Peripheral Ossifying Fibroma: Case Report and a Mini-review

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Abstract Peripheral ossifying fibroma (POF) occurs as a gingival overgrowth. The purpose of this article is to present a case of POF, briefly reviewing the current literature on this condition and emphasize the importance of inclusion of this lesion into list of all the pathologies, specially the gingival overgrowths. A case report of peripheral ossifying fibroma (POF) is reported in young adolescent which comprises the growth that occurred in the mandibular anterior region with displacement of anterior teeth, its satisfactory management and literature review. POF represents a reactive benign lesion of connective tissue and is not the soft tissue counterpart of ossifying fibroma and is also not related to peripheral odontogenic fibroma. Careful clinical examination and histopathology findings should be correlated to conclude the final diagnosis. Treatment consists of surgical excision with periodic follow-ups to observe any recurrence.

Keywords Peripheral ossifying fibroma; Gingival overgrowth; Fibroma; Granuloma; Fibroblast; Osteoid tissue

1 Introduction

Reactive lesions of the gingiva are very common. Peripheral ossifying fibroma belongs to the spectrum of reactive gingival hyperplasias (It occurs as a gingival overgrowth in response to local irritants. The pathogenesis of this lesion although is much under controversy (Patil et al., 2014). Other terms used in reference to POF are peripheral cementifying fibroma, peripheral fibroma with cementogenesis and peripheral fibroma with osteogenesis, peripheral fibroma with calcification, calcified or ossified fibrous epulis and calcified fibroblastic granuloma (Kale et al., 2014). POF was first reported by Shepherd in 1844 as alveolar exostosis. Eversol and Robin (1972) later coined the term peripheral ossifying fibroma (Reddy et al., 2011). It occurs in the younger age groups with a female preponderance. It has a predilection for maxillary arch and most of them occur in the incisor cuspid region (Mohiuddin et al., 2013). POF constitutes about 3.1% of all the oral tumors and about 9.6% of all the gingival lesions (Mishra et al., 2011). Although POF represents benign clinical behavior, the recurrence rate can reach up to 20% (Kale et al., 2014). This makes this entity worth discussing. The purpose of this article is to present a case of POF, briefly reviewing the current literature on this condition and emphasize the importance of inclusion of this lesion into the list of all pathologies, specially the gingival overgrowths.

2 Case Report

A 21 year old male patient visited a private dental practitioner with a chief complaint of swelling of gums in lower left front tooth region of jaw which interfered during eating since 5 months. Patient noticed a small swelling in relation to interdental papilla in 31, 32 region which gradually increased over a period of 5 months. There used to be occasional bleeding on brushing and during mastication which stopped on its own within few minutes. The swelling was painless, but interfered during mastication. Also, the patient noticed spacing between 31 and 32 due to the same and this gradually increased in the last 5 months. On intra-oral examination, a 1.5 x 1 x 0.5 cm, pedunculated, roughly ovoid, reddish pink, soft, nodular and non-tender gingival overgrowth was seen between 31 and 32 which extended from the interdental papilla to the attached gingiva (figure 1 a, figure 1 b).
Figure 1 a Pre-operative labial view revealing swelling in the inter-dental papilla in the 31, 32 region

Figure 1 b Pre-operative lingual view revealing swelling in the inter-dental papilla in the 31, 32 regions

Figure 1 c Incisal view revealing spacing between 31 and 32; local factors seen on the teeth related to the lesion

2.1 Bleeding on probing present
There were no ulcerations seen with the lesion. Local factors were seen in relation to the teeth in and around the lesion (Figure 1 c).

Intra-oral peri-apical radiograph (IOPAR) revealed spacing between 31 and 32 regions. (Figure 1 d) routine blood investigations were found to be normal. Serum alkaline phosphatase and serum calcium and phosphorus levels were also found to be within normal limits. Considering the past history and present clinical and radiographic findings, a provisional diagnosis of Peripheral Ossifying Fibroma was given with Peripheral Giant Cell Granuloma, Peripheral Fibroma and Pyogenic Granuloma as the possible differential diagnoses. A thorough treatment was planned to get the best possible results. Treatment started with non-surgical periodontal therapy including a thorough scaling and root planning and the patient was put on maintenance phase.
Patient was recalled after 15 days. Under local anesthesia, surgical excision of lesion was done up to the base of the lesion with proper degranulation and complete sub-gingival calculus and debris removal (figure 2 a, figure 2 b).

