



Plasma cell gingivitis – an unusual case of simultaneous disease occurrence in two siblings

Plazma ćelijski gingivitis – neuobičajen slučaj istovremene pojave oboljenja kod brata i sestre

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Abstract

Introduction. Plasma cell gingivitis (PCG) is a relatively rare disease that usually occurs on the anterior maxillary and mandibular gingiva. It manifests as extreme redness, swelling and gum tissue enlargement with propensity for bleeding, accompanied by extensive infiltration of plasma cells in the *lamina propria*. While the disease etiology remains unclear, its presentation is mostly attributed to nonspecific inflammatory reaction to certain foodstuffs or ingredients in oral hygiene products. **Case report.** A 9-year-old boy and 11-year-old girl were brought for exam by their mother because of fiery red lesions on the gingiva. The lesions had the same clinical features and identical localization and were concomitantly present in both siblings. After excluding other oral or systemic diseases with similar clinical manifestations, a diagnosis of PCG was established (most likely due to chewing gum). **Conclusion.** While being a purely benign, the PCG clinical appearance may mask much more detrimental conditions. Consequently, each such lesion requires due attention. To date, familial tendency for the development of such a condition has not been reported.

Key words:

gingivitis; plasma cells; diagnosis, differential; histological techniques.

Apstrakt

Uvod. Plazma-ćelijski gingivitis (PCG) je relativno retko oboljenje koje se najčešće javlja na gingivi frontalne regije gornje i donje vilice, a karakteriše se izrazitim crvenilom, otokom i uvećanjem desni sa izraženom tendencijom ka krvarenju, kao i masivnom infiltracijom plazma ćelija u rastresitom vezivnom tkivu (*lamina propria*). Bolest je do kraja nejasne etiologije mada se pretpostavlja da je u pitanju nespecifična inflamatorna reakcija na neki sastojak hrane ili sredstava za održavanje oralne higijene. **Prikaz bolesnika.** Brata i sestru, devetogodišnjeg dečaka i dve godine stariju devojčicu, majka je dovela na pregled zbog plamenocrvene promene na gingivi, istovremeno prisutne kod oba deteta, gotovo identičnog izgleda i lokalizacije. Nakon isključivanja drugih oralnih i sistemskih oboljenja sa sličnom prezentacijom, zaključeno je da se radilo o PCG (najverovatnije kao reakcija na žvakaće gume). **Zaključak.** Mada benigno, PCG je oboljenje koje svojom kliničkom slikom može maskirati postojanje znatno ozbiljnijih bolesti. Stoga svaka ovakva lezija zahteva odgovarajuću pažnju. Porodična sklonost ka oboljevanju nije opisana sve do sada.

Ključne reči:

gingivitis; plazma ćelije; dijagnoza, diferencijalna; histološke tehnike.

Introduction

Plasma cell gingivitis (PCG) is a relatively rare disease that can affect the gingiva only, or involve other parts of the mouth, usually lips and tongue. It typically manifests as pronounced redness of the anterior maxillary and mandibular gingiva, clearly demarcated towards the mucogingival junction and the surroundings, whereby the gingiva is edematous and enlarged with a pronounced tendency toward bleeding.

The disease severity ranges from clearly delimited to diffuse lesions affecting the lateral gingiva as well. If lips and tongue are also affected, the disease is characterized by filiform and fungiform papillae atrophy and deepening grooves on the dorsal surface of the tongue, along with swollen and fissured lips, mainly the lower one. The lesions are usually asymptomatic, although some patients may complain of pricking, burning sensation and even pain. Changes may occur in other parts of the oral cavity, and can extend to the en-

tire upper aerodigestive tract. Similar cases involving other periorificial mucous membranes have been reported as well^{1,2}.

PCG is also often referred to as gingival plasmacytosis, idiopathic gingivostomatitis, or plasma cell mucositis. Irrespective of the nomenclature, characteristic histological findings are the same, with marked plasmacellular infiltration in the *lamina propria*. While the disease etiology is presently unclear, available evidence is indicative of a nonspecific inflammatory reaction to some exogenous antigen. Various food additives and preservatives along with artificial sweeteners found in candy, chewing gum and oral hygiene products are commonly cited as the likely causative factors³.

PCG is a benign condition and there is no evidence of association with the development of plasma cell neoplasm. But the clinical appearance of the disease may resemble leukemia infiltration, lichen planus, discoid lupus, pemphigoid and myeloma. Therefore, along with allergy testing, a diagnostic procedure requires hematological screening and histopathological examination⁴. The therapies offered vary and often fail to yield the desired therapeutic results. Even extensive allergen tests may not reveal the responsible allergen. Similarly, a drug treatment, in particular use of steroids, may prove ineffective⁵. Hence, for more severe cases surgical excision of the affected tissue is recommended.

