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Clinicoradiographic Evaluation and Surgical Management of Verrucous Hyperplasia of the Mandibular Anterior Gingiva: A Case Report

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ABSTRACT

Verrucous hyperplasia (VH) is an uncommon oral potentially malignant disorder characterized by a verrucous or papillary exophytic proliferation of the oral epithelium without invasion into the underlying connective tissue. It is considered a precursor lesion to verrucous carcinoma and conventional oral squamous cell carcinoma, and therefore requires early recognition and appropriate management. VH is often associated with chronic local irritants such as poor oral hygiene, tobacco use, mechanical irritation, and persistent inflammatory stimuli.

This case report describes a 41-year-old female who presented with a painless gingival growth in the mandibular anterior region that had been present for one month. The patient also reported a sensation of heaviness in the left maxillary posterior region. Clinical examination revealed a well-defined exophytic growth on the gingiva in relation to the mandibular anterior teeth, with a verrucous surface texture. The lesion was firm in consistency and non-tender on palpation. Considering the clinical features, differential diagnoses included verrucous hyperplasia, verrucous carcinoma, and other reactive gingival lesions. An excisional biopsy was performed under local anaesthesia, and the specimen was submitted for histopathological evaluation. Microscopic examination demonstrated hyperplastic stratified squamous epithelium with elongated rete ridges and surface keratinization, along with epithelial dysplastic changes confined predominantly to the superficial epithelial layers. Importantly, there was no evidence of epithelial invasion into the underlying connective tissue, confirming the diagnosis of verrucous hyperplasia.

The lesion was managed through complete surgical excision along with elimination of local etiological factors and improvement of oral hygiene measures. The patient was placed on periodic follow-up to monitor for recurrence or malignant transformation. Early diagnosis, histopathological confirmation, and prompt surgical management are critical in preventing the progression of verrucous hyperplasia to invasive carcinoma.

Keywords: Verrucous hyperplasia; Oral potentially malignant disorder; Gingival growth; Epithelial dysplasia; Surgical excision; Case report; Oral pathology

INTRODUCTION

Verrucous hyperplasia (VH) is a distinct clinicopathological entity of the oral mucosa that is widely recognized as a potentially malignant disorder and a precursor lesion to verrucous carcinoma as well as conventional oral squamous cell carcinoma [1,2]. First described by Shear and Pindborg, verrucous hyperplasia represents a proliferative epithelial lesion characterized by an exophytic, verrucous, or papillary surface architecture. Clinically, the lesion often appears as a well-demarcated, white or whitish-pink growth with a rough, warty surface that may resemble verrucous carcinoma or other proliferative epithelial lesions of the oral cavity [3,4].

Clinical and radiographic evaluation plays an important role in the comprehensive assessment of oral potentially malignant disorders such as verrucous hyperplasia. Clinically, these lesions often present as well-defined exophytic growths with a verrucous or papillary surface texture, commonly appearing as white or whitish-pink proliferative lesions on the oral mucosa. Although verrucous hyperplasia primarily involves the epithelial surface, radiographic imaging is often performed to evaluate the underlying bone structures and to rule out associated bony involvement or other pathological changes. Conventional radiographic techniques, such as intraoral periapical radiographs, orthopantomograms, and advanced imaging modalities, including cone-beam computed tomography (CBCT) may assist in identifying bone loss, periodontal destruction, or other structural abnormalities that may contribute to the lesion or influence treatment planning.

Therefore, a combined clinical and radiographic approach is essential for accurate diagnosis and appropriate management of such lesions (26-29) VH most frequently involves the gingiva, alveolar ridge, buccal mucosa, and palate, although it may occur in any region of the oral mucosa. The lesion is typically slow-growing and may remain asymptomatic for extended periods, leading to delayed clinical presentation. Histopathologically, verrucous hyperplasia is characterized by marked epithelial hyperplasia with hyperkeratosis and parakeratosis, elongated rete ridges, and varying degrees of epithelial dysplasia. Importantly, the proliferating epithelium remains confined above the level of the adjacent normal mucosa, without evidence of invasion beyond the basement membrane into the underlying connective tissue, which serves as a key distinguishing feature from verrucous carcinoma [5,6].

The aetiology of verrucous hyperplasia is multifactorial and has been strongly associated with chronic local irritants and long-standing inflammatory stimuli. Contributing factors include poor oral hygiene, plaque accumulation, calculus deposition, mechanical irritation from ill-fitting prostheses or restorations, and deleterious habits such as tobacco chewing, smoking, and betel quid consumption [7-9]. Persistent epithelial irritation may promote abnormal epithelial proliferation and dysplastic changes, thereby increasing the risk of malignant transformation.