Complete excision of the lesion was done and care was taken to remove the entire base of the lesion along with 1mm of healthy marginal tissue surrounding it (figure 2 c). The lesion was stored in 10% formalin and sent for histo-pathological examination. Periodontal pack was given (figure 2 d, figure 2 e).
Figure 2 d Labial view revealing periodontal pack placement in the surgical area

Figure 2 e Lingual view revealing periodontal pack placement in the surgical area

On recall after 7 days, the periodontal pack was removed and the surgical site was examined which presented with good healing (figure 3 a, figure 3 b).

Figure 3 a Labial view revealing periodontal pack removal after 7 days recall with the surgical site presenting with good healing

Figure 3 b Lingual view revealing periodontal pack removal after 7 days recall with the surgical site presenting with good healing

Follow-up appointments were performed at 1 month interval (figure 4 a, figure 4 b) and 12 month intervals (figure 5 a, figure 5 b).
Healing was uneventful and no recurrence was observed even after 12 months. During this period, the patient did not report any complaints and no other treatment was needed. On histo-pathological examination, proliferating hyperkeratinized epithelium and connective tissue showing collagen fibers and proliferating fibroblasts was seen in addition to the trabeculae of woven bone with collagen fibers and proliferating fibroblasts (figure 6 a, figure 6 b).
3 Discussion

Gingiva is one of those anatomical regions in the oral cavity with the broadest array of lesions occurring ranging from inflammatory to neoplastic. POF is one such reactive lesion, which occurs exclusively on gingiva. Although, intra-oral ossifying fibromas have been described in the literature since the late 1940s, still there are lot of theories and various schools of thoughts regarding its pathogenesis. The widely accepted etio-pathogenesis for POF is the inflammatory hyperplasia of the cells of the periosteum or periodontal ligament; as there is excessive proliferation of mature fibrous connective tissue in response to gingival injury, gingival irritation, sub-gingival calculus or a foreign body in the gingival sulcus. Chronic irritation of the periosteal and periodontal membrane causes metaplasia of the connective tissue and resultant initiation of formation of bone or dystrophic calcification. An origin from cells of periodontal ligament has been suggested because of exclusive occurrence of POF from interdental papilla, the proximity of gingiva to periodontal ligament, the presence of oxytalan fibres within the mineralized matrix of some lesions, the age distribution which is inversely related to the number of lost permanent teeth, and the fibro-cellular response similar to other reactive gingival lesions of periodontal ligament origin (Mathur et al., 2014).

Another concept attracting much of interest regarding the origin of POF is the development of POF secondary to fibrosis of the granulation tissue of pyogenic granuloma (PG). This concept lies on the basis that both PG and POF share similar sex and site predilection, as well as similar clinical and histological features. Hence, these lesions may simply be considered as variable histological responses to irritation (Babu et al., 2010).

The third pathology sharing this spectrum of chronic irritation induced gingival hyperplasia is Peripheral giant cell granuloma (PGCG) and is known to be a related pathology to both PG and POF. Since it is known that periodontium responds to similar irritants in a different way, it is postulated that PGCG is a more intense response of periosteum to the irritation factors than that associated with the formation of the more common lesion that is pyogenic granuloma (Patil et al., 2014).
POF more commonly occurs in females and in the second decade, hence the role of hormones has also been questioned. Multicentric POF can also occur in the oral and maxillofacial region, and have been observed in conditions associated with known genetic mutations, such as, Nevoid basal cell carcinoma syndrome, multiple endocrine neoplasia type II, neurofibromatosis and Gardner syndrome (Ramu et al., 2012). Also, recently an immunohistochemical study done by Marcos A Jose et al., (2010) showed that the proliferating cells of connective tissue in POF are of myo-fibroblastic nature (i.e. cells sharing morphological characteristics with fibroblasts and muscle cells). An immunohistochemical study made to determine the nature of these proliferating spindle shaped cells showed the cells to be positive to vimentin and actin further confirming its myo-fibroblastic nature.