Existing literature reports on the PCG cases with various potential etiologies and diverse clinical presentation. Familial propensity, to the best of our knowledge, has not been reported thus far. Searching the Medline database, we found 46 journal articles on PCG published between 1965 and 2015. No case described pertained to PCG diagnosed in family members. In this article, we presented a case of PCG characterized by nearly identical localization and clinical appearance, simultaneously present in two members of the same family – a brother and a sister.

Case report

Nine-year-old boy was brought to the clinic by his mother due to the gingival redness observed by her son's

dentist during a routine checkup. As she was unaware of this condition, and the boy had no complaints, she could not indicate when the redness occurred. The mother was alarmed by the fact that she subsequently noted almost the same lesion at virtually the same spot in her 11-year-old daughter's mouth, who she also brought in for an exam. According to her, both children were healthy, they had no allergies and did not take any prescription medications. The children reported that they were unaware of the disease onset; they also confirmed lack of any subjective complaints and could not indicate any potential cause of redness.

Extraoral examination did not reveal any specificities in either sibling. Intraorally, on the gingiva surrounding the upper right central incisor, fiery-red lesion with brighter red pinpoints, clearly demarcated from the surrounding tissue, was noted in both children. In the boy's case, the lesion was about 1 cm in diameter, flat and almost macular, affecting the attached gingiva only, while the one observed in his sister was larger, slightly elevated, and affected both attached and marginal gingiva (Figure 1). Based on the clinical appearance, age and general good health of both siblings, a preliminary diagnosis of PCG was established. It was explained to the mother that, in order to reach a final diagnosis, further tests would be needed. Also, it was stressed that it would be advisable to attempt to relate the gum redness with potential modifications in dietary or oral hygiene patterns because the condition like this could be a reaction to some food, especially candy, chewing gum or a toothpaste ingredient. Mother pointed out that the entire family had been using the herbal toothpaste for some time, while children regularly chew gum ("the stronger the better", in the words of her son). Based on these assertions, the patients were advised to discontinue the use of the herbal toothpaste as well as chewing gum consumption and were invited for a checkup in one week's time when blood work results and microbiology findings would be reviewed. At the subsequent visit, clinical picture remained unchanged. The swabs were negative for bacteria and fungi in both children while complete blood count and differential were normal. The children were scheduled for the next control visit after completing allergy and immunology testing.



Fig. 1 – a) A flaming-red sharply demarcated lesion on the anterior gingiva in two siblings: a 9-year-old boy, and b) 11-year-old girl.

After three weeks, at the next appointment, although the mother confirmed that the entire family no longer used herbal toothpaste and the children were adamant that they stopped chewing gum, clinical presentation was virtually unchanged, without visible signs of lesion regression. The allergy testing for the most common inhaled allergens (house dust, animal hair, feathers, tobacco, mould, bacteria, grass pollen, weed pollen and tree pollen) and the most frequent food allergens (chicken eggs, wheat flour, soya bean, peanut, fish-based products, carrot, cow's milk) were negative, with the normal total serum immunoglobulin E (IgE) levels. Other immunoglobins (IgG, IgM, IgA), complement (C3, C4), C-reactive protein (CRP), rheumatoid factor (RF), transferrin, ferritin, haptoglobin and serum protein electroforesis were also within the normal range. Similarly, auto-antibodies anti-nuclear antibodies (ANA), antimitochondrial antibodies (AMA), antiparietal cell antibodies (APCA), antineutrophilic cytoplasmic antibodies (ANCA), antismooth muscle antibodies (ASMA), and ANA on Hep2 cells) were negative for both siblings.

After the two-week treatment with topical 0.1% triamcinolone in orabase, which failed to yield any improvements, the excision biopsy was performed. The lesions were excised completely and specimens were sent for pathohistological analysis. Pathohistological findings revealed that excised portions of the mucous lining had the same morphological characteristics in both children and were comprised of mucous membrane fragments covered with stratified squamous epithelium with mild parakeratosis, with moderately elongated epithelial ridges. In both cases, the keratinocyte distribution and maturation was normal. The entire *lamina propria* was edematous and occupied with diffuse, heavy infiltrate of mature, well-formed plasma cells, with eccentric nuclei and homogeneous eosinophilic cytoplasm. In addition, moderate dilation of capillary blood vessels was noted (Figures 2 and 3). These pathohistological results supported the plasma cell gingivitis diagnosis.