The presence and severity of epithelial dysplasia within verrucous hyperplasia are considered important prognostic indicators. Several studies have reported that lesions exhibiting moderate to severe dysplastic changes possess a higher likelihood of progression to verrucous carcinoma or conventional oral squamous cell carcinoma if left

untreated [10-12]. Therefore, early recognition and histopathological confirmation are crucial in preventing disease progression and ensuring appropriate management.

Although verrucous hyperplasia and verrucous carcinoma share several clinical and morphological similarities, the two entities can be distinguished histologically. VH demonstrates epithelial proliferation that remains superficial and does not invade the underlying connective tissue, whereas verrucous carcinoma exhibits broad pushing rete ridges that extend into the connective tissue stroma [13-15]. Accurate differentiation between these lesions is essential because their biological behaviour, treatment approach, and prognosis differ significantly.

Surgical excision with adequate margins remains the gold standard treatment for verrucous hyperplasia. Removal of associated etiological factors, improvement of oral hygiene, and regular follow-up examinations are essential components of management to minimize recurrence and monitor for possible malignant transformation [16-21]. Furthermore, recent literature highlights the importance of careful clinicopathological correlation and adherence to standardized diagnostic and reporting criteria to ensure accurate diagnosis and optimal patient outcomes [22-25].

The present case report describes a rare presentation of verrucous hyperplasia occurring in the mandibular anterior gingival region of a middle-aged female patient. The clinical presentation, histopathological findings, surgical management, and follow-up outcomes are discussed to emphasize the importance of early diagnosis and timely intervention in preventing malignant transformation.

CASE REPORT

A 41-year-old female patient presented to the Department of Oral and Maxillofacial Surgery with a chief complaint of a growth in the lower anterior tooth region that had been present for approximately one month. The patient reported that she initially noticed the lesion while chewing food, after which it gradually increased in size. The growth was painless but caused mild discomfort during mastication. In addition, the patient reported a sensation of heaviness in the left maxillary posterior region for the past 20 days. The patient's dental history revealed previous tooth extraction, and she had been edentulous in the right mandibular posterior region for approximately two years due to aggressive periodontitis that had resulted in progressive periodontal destruction and tooth loss. No significant systemic medical history was reported, and the patient was not under any long-term medication.

On intraoral examination, a localized exophytic growth was observed in the mandibular anterior gingival region. The lesion appeared well-defined with a verrucous and papillary surface texture. The growth was firm in consistency, non-tender on palpation, and did not exhibit bleeding. The surrounding gingival tissues showed mild inflammatory changes along with plaque accumulation. Based on the clinical presentation, a provisional diagnosis of verrucous hyperplasia was considered. Differential diagnoses included verrucous carcinoma, squamous papilloma, and inflammatory gingival enlargement.

Radiographic evaluation was performed as part of the diagnostic workup to assess the underlying osseous structures and periodontal condition. Intraoral periapical radiographs of the mandibular anterior region revealed significant periodontal bone loss associated with teeth 31, 32, 41, and 42, which corresponded with the patient’s history of aggressive periodontitis. No evidence of cortical bone destruction or intraosseous pathology related to the soft tissue lesion was observed. The radiographic findings supported the clinical impression that the lesion was confined to the

soft tissue structures without bony involvement. Radiographic assessment was therefore helpful in determining the extent of periodontal compromise, confirming the absence of invasive bony pathology, and assisting in treatment planning, including the decision to extract the periodontally compromised teeth.

Figure 1: Clinical presentation showing an exophytic growth in the mandibular anterior gingival region.

After completion of clinical and radiographic evaluation, the patient was scheduled for surgical management. Written informed consent was obtained before the procedure. The surgical area was prepared under strict aseptic conditions. The patient was positioned comfortably in a dental chair, and the surgical field was disinfected using povidone-iodine solution. Local anaesthesia was administered using 2% lignocaine hydrochloride with adrenaline (1:80,000) through local infiltration around the lesion to achieve adequate anaesthesia and provide vasoconstriction for better haemostasis.

Once profound anaesthesia was achieved, the lesion was carefully examined and outlined. An elliptical incision was planned around the lesion to ensure complete excision along with a margin of surrounding healthy tissue, thereby reducing the risk of recurrence. Using a sterile No. 15 surgical blade mounted on a Bard-Parker handle, the incision was made along the planned outline. The incision was extended through the mucosal layer down to the periosteum, maintaining uniform depth and precision. Care was taken to avoid injury to adjacent tissues and structures.

Figure 2: Surgical site following extraction of teeth 31, 32, 41, and 42.

Following the incision, the lesion was gently dissected and excised in a full-thickness manner. Tissue forceps and surgical scissors were used to facilitate careful separation of the lesion from the surrounding tissue. Throughout the procedure, delicate tissue handling was maintained to preserve the integrity of the specimen and prevent fragmentation. Once the lesion was completely excised, the surgical specimen was immediately placed in a container containing 10% buffered formalin and sent to the pathology laboratory for histopathological evaluation.

