the need for follow-ups, especially in gingival cases of PG, due to its higher rate of recurrence.

Hasanoglu et al. treated a recurrent PG with the use of diode laser. They used this laser for excision of the lesion with a 2-mm periphery from its clinical limits up to the periosteum. At 14-month follow-up, no recurrence was noted.<sup>37</sup> Bugshan et al. used a series of intra-lesional injections of corticosteroids in association with the local application of clobetasol propionate ointment for two weeks to treat a recurrent PG.<sup>38</sup> Parisi et al. treated a case of pyogenic granuloma with repeated recurrence after surgery with the use of a series of intra-lesional injections of corticosteroids.<sup>11</sup> Tursten et al. reported a case of recurrent PG which resolved after administration of oral systemic steroids.<sup>39</sup>

In 2015, Frunkin et al. treated two cases of recurrent gingival pyogenic granuloma using a non-surgical protocol consisting of strict oral hygiene instructions [i.e. regular use of interdental toothbrushes of the convectional and single-tufted types], splinting, scaling, root planning and maintenance which included deplaquing of the teeth and reinforcement of oral hygiene instructions.<sup>40</sup> The lesions exhibited

recurrence after 6 and 12 months; however, the present case exhibited rapid and repeated recurrence in 1-2 weeks.

In 2017, Tiwari et al. treated a case of recurrent gingival pyogenic granuloma with less invasive management by reflecting a papilla preservation flap, excising the lesion from inside the flap till healthy tissue was visible, and exposing to diode laser to prevent recurrence.<sup>30</sup>

Selection of a treatment modality should be based on consideration of an improvement in esthetic appearance and the function of soft tissues with minimal invasion. Given the tendency of bleeding at the surgical site, which might inhibit oral hygiene measures by the patient and since local irritation due to calculus and plaque is the main reason for the development and recurrence of the lesion, we decided to establish a strict maintenance phase for the patient, which consisted of tooth deplaquing with the use of an ultrasonic scalar and persuasion of the patient to observe proper oral hygiene measures twice a week for one month. After a month the lesion improved significantly. Then professional tooth cleaning continued weekly for another one month. Concomitant with improvement of the lesion, the patient's ability to clean the teeth in the area improved significantly. At the end of the second month, the lesion resolved completely. The maintenance phase continued on a monthly basis in order to reinforce oral hygiene and clean the teeth professionally. No recurrence was noted in the area involved at 13-month follow-up.

## Conclusions

It can be concluded based on the present report that establishing a strict maintenance phase after the surgical phase can be considered as a non-invasive, safe and effective approach to prevent and treat recurring cases of PG after surgery.

## Declaration of Interest

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