

Case report

The early detection of tongue cancer with the etiology of mechanical trauma

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ABSTRACT

Background: Oral squamous cell carcinoma (OSCC) occurs in approximately 95% of people older than 40 years; usually, it is diagnosed at the age of 60 years. The etiology of OSCC is multifactorial. Chronic mechanical trauma due to sharp teeth has also been suggested as an etiology of oral squamous of the tongue. **Purpose:** This case report aimed to describe the etiology of OSCC resulting from mechanical trauma and to prevent further metastasis by correctly diagnosing the lesion earlier. **Case:** A 49-year-old female patient presented with painful and swollen stomatitis two months ago. No submandibular lymph nodes were palpable. An indurated ulceration and sharp teeth on the right region of the jaw were obtained from the intraoral examination. Malignancy was concluded from Histopathology Examination (HPE) and Magnetic Resonance Imaging (MRI) radiography results. **Case Management:** Multiple extractions were chosen to eliminate the etiology of mechanical trauma due to sharp teeth, and the patient underwent hemiglossectomy with the keyhole method. Postoperative, the histopathology examination revealed an OSCC of the tongue. The patient is currently in the second cycle of chemotherapy by hematologist-oncologists. **Conclusion:** The early appropriate diagnosis of a tongue ulcer can prevent metastasis, decrease morbidity, and increase quality of life.

Keywords: carcinoma; chronic trauma; oral cancer; sharp teeth; tongue

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INTRODUCTION

Ninety-five percent of oral squamous cell carcinoma (OSCC) cases occurs in people who are older than 40 years; it is usually diagnosed at the age of 60 years.¹ OSCC is more common in men than women; this is due to the high risk of tobacco and alcohol consumption. The etiology of OSCC is multifactorial, including tobacco, alcohol, and nutritional factors. Chronic mechanical trauma due to sharp teeth has also been suggested as a possible etiology of tongue-OSCC.² Treatment of OSCC is determined by the metastatic and degree of tissue dysplasia. The first-choice treatment for tongue OSCC is surgery that is followed by radiotherapy or radiochemotherapy.³

Eliminating local factors, such as sharp teeth, is especially important because this condition is an etiological factor of OSCC development. The patient's general condition and age become important during the management of OSCC, especially in a patient with underlying diseases. The early

diagnosis of this condition and proper multidisciplinary management of OSCC must be made to improve the prognosis and the patient's quality of life.⁴ This case report presented the management of OSCC in a young patient with mechanical trauma due to sharp teeth.

CASE

A 49-year-old female patient was presented to the Dental Department of Mardi Rahayu Hospital in Kudus, Central Java, with slightly painful and swollen stomatitis on the right side of the tongue on April 14, 2022. Intraoral examination showed a major white ulceration more than 10 mm in diameter, with a diffuse and irregular margin, indurated and slightly raised in the dextral lateral tongue. The cusp of teeth (44) was observed sharp and in close contact with the ulcer (Figure 1). With an extraoral examination, no submandibular lymph nodes were palpable.

The patient had no history of smoking, drinking alcohol, or hypertension, but had under-controlled diabetes mellitus that required routinely taking oral medication. There is no history of family-related cancer.

CASE MANAGEMENT

Due to the indurated ulceration, the lesion was suspected to be malignant. An MRI was performed on the patient. The

MRI showed a mass in the anterior-mid-posterior lateral of the tongue [Tr: 26.2 mm x AP: 19.3 mm x CC: 22.1 mm] (Figure 2A) and classified as T1-2 N0 M0 (Figure 2B and 2C). Malignancy was concluded from MRI radiography results, but no definitive diagnosis was decided yet.

Multiple extractions were performed to eliminate the etiology of mechanical trauma due to sharp teeth, and the patient underwent a hemiglossectomy with the keyhole method under general anesthesia. The excision was made 2 cm from the affected site, and the malignant mass and



Figure 1. The intraoral examination showed an indurated ulceration in the lateral border of the tongue (A); tooth 44 close to the ulcer and in contact during tongue movement while eating and talking (B).