After removal of the lesion, the underlying tissue bed was thoroughly curetted using a surgical curette to remove any residual epithelial remnants and eliminate local irritants such as plaque and calculus that may have contributed to the development of the lesion. During the same procedure, teeth 31, 32, 41, and 42 were extracted due to their poor periodontal prognosis and advanced periodontal involvement. Extraction sockets were gently curetted to remove granulation tissue and irrigated with sterile saline solution.

Figure 3: After removal of the lesion, the image shows the exposed bone and sockets of 32,31,42,41.

The surgical site was then thoroughly irrigated with sterile saline to remove debris and ensure a clean wound surface. Haemostasis was achieved primarily through pressure application using sterile gauze. In areas where minor bleeding persisted, electrocautery was utilized to achieve effective haemostasis. Once adequate haemostasis was obtained, the wound margins were approximated using interrupted sutures with 3-0 silk suture material to promote primary closure and facilitate proper healing.

Figure 4: Electrocautery used to achieve haemostasis during the surgical procedure.

Following suturing, a periodontal dressing was placed over the surgical site to protect the wound from mechanical irritation and enhance patient comfort during the postoperative healing period. Postoperative instructions were provided to the patient, including maintenance of proper oral hygiene, avoidance of trauma to the surgical site, and adherence to a soft diet for several days. The patient was advised to use chlorhexidine mouthwash to maintain oral cleanliness and reduce the risk of infection. Analgesics and antibiotics were prescribed to manage postoperative pain and prevent infection.

The patient was recalled after one week for suture removal and evaluation of healing. The surgical site showed satisfactory healing without signs of infection or complications.

Figure 5: Postoperative view showing closure of the surgical site using 3-0 silk sutures.

Long-term follow-up was advised to monitor the patient for any recurrence of the lesion or potential malignant transformation.

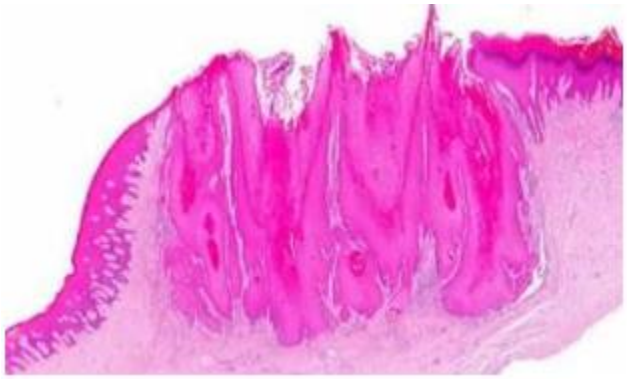

Figure 5: Histopathological section showing hyperplastic stratified squamous epithelium with papillary projections consistent with verrucous hyperplasia (H&E stain).

Histopathological examination of the excised specimen revealed hyperplastic stratified squamous epithelium with papillary projections and surface keratinization. Dysplastic changes such as nuclear hyperchromatism and cellular pleomorphism were observed predominantly in the upper one-third of the epithelium. The underlying connective tissue stroma consisted of loosely arranged collagen fibers with numerous fibroblasts. A chronic inflammatory infiltrate composed predominantly of lymphocytes and neutrophils was also observed. Multiple endothelial-lined blood vessels containing red blood cells were evident within the connective tissue. Importantly, there was no evidence of epithelial invasion into the underlying connective tissue stroma. Based on these findings, a definitive diagnosis of verrucous hyperplasia was established.

DISCUSSION

Verrucous hyperplasia (VH) is widely regarded as an early lesion within the spectrum of verrucous carcinoma and conventional oral squamous cell carcinoma, highlighting the importance of early recognition and appropriate management [1,2,16]. VH represents a proliferative epithelial lesion characterized by exophytic growth and a verrucous or papillary surface architecture. Although the clinical appearance may resemble other proliferative lesions of the oral cavity, its biological behaviour and potential for malignant transformation make it a significant entity in oral pathology. Early identification of such lesions is crucial because delayed diagnosis may allow progression to more aggressive forms of oral malignancy.

Clinically, verrucous hyperplasia most commonly affects the buccal mucosa, gingiva, alveolar ridge, and palate, often presenting as a well-defined white or whitish-pink verrucous growth [3,4]. In the present case, the lesion was located in the mandibular anterior gingival region, which represents a relatively uncommon site for VH compared with the more frequently reported posterior regions of the oral cavity. The lesion exhibited a characteristic exophytic verrucous appearance and was firm, non-tender, and slow-growing, which is consistent with previously reported clinical features of verrucous hyperplasia. Clinical and radiographic assessments together play a critical role in the evaluation of oral potentially malignant disorders. While verrucous hyperplasia is primarily a mucosal lesion and does not typically demonstrate radiographic changes, imaging is valuable in assessing the status of the underlying bone and identifying associated periodontal or inflammatory conditions. Radiographic findings may reveal periodontal bone loss, alveolar bone resorption, or other dental pathologies that may contribute to chronic irritation and lesion development. Advanced imaging techniques such as CBCT can further aid in evaluating subtle bone changes and determining the precise anatomical extent of oral lesions when required. Therefore, clinicoradiographic correlation remains an essential component of diagnosis, allowing clinicians to rule out invasive malignancy, plan appropriate surgical intervention, and monitor the patient during follow-up [26-30].