At the assessments following surgery, both siblings were asymptomatic and free of lesions, including their last appointment six months after surgery. Unfortunately, they failed to attend subsequent follow-ups.

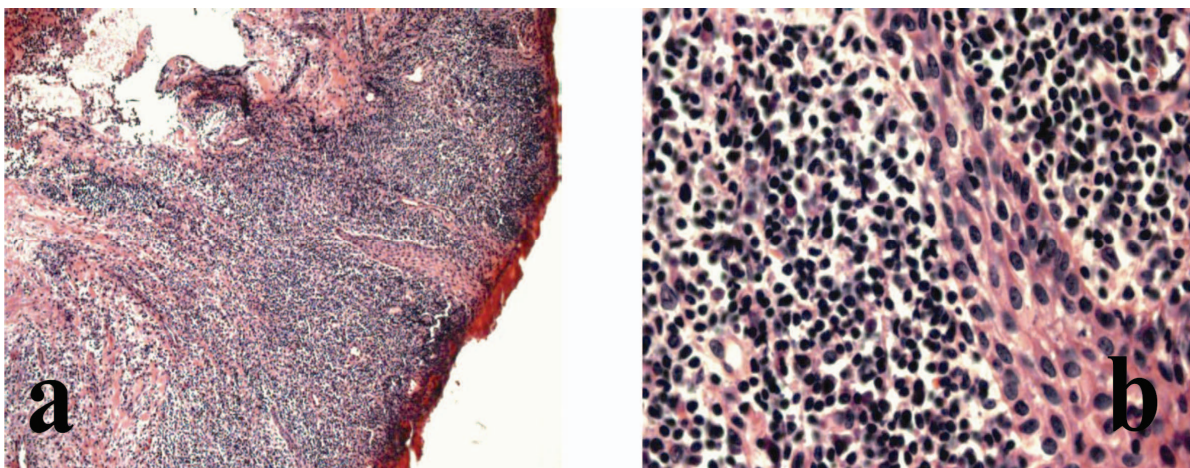


Fig. 2 – Histological findings in the boy: a) stratified epithelium with dense inflammatory infiltrate in the lamina propria hematoxyllin and eosin [(HE) $\times 50$]; b) Inflammatory infiltrate is composed mainly of mature plasma cells (HE $\times 400$).

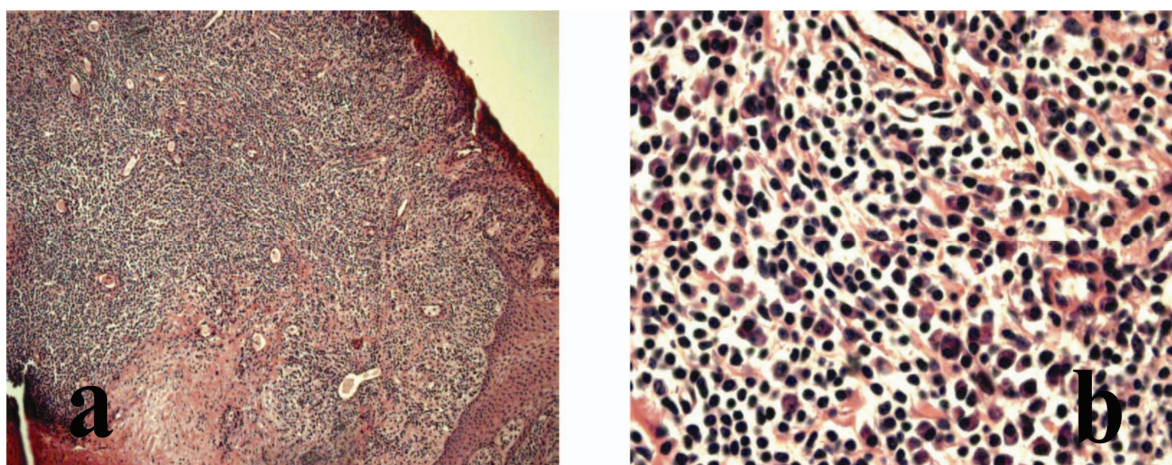


Fig. 3 – The same histological findings in the girl: a) stratified epithelium with dense inflammatory infiltrate in the lamina propria (hematoxyllin and eosin [(HE) $\times 100$]; b) Inflammatory infiltrate is composed mainly of mature plasma cells (HE $\times 630$).

