

Unprecedented association: Enormous calculus concomitant with salivary gland tumor

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ABSTRACT

Calculus represents a mineralized form of bacterial plaque, commonly developing on natural tooth surfaces exposed to a continuous supply of saliva. The salivary composition significantly influences the degree of calculus formation in individuals, exerting a pivotal role in this aspect. Reduced salivary output elevates vulnerability to oral diseases. Numerous contributing elements might be associated with the development of significant calculus, potentially implicating the existence of a salivary gland tumor, notably related to the left parotid gland. This report stands as notable documentation of an extraordinary and infrequent occurrence of calculus formation associated with a salivary gland tumor, presenting an exceptional case within the scope of medical literature.

Keywords: Calculus, oral hygiene, periodontal disease, saliva, salivary gland tumor

Introduction

In primary care and preventive medicine, accurate diagnosis is vital for timely interventions, requiring thorough investigation and consideration of differential diagnoses. Recognizing minor findings during routine screenings offers insights into underlying health issues, underscoring the need for a comprehensive diagnostic approach to optimize patient care. Dental calculus, a mineralized form of plaque, acts as a site for plaque retention, contributing as a secondary factor to infectious periodontal disease.^[1] Supragingival calculus typically contains around 37% mineral content.^[2] Various factors, such as oral hygiene, dental

visits, diet, medications, salivary composition influenced by genetics, age, gender, and masticatory behaviors, contribute to its formation.^[3] Alkaline saliva and elevated urea concentration correlate with increased dental calculus formation.^[4] Decreased salivary flow, influenced by various physiological and pathological factors, contributes to heightened calculus formation. Conditions such as stress, radiation therapy, chemotherapy, salivary gland tumors, and systemic diseases can diminish salivary flow, increasing the risk of calculus formation.^[5] This case report highlights an unusual instance of significant dental calculus alongside a neoplasm affecting the left Parotid gland.

Case Report

A 45-year-old female patient presented with discomfort in the posterior maxillary region, accompanied by bleeding gums, halitosis, and chewing difficulties. Extraorally, an oval, indurated swelling measuring 3 × 2 cm was observed, extending from the

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left mandibular angle to the upper region of the ear's tragus for the past six months [Figure 1]. The swelling appeared non-tender with an unremarkable surface. The patient also displayed signs of debilitation and emaciation. The patient reported left-sided facial numbness and difficulty in mouth opening, along with a history of two decades of tobacco chewing and recent tooth extractions. Intraoral examination showed a firm mass extending from tooth #25 to #28, surpassing the mucogingival junction both buccally and palatally, reaching the hamular notch [Figure 2]. The mobile mass involving teeth #25 to #28 [Figure 3] exhibited generalized staining, calculus, and gingival recession. The radiographic assessment revealed a radiopaque mass involving tooth #28, generalized bone loss, multiple caries, and residual roots, leading to a provisional diagnosis of chronic generalized periodontitis with parotitis. Fine-needle aspiration cytology (FNAC) of the extraoral swelling indicated the presence of a benign salivary gland neoplasm with oncocytic differentiation. The axial MRI section indicated a multilobular hyperintense region within the left parotid gland, suggesting a potential neoplasm affecting the duct. Additionally, a notable hypodense area measuring 3 × 2 cm was observed within the left maxillary arch [Figure 4]. Consequently, the patient was referred to the Oral Surgery department for further assessment, including the possibility of parotidectomy. After routine investigations, phase I therapy began with Scaling and Root Planing (SRP), followed by extraction of the affected tooth and complete excision of the mass under local anesthesia. The mass, measuring approximately 3 cm × 1.06 cm, was removed, and concurrent oral hygiene measures were initiated. Histochemical and biochemical analysis of the specimen, along with salivary analysis, revealed the presence of calcium (41%), phosphates (17%), and calcium phosphate (71%), indicating the composition of dental calculus.

