VER
Vascular & Endovascular Review

Early Detection and Multidisciplinary Management of Gingival Squamous Cell Carcinoma in a Young Adult

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ABSTRACT

Gingival squamous cell carcinoma (GSCC) is an uncommon and aggressive tumour that usually leads to a clinical picture, which closely resembles various inflammatory diseases of the periodontium, thereby posing a diagnostic challenge and may further compromise the patient's prognosis. In this report, we present a 32-year-old male patient with GSCC and underscore the importance of timely diagnosis and close monitoring in the management of the disease. The patient was a male who came with a complaint of pain and swelling in the mandibular right posterior region, which was suggestive of Periodontal inflammation. Histological examination of prompt biopsy confirmed squamous cell carcinoma, which was well differentiated. A complete management plan was adopted, namely, partial mandibulectomy, radiotherapy, and chemotherapy and the patient improved greatly one year after the diagnosis. This case again raises the possibility of malignancy in chronic gingival swellings and underlines the value of early management in GSCC.

KEYWORDS: Gingival Squamous Cell Carcinoma, Early Diagnosis, Mandibular Neoplasm, Oral Cancer Management, Young Adult Malignancy

How to Cite: Dr. Rachita Arora, Dr. Anchal Sood, Dr. Swantika Chaudhry, Dr. Jaspinder Kaur, Dr. Shally Suri, (2025) Early Detection and Multidisciplinary Management of Gingival Squamous Cell Carcinoma in a Young Adult, Vascular and Endovascular Review, Vol.8, No.16s, 356-363.

INTRODUCTION

Gingival squamous cell carcinoma (GSCC) is among the most aggressive forms of oral cancer and accounts for approximately 10% of all oral squamous cell carcinomas [1]. This translates to roughly 37,700 new cases annually worldwide, given the global oral cancer incidence of 377,000 cases per year. While relatively uncommon in global statistics, GSCC represents a significant proportion of oral cancers in the Indian subcontinent [2], where it constitutes 15-20% of oral malignancies compared to only 6-10% in Western countries. This indicates regional variation, and hence, it is paramount to appreciate the geographical and demographical variations in GSCC prevalence. Although less common, GSCC has specific diagnostic and therapeutic implications since it may mimic other types of benign inflammatory conditions of the periodontal tissues [2]. The conditions are mainly similar to other general oral diseases, patients are generally misdiagnosed, and the outcome is generally poor [3].

Unlike some other forms of oral cancer, GSCC shows a weaker association with conventional risk factors such as smoking and alcohol consumption [4]. While tobacco and alcohol remain the primary risk factors for oral squamous cell carcinoma in general, the etiology of GSCC specifically is not yet well established [4]. This differential risk profile highlights the unique pathogenesis of GSCC compared to other oral cavity malignancies. It chiefly occurs in the mandible and has a preference for the molar area of the jaw [5]. GSCC is often diagnosed at a late stage because of its nonspecific symptoms, which can include simple ulcers to more aggressive, exophytic lesions [6]. All these factors

together explain the differences in the five-year survival rates in GSCC as compared to squamous cell carcinomas at other sites in the oral cavity [7].

The diagnosis and treatment of GSCC at an early stage are important for better prognosis of the patients [8]. Therefore, this goal can only be met if dental personnel, who are usually the first to encounter patients with oral lesions, have a high level of suspicion [9]. The role of malignancy in the differential diagnosis of persistent gingival swelling should not be over-emphasized, especially in patients who may not fall in the usual risk group for oral cancer [10].

The current case report describes the experience of a 32-year-old male with GSCC, highlighting the importance of early intervention in improving the prognosis. In this report, we propose a diagnostic process, treatment, and follow-up care of GSCC to stress the importance of early recognition and management of the condition [11]. We also want to prove that if the intervention is done early and properly, positive outcomes may be obtained even in the cases that are considered to be critical [12, 13].

