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The Confluence of Chronic Mechanical Trauma and Psychosocial Stress in Early-Stage Carcinoma: A Diagnostic and Management Challenge in a Geriatric Patient with Multiple Comorbidities. – A Case Report.

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ABSTRACT: This case report details the diagnosis and management of early-stage squamous cell carcinoma (SCC) of the tongue in a 75-year-old female with multiple comorbidities, including diabetes, hypertension, osteoporosis, a cardiac pacemaker, and a history of breast cancer treated with surgery, radiotherapy, and chemotherapy.

The patient had a recurrent ulcer on the border of the left lateral tongue, which was clinically linked to sharp, carious teeth and occurred during a time when the patient was under a lot of caregiver stress. She had a successful partial glossectomy with selective neck dissection after biopsy confirmation and staging (pT2N0Mx). No adjuvant therapy was needed, and at one year, there was no recurrence.

This scenario emphasises the dentist's vital role in early cancer diagnosis and highlights that, regardless of an apparent traumatic aetiology, a biopsy is necessary for persistent oral ulcers. It also emphasises the possible synergistic effect of severe psychological stress and persistent mechanical irritation in the development of oral cancer. It promotes a customised, interdisciplinary approach to treating elderly cancer patients.

1. INTRODUCTION

The tongue is the most common site of occurrence for oral squamous cell carcinoma (OSCC), which is a significant global public health concern (1,2). The aetiology of OSCC is complicated, and the two main known risk factors are alcohol and tobacco use(3). Beyond these, the impact of persistent mechanical irritation from things like sharp teeth or poorly fitting dental prosthesis has been discussed, but it is acknowledged as a possible co-carcinogenic factor that may act through long-term cycles of mucosal injury and regeneration(4).

Simultaneously, new oncological research indicates that severe, long-term psychosocial stress is a major element that promotes cancer growth. Stress can alter the biology of cancer by stimulating inflammation, inducing immunosuppression through glucocorticoid pathways, and increasing angiogenesis through neuroendocrine signalling(5,6). The elderly population, who often deal with complicated medical histories and significant life stressors, such as the responsibility of caregiving, has a notably high incidence of OSCC (7,8).

The key to a better prognosis is still early identification, which allows for less invasive single-modality therapies with better functional results(9). Dental professionals are essential sentinels in this situation. Even in cases where a plausible local irritant

is present, they must retain a high index of suspicion for any non-healing oral injury, especially in patients who are under a great deal of psychological stress⁽¹⁰⁾.

This report presents an exemplary case of early tongue SCC in a medically complex older adult, where a non-healing ulcer developed at a site of detectable dental trauma during an extended period of intense caregiver stress. It examines the multifactorial interaction—including physical trauma, mental stress, and host factors—in the presentation and treatment of oral cancer and demonstrates the diagnostic necessity of biopsy for persistent lesions.

2. CASE PRESENTATION

2.1. Patient Profile and Medical History

A 74-year-old woman presented at the dental office. Her notable medical history included: 20 years of Type 2 Diabetes Mellitus; suboptimal management (HbA1c: 7.8%); 15 years of managed hypertension; and 10 years of moderate osteoporosis.

Oncology History: A radical mastectomy, chemotherapy, and radiation were used to treat a left breast cancer 20 years prior; no side effects were noted.

Heart History: Twelve years ago, a permanent cardiac pacemaker was placed.

Psychosocial Context: The patient described "tremendous stress" from being her bedridden husband's principal carer for more than a year.

2.2. Clinical Presentation and Initial Assessment:

A six-month-old non-healing tongue ulcer on the left side was the main complaint. A 2x2 mm ulcer on the left lateral border in the posterior one-third area was found during an intraoral examination (Fig. 1). Proximal deep caries with sharp, uneven edges on the left upper and lower first molars near the ulcer seemed to injure the tongue when it moved laterally. There was no palpable lymphadenopathy in the submandibular or cervical regions. An initial working diagnosis of a tooth irritation-related traumatic ulcer was made.

2.3. Diagnostic Workup and Staging:

Under local anaesthesia, a punch biopsy was carried out. Poorly differentiated squamous cell carcinoma with penetration into the underlying connective tissue was discovered by histopathological examination (Fig 2 & 3). A whole-body 18F-FDG PET-CT scan was acquired for thorough staging, and the results revealed: Primary Tumour (T): A poorly defined, FDG-avid enhancing lesion at the tongue's left lateral border (Fig 4). Lymph Nodes (N): There are no notable axillary or cervical lymph nodes that are FDG-avid. Distant Metastasis (M): There are no foci of distant metastases. This was associated with a cT2N0M0 clinical stage.