The findings of the study, thereby, raised suspicion regarding the interlink between PG and POF (Mathur et al., 2014). Clinically, POF commonly presents as a pedunculated or sessile localized overgrowth on the gingiva. On palpation, it appears to be firm, non-tender and attached to the interdental gingiva. The overlying mucosa may show foci of ulceration or it may be non-ulcerated with normal overlying mucosa.10 It is a slowly growing lesion which attains mostly the size of 1-2 cm in diameter; rarely, larger lesions up to the size 9 cm have also been reported.11 POF may occur at any age but exhibits a peak incidence between the second and third decades. Almost 60% of the lesions occur in the maxilla and are seen usually anterior to the first molars, mostly, in incisor-cuspid region and during the second decade of life. The lesion affects females more commonly than males (5:1 respectively) (Mathur et al., 2014). Due to the marked female predilection, the role of hormones is also postulated in the pathogenesis of POF (Ramu et al., 2012). The lesions usually are solitary however, multi-centric lesions have also been reported rarely. One such case has been reported by Kumar K S et al where the lesion involved both the maxillary and mandibular gingivae and both sides of the jaws were affected (Kumar et al., 2006). POF has to be differentiated clinically from other reactive pathologies occurring on the gingiva. Radiographic changes in POF are not routinely seen; however, sometimes small amount of radioopaque material is seen, specifically in larger lesions or long standing lesions with much amount of mineralization to produce radiographic changes (Kumar et al., 2006)

These lesions are known to cause cupping resorption of the adjacent superficial alveolar bone. Other bone changes that can be noted are, widening of the periodontal ligament space along with thickened lamina dura. Pathologic migration of the involved teeth is noted due to resorption of the interdental bone. Because of the huge clinical spectrum to which POF can mimic, confirmatory diagnosis has to be established by histopathology of the lesion. Gardner (1982) stated that cellular connective tissue of POF is so characteristic that a histological diagnosis can be made with confidence, regardless of the presence or absence of calcification. This feature holds significance as the mineralized component of peripheral ossifying fibroma varies from 23% to 75 %. The mineralization can contain following components: Lamellar or woven osteoid tissue; Cementum like material; and Dystrophic calcification (Reddy et al., 2011). Dystrophic calcification is mostly seen in ulcerated lesions (Buchner et al., 1987). Cundiff stated that mineralization is an inherent potential of periodontal ligament/periosteum. The same lesion that shows minute dystrophic calcification may also show other type of mineralization, if left long enough (Gardner et al., 1982). Along with the above mentioned two important features, other histological features include intact or ulcerated surface epithelium, connective tissue comprising of plump fibroblasts which are proliferating and other components which are mesenchymal in origin and less to highly profuse endothelial cell proliferation. This may cause bleeding in POF further making clinical diagnosis confusing (Reddy et al., 2011).

Treatment requires proper surgical intervention that ensures deep excision of the lesion including periosteum and affected periodontal ligament. Thorough root planing of the adjacent teeth and/or removal of other sources of irritants should be accomplished. Due to the high rate of recurrence (8% to 20%), post-operative follow-ups are required. POF recurs due to 1) incomplete removal of the lesion, 2) failure to eliminate local irritants and 3) difficulty in accessing the lesion during surgical manipulation as a result of the intricate location of the lesion.
(usually an interdental area) (Shetty et al., 2011) In the above mentioned case report, no clinical signs of recurrence after 1 year of follow-up were seen.

Table 1: Showing data on differentiating features regarding various pathologies

| Oral pyogenic granuloma | Parulis | Peripheral odontogenic fibroma | Hemangiopericytoma | Peripheral giant cell granuloma | Metastatic carcinomas granuloma |
|-------------------------|---------|--------------------------------|--------------------|--------------------------------|---------------------------------|
| Soft, friable nodule, that bleeds readily with slight provocation | Associated with an entrapped foreign body, a gingival pocket or a non-vital tooth | Clinically similar to POF | Fast growing tumors with a characteristic blush red color | Slight predilection of When localized in the arch and frequently observed in the incisor-cusp region exophytic lesion gingiva, may provoke irregular bone destruction below the |
| Difficult to differentiate clinically from POF, histopathology is a must. | Characterized by presence of pain and purulent exudates with fluctuation in the lesion | Histologically defined as a fibroblastic neoplasm containing odontogenic epithelium | No age or gender predilection | Radiographs of certain lesions may show radiopaque calcifications at the center of the lesion |
| | | | Consistency hard and margins indurated | |

4 Conclusion

POF is a slowly progressing lesion. Many cases will progress for long periods before patients seek treatment because of the lack of symptoms associated with the lesion. A slow growing pink soft tissue nodule in the gingival region should raise suspicion of a POF. Treatment consists of surgical excision, including the periosteum, and scaling of adjacent teeth. Close post-operative follow-up is required because of the growth potential of the incompletely removed lesions and a high recurrence rate.

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