We hope to contribute to the current body of knowledge on GSCC and optimistically, improve future patient outcomes through increasing awareness on timely diagnosis and management [14, 15]. The management of GSCC includes surgery, radiotherapy and chemotherapy is a clear indication that GSCC is not an easy disease to manage and that an integrated approach is required [16, 17].

CASE PRESENTATION

Patient Information and Chief Complaint

A 32-year-old male patient was referred to the Department of Periodontology and Oral Implantology, Baba Jaswant Singh Dental College Ludhiana, Punjab, with a complaint of pain and swelling in the lower right posterior jaw. The patient reported these symptoms to have started about six months ago. He said that the pain was spontaneous and constant, very intense (though no standardized pain score was recorded), which worsened with touch and eating, which also lead to stopped brushing in the affected area and was only slightly relieved by paracetamol.

Medical History

Upon taking a detailed medical history, it was revealed that the patient had a 10-year history of tobacco chewing, specifically consuming approximately 5-6 packets of gutka (tobacco with betel nut and slaked lime) daily. He denied any history of alcohol consumption. Additionally, he had recently completed multidrug therapy (MDT) for Hansen's disease (leprosy) six months prior to his dental visit. Hansen's disease is a chronic infectious condition caused by Mycobacterium leprae that primarily affects the peripheral nerves, skin, upper respiratory tract, eyes, and mucous membranes. The patient had been diagnosed with the multibacillary form of the disease two years earlier, requiring the standard WHO-recommended 12-month MDT regimen. The MDT regimen included dapsone, rifampicin, and clofazimine—medications not typically associated with significant periodontal implications, though clofazimine is known to cause skin discoloration as a side effect. At the time of presentation, the patient exhibited hyperpigmented and hypopigmented lesions over his body, likely residual effects of both his previous condition and the clofazimine therapy. The patient reported no sensory deficits in his oral cavity, which can sometimes occur in advanced cases of Hansen's disease.

Clinical Examination

Intraoral examination revealed a significant swelling on both the buccal and lingual aspects of teeth 44 to 47, extending from the mesial aspect of tooth 44 to the distal aspect of tooth 47. The gingival lesion appeared erythematous with speckled, non-scrapable white patches. The surface of the lesion was eroded and ulcerated. On palpation, the lesion felt firm to hard, with a fixed broad base.

Figure 1: *Clinical picture showing severely inflamed and ulcerated gingiva on the buccal and lingual aspect of teeth #44 to #47*

Note. Clinical photograph showing erythematous, ulcerated gingival lesion with white patches on the buccal and lingual aspects of teeth #44 to #47, illustrating the initial presentation of the gingival squamous cell carcinoma.

Initial Investigations

Given the clinical presentation and the patient's complex medical history, a series of investigations were initiated. An intraoral periapical radiographic examination revealed moderate horizontal bone loss in relation to teeth 44 to 47. Routine blood investigations showed an elevated erythrocyte sedimentation rate (ESR) of 52 mm/hr and a low platelet count of 98,000/µL. These hematological abnormalities required careful interpretation as they could reflect either the gingival pathology, residual effects of Hansen's disease, or potential side effects of the recently completed MDT, particularly dapsone which can cause thrombocytopenia. In light of these findings, the patient was referred to a physician for further evaluation before proceeding with definitive diagnosis.

