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Case Report

Histopathological Insights into Oral Pulse Granuloma: A Case Report of an Uncommon Palatal Lesion

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ABSTRACT:
Introduction: Pulse granuloma is a type of granulomatous reactive lesion often characterized by clusters of eosinophilic hyaline rings admixed with inflammation, and the oral and gastrointestinal regions being the common sites. The gingiva is the most prevalent location in the oral cavity, the little nodular lesion. Occasionally happens at unusual locations and sizes also. Pulse or hyaline ring granulomas are distinct oral and extraoral lesions caused by the cellulose component of plant meal insertion in contrast to starch components. It has been demonstrated that a distinct form known as reactive gingival growth exhibiting the histologic characteristics of oral pulse or hyaline ring granuloma (OPHRG) is the consequence of food particles of plant or vegetable origin being implanted into the periodontium. **Case Presentation:**This paper highlights the importance of clinical examination, relevant investigations, treatment provided, and its result in the case of a 71-year-old male patient who reported to the Department of Oral Pathology with the complaint of growth and bleeding in the palatal aspect of 27 for 3 month period that was diagnosed initially as benign soft-tissue growth. **Histopathology:** The histological examination revealed the unique presence of giant cells engulfing the foreign body, thus the diagnosis of hyaline ring/pulse granuloma was given. **Conclusion:** In this case report, we focused on the importance of histopathological importance in diagnosing hyaline ring/pulse granuloma.
Keywords: Pyogenic granuloma,exophytic growth,hyaline ring granuloma,pulse granuloma

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INTRODUCTION

Pulse granuloma is a distinct oral pathologic entity that was first identified by King in 1978. [1]He identified typical leguminous food particles included in this lesion and observed that both the particles and the granulomatous response they elicit are consistent with earlier reports of a similar disease in lung tissue brought on by aspiration.[2]Extraoral pulse granulomas are incredibly uncommon, frequently indicate severe pathology, and are easily confused for other conditions.

The initial description of the lesion was "chronic periostitis," due to the presence of so-called hyaline rings (HR), which are rings of palely eosinophilic structureless material with many multinucleated giant cells surrounding and within the rings. [3] Additionally, the lesion shared characteristics with other granulomas, including areas of fibrosis with mature fibroblasts, vacuolated macrophages, plasma cells, and lymphocytes. [4] Dunlap and Barker were the ones who first used the term "HR," believing that these structures were endogenous (hyaline degenerative alterations in the walls of blood vessels). [5] Lewars and a few other authors held the opposite opinion, believing that food particles of minuscule size were embedded in the mucous membrane and eventually found their way into the periosteum's submucous tissue, where they caused a reaction

similar to that of a foreign body.Following King's identification of the HRs as structures derived from pulse fragments—edible seeds of legumes—the lesion above is now known as an oral pulse, or hyaline ring granuloma (OPHRG). [6] In this article we described a case of oral pulse or hyaline ring granuloma (OPHRG), the initial clinical diagnosis as a reactive benign lesion, and the histopathological view that changed the diagnostic perspective.

Case presentation

A 71-year-old male patient reported to the Department of Oral Pathology OPD with a chief complaint of growth and bleeding in the upper left back tooth region for the past 3 months. The patient also presented with a gradual increase in the size of the swelling associated with mild pain and bleeding. The patient also revealed a history of diabetes and hypertension for the past 6 years and is under medication for the same.

Clinical findings

Intra-oral examination showed a solitary growth present in the palatal region of 27 measuring 2x2cm in size approximately and it is oval and there was no visible pulsation or secondary changes on palpation. (Figure 1) It was firm in consistency with pedunculated base with stalk attached to an interdental region of 27. Based on the above findings provisional diagnosis of Benign soft tissue growth in the palatal aspect of 27 was made.