2.4. Treatment and Histopathological Outcomes

Her management was tailored by a multidisciplinary team. A completely surgical strategy was chosen due to the early nodal stage (cN0) and her prior history of treatment with radiation. The patient's left submental, sublingual, and submandibular lymph nodes were removed during a partial glossectomy of the left posterior tongue (Level I neck dissection, Fig 5).

The surgical specimen's final histology was reported:

The primary specimen is a squamous cell carcinoma with moderate differentiation.

Margins: There was no tumour invasion in any of the surgical margins.

Lymph Nodes (pN): There was no sign of metastasis, and all 12 removed lymph nodes displayed reactive hyperplasia.

pT2 pN0 pMx was the final pathological stage. No adjuvant chemotherapy or radiation was advised by the multidisciplinary tumour board.



2.5. Follow-up:

The patient recovered uneventfully (Fig 5). For the first six months, she was part of a strict follow-up regimen that included clinical exams every month, and after that, every three months (Fig 6). There was no radiological or clinical evidence of distant metastasis or local recurrence at the one-year postoperative evaluation. The patient reported that their speech and swallowing had adapted satisfactorily (Fig 7).

3. Discussion

In addition to presenting a discussion of biobehavioural impacts, this case serves as an engaging clinical narrative that emphasises a number of important concepts in oral medicine, surgical oncology, and geriatric care.

First of all, it is an instance of the basic principle that a "traumatic ulcer" is an exclusionary diagnosis. Histological examination is essential for any oral mucosal lesion that lasts longer than two to three weeks following the removal of a suspected irritant(11,12). A typical diagnostic error that can postpone an important diagnosis is the presence of sharp, carious teeth, which presented a reasonable but deceptive explanation(4).

Second, the treatment is in line with current guidelines for tongue cancer in its early stages (I/II). Primary surgical excision combined with an elective selective neck dissection (often Levels I–III) is the accepted standard for clinically node-negative (cN0) T1–T2 tumours, offering therapeutic and prognostic advantages(13,14). Clear surgical margins (>5 mm) and a pathologically negative neck (pN0) support the evidence-based choice to forego adjuvant radiotherapy, sparing the patient serious morbidity such as xerostomia and osteoradionecrosis without compromising oncological management(15,16).

Third, and crucial to the complexity of this study, is the possible interaction between severe psychological stress and long-term physical trauma. In addition to being a known inducer of cellular turnover and a potential initiation in a vulnerable region, the sharp tooth served as a source of ongoing mechanical damage(17). As a caregiver, the patient also experienced severe chronic stress.

The hypothalamic-pituitary-adrenal (HPA) axis is activated by chronic stress, which results in prolonged cortisol release. This can suppress cell-mediated immunity, particularly by reducing the activity of cytotoxic T lymphocytes and natural killer cells, which may compromise immune surveillance of cancerous clones(5,18). Additionally, stress-induced catecholamines, such as norepinephrine, can bind to β -adrenergic receptors on tumour and stromal cells, hence increasing angiogenesis, metastasis, and cancer growth pathways(6,19).

A plausible synergistic model is suggested by the co-occurrence, even though a single case cannot establish a direct causal link: systemic stress-induced immunosuppression and pro-tumorigenic signalling may have created a permissive microenvironment for malignant transformation and progression, while chronic trauma may have created a localised focus of vulnerable, proliferating epithelium(20,21). This biobehavioural viewpoint highlights the significance of comprehensive patient evaluation and enhances our clinical knowledge.

Finally, the case validates the feasibility of definitive cancer surgery in carefully selected older adults with multimorbidity. A comprehensive geriatric assessment, rather than chronological age alone, should guide treatment intensity(8,22). The successful outcome—achieved through meticulous multidisciplinary planning—highlights that curative, stage-appropriate treatment can be safely delivered to geriatric patients, optimising survival while preserving quality of life(23).

4. CONCLUSION

This report demonstrates that, with timely diagnosis and proper staging, surgery alone can effectively manage early-stage oral squamous cell carcinoma in elderly patients with complicated histories. It effectively restates the dentist's critical role in early detection: regardless of a probable traumatic aetiology or coexisting stressors, a chronic mouth ulcer needs to be biopsied. This patient's combination of significant psychological stress and long-term dental injuries raises the possibility of a multifactorial model of oral carcinogenesis. In the end, providing this expanding patient population with individualised, multidisciplinary care is still crucial to getting the best results.

Patient Perspective: Informed consent was collected. The patient expressed appreciation for the methodical investigation that led to her diagnosis.

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Informed Consent: The patient gave written informed consent for this case report and any accompanying photos to be published.

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