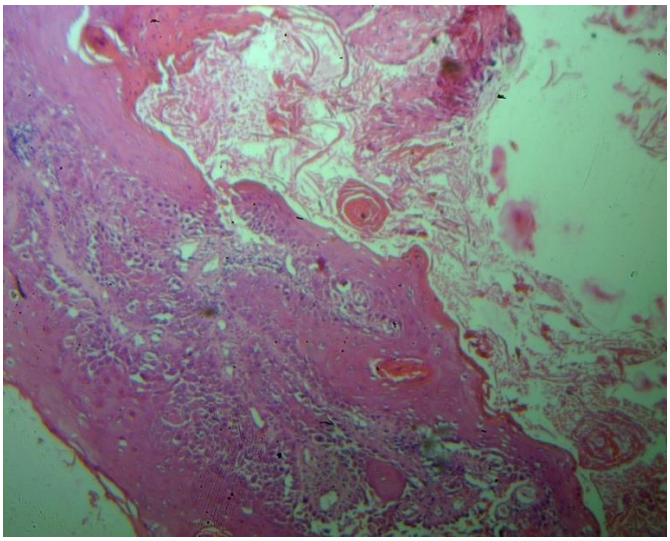
Table 1: *Initial Laboratory Findings*

Parameter	**Patient Value**	**Reference Range**
ESR	52 mm/hr	0-15 mm/hr
Platelet Count	98,000/µL	150,000-450,000/µL
Hemoglobin	13.2 g/dL	13.5-17.5 g/dL
Total WBC Count	7,800/µL	4,000-11,000/µL
HBsAg	Negative	Negative
Anti-HCV	Negative	Negative
HIV	Negative	Negative

Advanced Investigations (at PGI Chandigarh)

After the blood parameters of the patient were normal and with the permission of the physician, an incisional biopsy of the lesion was carried out. Histological examination of the biopsy sample demonstrated that the squamous epithelium had full thickness dysplasia. The subepithelium had a moderate acute and chronic inflammatory cell infiltrate and fibrosis. Importantly, keratin pearls were identified throughout the section. These findings supported the clinical and radiographic diagnosis of well-differentiated squamous cell carcinoma of the gingiva.

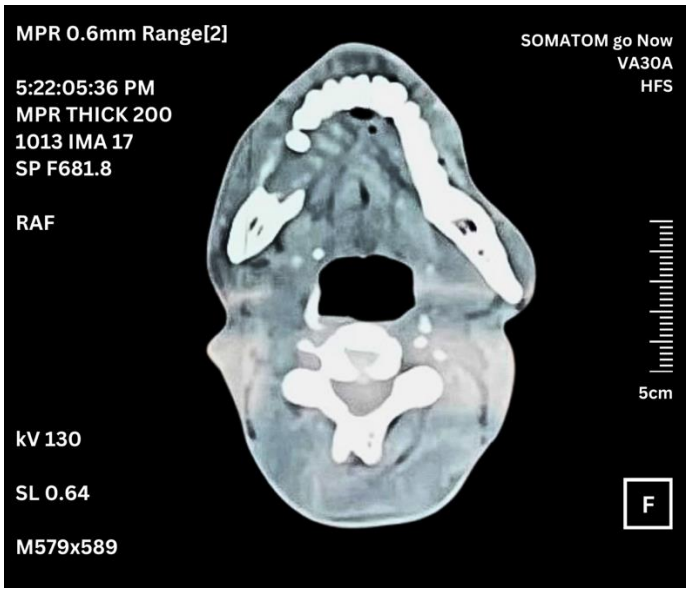
Figure 2: *Histopathological section shows gingival squamous cell carcinoma*



Note. Histological examination showed the presence of dysplastic squamous epithelium with keratinisation and inflammatory infiltrate, which was consistent with well-differentiated squamous cell carcinoma.

Following this diagnosis, the patient was promptly referred to the Oncology Department at PGI Chandigarh for comprehensive management. At PGI, a series of additional investigations were conducted to determine the extent of the disease. A chest X-ray (PA view) was performed, which appeared normal with no evidence of metastases. A 256-slice CT scan from the base of the skull to T4 revealed thickening of the right buccal mucosa and gingivobuccal sulcus, with erosion of the underlying mandible.

Figure 3: *Axial CT scan demonstrating right gingivobuccal sulcus thickening with mandibular erosion at the level of posterior teeth (#44-47), showing the primary tumor's infiltrative pattern.*



The image shows abnormal soft tissue thickening and density changes in the right gingivobuccal region with associated bone destruction, which represents the gingival squamous cell carcinoma's local invasion.

To further confirm the diagnosis and assess the extent of the disease, multiple biopsy specimens were taken, including samples from the mucosa, soft tissue margins, lymph nodes at various levels (1A, 1B, 2A, 2B, 3), submandibular gland, fibrofatty tissue, and buccal fat. The histopathological examination of these specimens was in accord with the

preliminary diagnosis of squamous cell carcinoma. Based on these comprehensive investigations, the final TNM staging was determined to be pT2N0Mx.