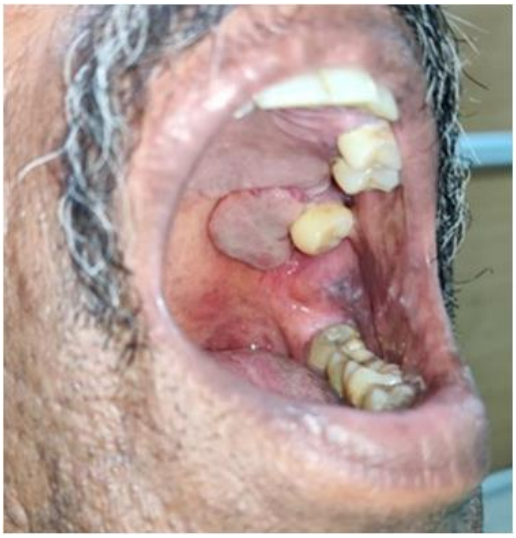

Fig 1 – Intraoral examination showing presence of lesion in the palate in relation to 27.

Histopathological assessment

Biochemical and hematological investigations were done, following which an excisional biopsy was performed was subjected to histopathological examination.The histopathology of the section shows epithelium and connective tissue. The epithelium is parakeratotic stratified squamous which is hyperplastic in some areas and stretched in few areas. The epithelium is ulcerated in a few areas and replaced by a pyogenic membrane. The connective tissue shows loosely to densely arranged collagen fibers, numerous blood vessels, endothelial cell proliferation, extravasated RBCs', and diffuse inflammatory cells infiltrate predominantly lymphocytes followed by plasma cells and few neutrophils. Few blood vessels also exhibit hematoxyphilic calcified thrombi-like structures. The section also shows a few multi-nucleated giant cells close to the pyogenic membrane with the nucleus randomly oriented in the cytoplasm of a few giant cells and the nucleus arranged near the cytoplasm like horseshoe-shaped manner in a few giant cells and one giant cell exhibits engulfed foreign body inside the cytoplasm. The pyogenic membrane on the surface exhibits microbial carriage and foreign bodies (vegetable matter). (Figure 2)

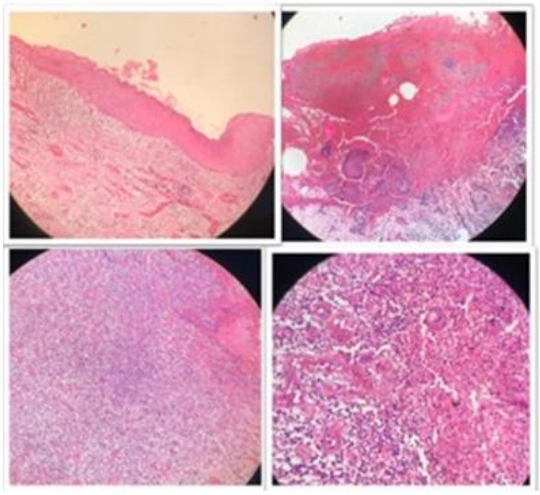

Fig 2-Histopathology demonstrating lining epithelium replaced by pyogenic membrane with microbial carriage and connective tissue with multinucleated giant cells and one giant cell engulfing the foreign body

Diagnosis and follow-up

A definitive diagnosis was made based on histopathological examination as oral pulse or hyaline ring granuloma (OPHRG). The patient was followed for 3 months. No recurrence was seen.

Informed consent: Written informed consent was obtained from the patient.

DISCUSSION

Oral pulse granuloma is a unique and relatively uncommon inflammatory lesion found in the oral cavity, primarily associated with the presence of foreign materials, particularly plant-derived food particles. This condition has captured the interest of dental and medical professionals due to its distinctive clinical presentation and histopathological features, which set it apart from other oral lesions. [7]

Lewars made the first formal description of oral pulse granuloma in the early 20th century. He identified it as an inflammatory lesion located in the buccal sulcus of a patient with a mandibular denture. This initial observation marked a significant milestone in dental pathology, as it linked the presence of oral lesions to foreign body reactions, particularly those involving food particles. [8] Over time, various terms were proposed for this condition, including "chronic mandibular periostitis," "hyaline body granuloma," and "giant cell angiopathy." [9] Ultimately, the term "oral pulse granuloma" was adopted due to its association with pulses—edible seeds or legumes—which are often implicated in its development.