Histopathological examination remains the gold standard for definitive diagnosis, as clinical features alone are often insufficient to distinguish verrucous hyperplasia from verrucous carcinoma or other proliferative epithelial lesions [5,13,14]. A key histological feature that differentiates VH from verrucous carcinoma is the absence of epithelial invasion into the underlying connective tissue. In verrucous carcinoma, the epithelium demonstrates broad, pushing rete ridges that extend into the connective tissue stroma, whereas in verrucous hyperplasia, the proliferative epithelium remains confined above the level of the adjacent normal epithelium. In the present case, histopathological

analysis revealed hyperplastic stratified squamous epithelium with papillary projections and dysplastic changes confined to the superficial epithelial layers. The absence of invasion into the connective tissue confirmed the diagnosis of verrucous hyperplasia.

The presence and degree of epithelial dysplasia are considered important indicators of malignant potential. Dysplastic alterations such as nuclear hyperchromatism, cellular pleomorphism, and architectural disturbances suggest increased epithelial activity and a risk for malignant progression [10-12]. In the present case, dysplastic changes were limited to the upper one-third of the epithelium, indicating an early stage of disease with a favourable prognosis when treated appropriately. Early-stage lesions with superficial dysplasia are generally associated with better clinical outcomes following surgical intervention.

The aetiology of verrucous hyperplasia is multifactorial and is frequently associated with chronic irritation and long-standing inflammatory stimuli within the oral cavity [7-9]. Local factors such as plaque accumulation, calculus deposition, trauma from ill-fitting prostheses, and previous dental procedures may contribute to persistent epithelial stimulation and abnormal proliferative changes. In the present case, the patient had a history of aggressive periodontitis and previous tooth extractions, which may have contributed to chronic local irritation in the oral cavity. Poor periodontal status and plaque accumulation in the mandibular anterior region could have acted as additional predisposing factors in the development of the lesion.

Surgical excision remains the treatment of choice for verrucous hyperplasia and is considered the most reliable approach to prevent progression and recurrence [19,20]. Complete removal of the lesion with adequate margins allows both definitive treatment and histopathological confirmation of diagnosis. In addition, elimination of local etiological factors such as plaque, calculus, and periodontal infection is essential in preventing recurrence. In the present case, complete surgical excision of the lesion was performed along with extraction of periodontally compromised teeth and thorough curettage of the underlying tissue bed to remove potential sources of chronic irritation.

Failure to eliminate etiological factors or incomplete removal of the lesion may lead to recurrence or progression to verrucous carcinoma or squamous cell carcinoma. Therefore, long-term follow-up is considered an essential component of patient management [17,18,21]. Regular clinical examinations allow early detection of any recurrence or malignant transformation. The present patient was placed under periodic follow-up to ensure proper healing and to monitor for any signs of recurrence.

Recent literature also emphasizes the importance of standardized reporting and adherence to clinical and pathological diagnostic guidelines in the management of oral potentially malignant disorders [22-25]. Accurate clinicopathological correlation, detailed documentation of clinical findings, and careful histopathological evaluation are essential for appropriate diagnosis and treatment planning. Such standardized approaches contribute to improved patient outcomes and facilitate better comparison of clinical findings across different studies.

CONCLUSION

Verrucous hyperplasia is a clinically significant oral potentially malignant disorder that requires prompt recognition and appropriate management to prevent progression to invasive malignancy. Although it may resemble other

proliferative lesions of the oral cavity, careful clinicopathological evaluation is essential to establish an accurate diagnosis. The present case highlights the importance of early diagnosis, thorough surgical excision, and elimination of local etiological factors in achieving favorable clinical outcomes. Additionally, long-term follow-up plays a crucial role in monitoring for recurrence and detecting any early signs of malignant transformation. Increased awareness among clinicians and timely intervention can significantly reduce the risk of disease progression and improve overall patient prognosis.

ETHICAL STATEMENT

Written informed consent was obtained from the patient before treatment and publication of this case report. All necessary measures were taken to maintain patient confidentiality and anonymity throughout the preparation of this manuscript. The study was conducted in accordance with accepted ethical standards and institutional guidelines for clinical research and case reporting. No external funding or financial support was received for this study, and the authors declare no conflict of interest related to the publication of this case report.

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