TREATMENT

As a result of the widespread and severity of the disease, a comprehensive treatment plan was used. The surgical treatment performed included partial mandibulectomy with autogenous bone grafting harvested from the patient's anterior iliac crest. This donor site was selected for its adequate volume of corticocancellous bone required for mandibular reconstruction. After surgery, the patient underwent adjuvant radiotherapy in the form of external beam radiation therapy (EBRT) for five weeks, given on a daily basis for five consecutive days a week. Also, the treatment involved chemotherapy through intravenous drips of Cisplatin (75mg) and five-fluorouracil (750mg) every month for four consecutive months.

Follow-up and Outcomes

Following treatment completion, the patient has been monitored with regular follow-up examinations at three-month intervals at both our center and PGIMER, Chandigarh, India-160012. At the time of this report, one year has elapsed since treatment completion. The patient remains in good health with multiple positive outcome parameters including: no pain or discomfort in the surgical area, absence of any visible or palpable lesions, normal oral mucosa with adequate healing, no lymphadenopathy, normal blood parameters (hemoglobin 13.8 g/dL, WBC count 7,200/µL, platelet count returned to normal at 165,000/µL), and negative imaging studies (CT scan) showing no evidence of local recurrence or metastasis. Although, as a consequence of the partial mandibulectomy, the patient experiences mild dysphagia, which is being managed through dietary modifications (soft food diet), swallowing exercises prescribed by a speech therapist, and postural adjustments during eating. These conservative management strategies have resulted in gradual improvement in the patient's swallowing function with increased ability to consume a wider variety of foods.

Figure 4: *Post-operative image showing healing following partial mandibulectomy with autogenous bone grafting*

Note. The surgical treatment performed included partial mandibulectomy with autogenous bone grafting.

This case illustrates the value of raising suspicion and initiating aggressive, coordinated treatment for patients with gingival squamous cell carcinoma. It also highlights the importance of the dental practitioner to have a high level of suspicion for malignancy in any persistent gingival lesion, including the young population, particularly those in their third and fourth decades of life (20-40 years) who may have additional risk factors such as tobacco use, despite their younger age.

DISCUSSION

This case of GSCC in a 32-year-old male has many interesting features which can be discussed in relation to current literature and clinical practice. This case highlights the diagnostic difficulties of GSCC and the need for early recognition and aggressive, coordinated multidisciplinary management to enhance the prognosis of the affected patients.

A notable aspect of this case is the patient's relatively young age of 32 years, which is atypical for GSCC presentation, as this malignancy primarily affects older individuals in the fifth to seventh decades of life [17, 18]. Dhanuthai et al. [19] pointed out that OSCC, including GSCC, is most frequent in the fifth to seventh decade of life. The fact that our patient is a young adult male underlines the importance of the clinician considering malignancy in the diagnosis of gingival lesions, irrespective of the age of the patient.

This is because the initial presentation of the lesion, in this case, is typical of the diagnostic difficulties commonly encountered in GSCC. The symptoms of pain and swelling, as well as the clinical appearance of the lesion, may mimic other inflammatory diseases of the periodontium. This is in concurrence with Ramesh and Sadasivan [5], who noted that oral squamous cell carcinoma can mimic gingival overgrowth and hence may lead to misdiagnosis or delayed diagnosis. In our case, the early decision to do a biopsy was very helpful in getting the right diagnosis at an early stage.

This includes the history of tobacco chewing for the past ten years. Bugshan and Farooq [12] have clearly demonstrated that tobacco use is significantly associated with oral SCC, although Bornstein et al. [6] pointed out that the relationship between GSCC and conventional risk factors such as tobacco and alcohol is not very close. This case contributes to the evidence that [4] tobacco use may contribute to GSCC formation even in young adults.f

The management in this case, comprising of surgery, radiotherapy, and chemotherapy, is in conformity with the current standard of care for GSCC patients at this stage. The choice to excise the mandibulectomy with autogenous bone grafting and then use adjuvant radiotherapy and chemotherapy may have played a crucial role in the favorable outcome at the one-year follow-up. This multimodal approach is backed by Fridman et al. [16], who revealed enhanced survival rates with the use of combined treatment modalities in early-stage oral cavity squamous cell carcinoma.