As research progressed through the mid-20th century, clinicians began documenting numerous cases of oral pulse granuloma. These lesions were predominantly found in the posterior mandible, especially among edentulous patients or those with a history of dental treatments. Reports indicated that oral pulse granulomas often arose from retained food particles lodged in extraction sockets, deep periodontal pockets, or as complications following dental procedures. [8,10]

Histopathological studies conducted during this period revealed that oral pulse granulomas are characterized by irregular oval or spherical bodies surrounded by a connective tissue stroma rich in inflammatory cells, including giant cells. The identification of eosinophilic hyaline material—often forming concentric rings around the foreign material—became a key diagnostic feature. This histological understanding has been crucial for differentiating oral pulse granulomas from other similar lesions such as periapical cysts or tumors.[9-10]

The etiology of oral pulse granuloma has been the subject of considerable debate, leading to the development of two primary theoretical frameworks: the exogenous theory and the endogenous theory. Each theory offers a distinct perspective on the origins and mechanisms underlying this unique inflammatory lesion. The Exogenous Theory posits that the hyaline rings observed in these lesions result from foreign materials (such as pulses) penetrating the oral mucosa. This perspective emphasizes the role of external factors in triggering the inflammatory response characteristic of oral pulse granulomas. [11-12] Alternatively, the Endogenous Theory suggests that these rings arise from degenerative changes within blood vessel walls and collagen fibers. This perspective highlights intrinsic factors contributing to lesion formation. [13]

While both theories provide valuable insights into the pathogenesis of oral pulse granuloma, many researchers lean towards the exogenous theory due to its strong association with food particles and clear clinical manifestations. However, it is also acknowledged that endogenous factors may contribute to lesion development, particularly in cases where no identifiable foreign material is present.

Pulse granulomas, while most commonly associated with the oral cavity, have been identified in various other anatomical locations, including the gastrointestinal tract, lungs, and skin. The presence of these lesions in diverse sites highlights their nature as a foreign body reaction to plant materials, particularly those derived from legumes. [14]

In the gastrointestinal tract, they can occur in the colon and gallbladder, often mimicking malignancies due to their mass-like appearance; for instance, cases of colonic pulse granulomas have been reported where vegetable debris was found during examinations for unrelated conditions. [15] In the respiratory system, pulse granulomas may develop as a result of aspirated plant materials, presenting as pulmonary nodules with similar histological features to those seen in oral lesions. Additionally, these granulomas can manifest on the skin as subcutaneous nodules following trauma or foreign body implantation. [16] Rare instances have also been documented in the uterine tubes and nasal cavity. [16-17] Overall, the presence of pulse granulomas across diverse sites underscores their nature as a foreign body reaction primarily triggered by plant materials, highlighting the importance of accurate diagnosis and management to prevent misinterpretation as more serious conditions.

In recent years, a growing body of literature has focused on the clinical and histopathological features of oral pulse granuloma. A comprehensive review of 208 cases conducted by Swetha Acharya et al. highlighted that these lesions predominantly affect the mandible and are most commonly seen in individuals aged between 6 and 70 years. [7] The retrospective nature of many studies has underscored that oral pulse granulomas are often overlooked during initial diagnoses, particularly when associated with periapical lesions or odontogenic cysts. [6]

Additionally, contemporary research has emphasized the importance of accurate diagnosis to prevent mismanagement. Oral pulse granulomas can mimic more serious conditions, including malignancies, making histopathological examination critical for proper treatment planning. [18]

CONCLUSION

In conclusion, this case reinforces the need for heightened awareness among clinicians regarding oral pulse granuloma, emphasizing that while it is benign, its clinical presentation can be deceptive. Continued research into its etiology and pathogenesis is essential to enhance diagnostic accuracy and improve patient outcomes in similar cases.

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