Discussion

Dental calculus, a calcified plaque, forms rapidly due to increased saliva pH and precipitated proteins, maturing within 14 days with peak mineralization hindered by mechanical wear, known as the “reversal phenomenon”.^[5,6] Extensive dental calculus, historically documented by Pierre Fauchard in the early 17th century, is now rare due to modern lifestyles, advanced dental care, and emphasis on oral hygiene.^[7] Cases of significant calculus, like Wilson's 1967 documentation of 3 cm × 2 cm,^[8] Borges Pereira *et al.*'s 2011^[9] report of a calculus mimicking neoplasm, and Chauhan *et al.*'s 2020^[10] case with dimensions of 4 cm × 3 cm, highlight exceptional instances. In this case, a large calculus measuring 3 cm × 1.06 cm in diameter was presented, alongside a discussion on the rare occurrence of salivary gland tumors, comprising 0.5 to 1.2% of all cancers and about 5% of head and neck malignancies.^[11] The World Health Organization (WHO) recognized 24 distinct malignant salivary gland cancers in 2005, with a slight tendency to occur more frequently in women, with a male-to-female ratio of around 1 to 1.5.^[12] Salivary gland cancer typically manifests as lumps or swelling in the mouth, cheek, jaw, or neck, alongside symptoms like numbness, pain, muscle weakness, and difficulty in mouth opening. Other indications include fluid drainage from the ear and swallowing difficulties.^[13]



Figure 1: An oval, indurated swelling measuring 3 × 2 cm extending from the left mandibular angle to the upper region of the ear's tragus



Figure 2: A firm mass extending from tooth #25 to #28, surpassing the mucogingival junction both buccally and palatally, reaching the hamular notch



Figure 3: A hard calculus mass measuring approximately 3 cm × 1.06 cm

For treatment, superficial parotidectomy is widely accepted as the standard approach for addressing both benign and malignant tumors located in the superficial lobe of the parotid gland.^[13]

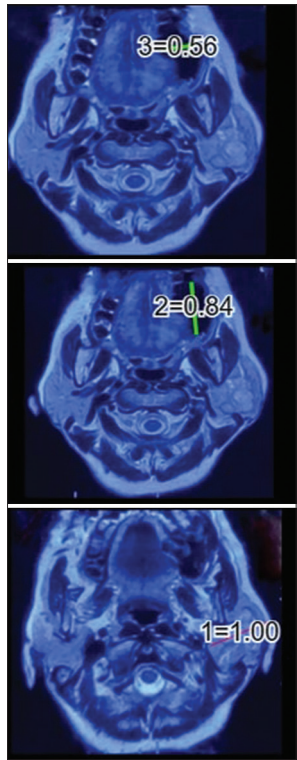


Figure 4: The axial section of the MRI showing the presence of a multilobular hyperintense region within the left parotid gland, indicative of a potential salivary gland neoplasm with a notable hypodense area was within the left maxillary arch measuring 3 × 2 cm

In this case, a patient with a two-decade history of tobacco chewing presented with chronic periodontitis resulting in extensive tooth loss. The notably high volume of calculus observed likely stemmed from a non-functional area in the mandibular posterior third quadrant due to missing teeth #34 to #38, which were not replaced with prosthetics. The patient's lack of utilization of the left side of the mouth potentially contributed to the unimpeded accumulation of such a substantial mass of calculus without hindrance. The presence of this sizable calculus mass posed significant challenges for the patient in maintaining oral hygiene, leading to further calculus formation and contributing to its current size. Also, the presence of a benign parotid neoplasm could potentially contribute to the substantial formation of calculus due to the resultant hypofunction of the parotid gland.

This hypofunction may lead to compromised glandular activity in the affected area, disrupting the usual cleansing action provided by saliva and thereby fostering significant calculus accumulation. Additionally, tenderness in the affected region might impede the patient's ability to perform adequate oral self-care measures, further exacerbating the situation.

Conclusion

This case report sheds light on an exceptional occurrence of an unusually large calculus deposition in the posterior maxillary region resembling a tumor. Such a unique presentation prompts consideration of factors such as salivary gland tumors,

especially near the left parotid gland. This report serves as a rare documentation of a substantial and atypical calculus formation associated with a salivary gland tumor, emphasizing the crucial role of meticulous examination and investigative procedures in achieving precise diagnosis within clinical practice.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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