Rigorous oral hygiene protocols will have to be part of the management of GSCC in addition to the conventional treatment modalities. Patients should avoid using hard-bristled toothbrushes with a gentle technique, rinse with an alcohol-free antiseptic rinse, and stay hydrated. These measures significantly reduce the risk of infection and help tissue healing during post-treatment recovery. Patients with GSCC need to maintain oral hygiene vigilance and have regular professional follow-ups for long-term success. Therefore, a structured maintenance program, including meticulous interdental cleaning, selection of the proper diet, and periodic dental examinations for recurrence monitoring and professional prophylaxis, is necessary for an improved quality of life and long-lasting treatment outcome [15].

The good outcome in this case, without any evidence of recurrence one year after treatment, is encouraging. To confirm this positive outcome, we conducted repeat comprehensive evaluations at 3, 6, 9, and 12 months post-treatment, including physical examinations, blood tests, and contrast-enhanced CT scans, all of which remained negative for recurrence. Nevertheless, it is imperative to state that long-term follow-up is essential in GSCC cases. Huang et al. [18] indicated that the disease might recur after a long treatment; hence, a longer follow-up time is needed. That is why the standard guidelines recommend regular follow-ups with this patient every 1-3 months during the first year, every 2-4 months during the second year, every 4-6 months during the third to fifth years, and annually thereafter, as per the National Comprehensive Cancer Network (NCCN) guidelines for head and neck cancers. Each follow-up visit includes a thorough clinical examination, periodic imaging studies, and laboratory tests to ensure early detection of any potential recurrence.

GSCC has a poor prognosis and this is a rare case which we were able to treat successfully at one year with disease free survival. GSCC is generally more aggressive than SCC at other sites in the oral cavity, such as the tongue (most common site, ~40% of oral SCCs, with higher prevalence in males), floor of mouth (~20%, male predominance), buccal mucosa (particularly common in South Asian populations due to tobacco habits, ~10%), and lip (more common in males with sun exposure, ~25%), as Majumdar et al. [20] has pointed out. The aggressive nature of GSCC compared to other oral SCC sites is also supported by Yan et al. [7], who demonstrated lower overall survival rates for gingival SCC compared to other oral sites. In this case our positive result would suggest that the result may be even better if the tumor is diagnosed at an early stage and treated aggressively.

Given that GSCC is normally associated with a poor prognosis, this case which we were able to treat successfully at one year with disease free survival is relatively rare. Majumdar et al. [20] point out that GSCC is usually more aggressive than SCC in other regions of the oral cavity. In our particular case, the positive result does support the premise that if the tumour is found early and aggressively treated, the outcome could be better. This report should also remind dental practitioners to maintain a high index of suspicion in examining atypical gingival lesions regardless of the patient's age or risk factor profile.

The authors would like to express their sincere gratitude to PGI Chandigarh for their invaluable support that greatly enhanced the quality of this case report.

CONCLUSIONS

This case report underscores the importance of early diagnosis and aggressive multimodal treatment in improving outcomes for gingival squamous cell carcinoma (GSCC). Our findings show that we can achieve a good outcome even with a younger patient with an atypical risk profile in a difficult case.

The importance of considering malignancy in the workup of persistent gingival swellings, irrespective of the patient's age, is stressed in this case. Clinically, there are significant implications such as the need for prompt biopsy of lesions unresponsive to routine treatment, which plays a crucial role in diagnosis, as well as benefits from the combined therapy of surgery and adjuvant chemoradiotherapy, and the importance of structured long-term follow-up for monitoring recurrence and treatment response. The successful outcome of this study contributes to prognostic factors in GSCC and may help to inform future treatment approaches.

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