Discussion

PCG has been reported in relevant literature since the 1960s. However, the disease etiology remains unclear. Early publications suggested allergic nature of this condition. In 1969, Owings speculated that the lesions were caused by an autoimmune response to certain anaerobic bacteria from gingival crevice⁶. Other causes like fungal infection, undetectable hormonal imbalance or decreased vitamin intake were also postulated. In 1971, Kerr et al.⁷ described eight PCG cases concomitant with cheilitis and glossitis, ascribing these to hypersensitive reaction to certain chewing gum ingredients. These authors noted that all patients were habitual gum chewers and all experienced marked improvements in the symptoms two weeks after abstaining from gum use, with complete lesion absence within one month from gum chewing cessation. In addition, the same authors reported that, in some patients, lesions reappeared after chewing gum for 15 minutes. Since then, other authors also reported similar cases, leading to the conclusion that PCG is likely an allergic reaction to various artificial sweeteners and preservatives, typically found in candy or chewing gum, but also present in toothpaste and mouthwash. Even though the allergen typically remains unidentified, many researchers cite cinnamon, clove, chili peppers and essential oils such as peppermint, spearmint and wintergreen as likely allergens⁸.

The case described here is noteworthy due to the fact that PCG in this case had familial occurrence, which is, to the best of our knowledge, the first case of its kind described in literature. Moreover it is unique due to the fact that the disease had almost the same appearance and affected the same gingival region simultaneously in two siblings. According to Sollecito and Greenberg⁹, three types of PCG are presently recognized; PCG caused by known allergens, neoplastic PCG, and PCG of unknown etiology. We postulate that, in our case, PCG is an allergic reaction to some chewing gum ingredient, even though we failed to establish that with certainty. Our hypothesis is based on the children self-reported penchant for chewing gum. Also, according to their mother, both siblings not only chewed gum at home, but they were also often reprimanded by their teachers for chewing gum during class. It is thus likely, even though refuted by the children, that they deposited the gum during the class in the fornix, rather than throwing it away, and resumed chewing in the intermission. While these are merely suppositions, they fit the clinical picture, given that the lesions had particular localization, were well-demarcated and indicative of contact-induced allergy. In addition, the habit of keeping chewing matter between the cheek or lip and gum is not unknown. It is particularly familiar with tobacco chewers who usually place tobacco in the sulcus where it is retained for several hours. In the existing literature, a PCG case was reported in an individual with propensity for chewing khat leaves which were frequently deposited in the sulcus resulting in mandibular gingiva and buccal mucosa reddening and swelling¹⁰. Our supposition is, however, countered by the fact that, in contact-induced allergy, similar changes would be

expected in the alveolar and upper lip mucosa as well. These regions were clinically healthy in both children examined in this work. Similarly, we would expect the lesions to disappear or at least regress once the children stopped chewing gum which did not occur. While it was noted that PCG may persist despite the elimination of the suspected allergens, it is also reasonable to question whether the siblings did indeed stop chewing gum as they so adamantly claim.

Burkhart⁸ emphasize that the term PCG is currently utilized when the histological picture is dominated by a mass of plasma cells, suggesting that this is indicative of a Type IV hypersensitive reaction that is not life threatening, but rather a delayed, cell mediated response. As PCG is a benign lesion, it is essential to exclude in the differential diagnosis other oral or systemic diseases with similar clinical manifestations and localisation. Comprehensive medical history, hematological analyses and immunological assays should be performed in order to exclude acute leukemia, multiple myeloma and lupus. Further diagnostic assessments should include diet history and allergen testing, as their findings can be indicative of causative factors. Elimination of other inflammatory conditions like desquamative gingivitis, lichen, or other dermatological disorders with oral presentation is often impossible without examining the tissue under the microscope^{2,10}.

Disease treatment varies, and there is presently no standardized protocol that clinicians should follow. Although allergen remains elusive in most cases, the first line therapy should commence with exclusion of all known potential allergens, as this may result in improvements in some cases. However, as with other recommended therapy modes, such measures often fail to yield satisfactory results. Also, oral hygiene improvements and professional periodontal care usually result in the reduction of the marginal gingivitis, without any beneficial effects on the attached gingiva. Moreover, antifungal therapy, even with the positive *Candida albicans* diagnosis as well as corticosteroid application, whether topical, intralesional or systemic, does not always produce improvements^{5,11}. Consequently, excision biopsy of the lesion, wherever applicable, including the case presented here, followed by histological analysis might be not only the best diagnostic approach, but also the most beneficial therapeutic option.

Conclusion

PCG is a rare condition, most likely allergic in nature. While being a purely benign, the clinical appearance and localization may mask much more detrimental conditions. Consequently, each such lesion requires due attention.

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