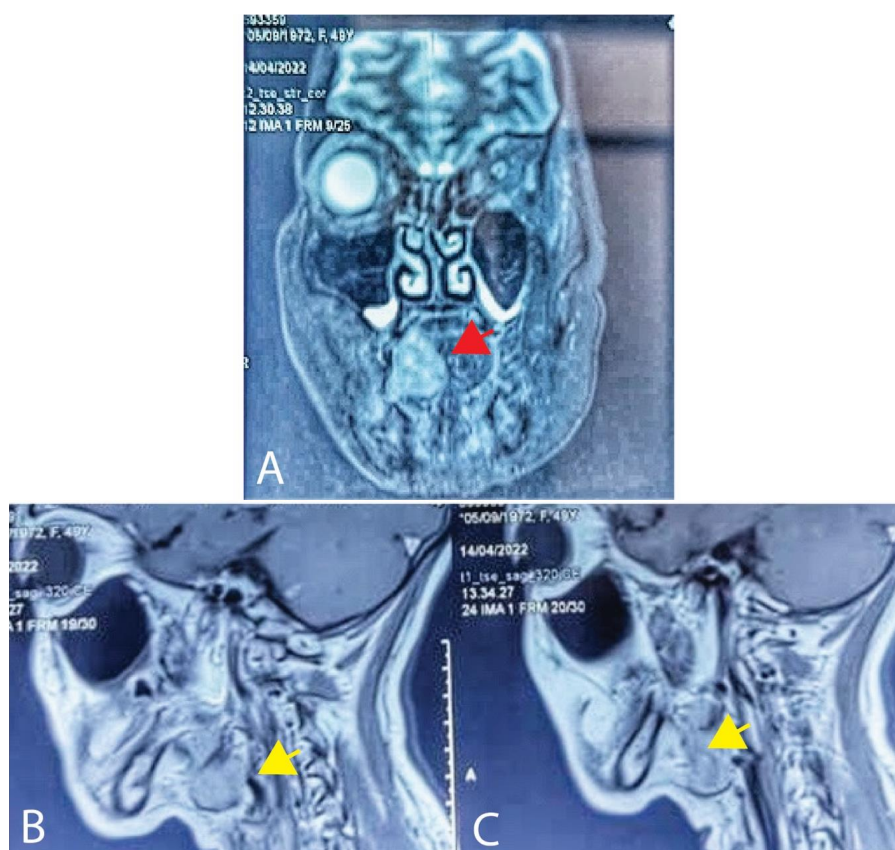


Figure 2. MRI radiographs showed a malignancy mass in the lateral border of the tongue (red arrow) (A), and the mass expansion that classifies as T1-2 N0 M0 (yellow arrow) (B-C).

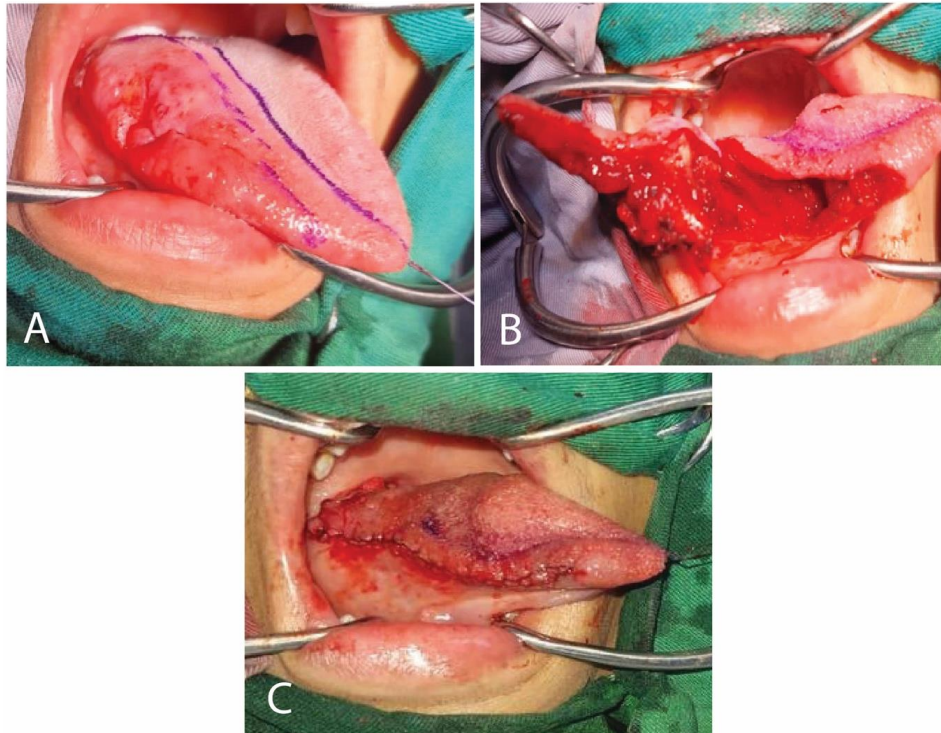


Figure 3. The partial hemiglossectomy. Pre-operation (A), during operation (B), and post-operation (C).

healthy surrounding tissue were removed (Figure 3A-B). The defect was repaired and sutured (Figure 3C).

After performing the surgery, the excised tissue was taken for histopathology examination. Analysis showed the tissue was covered with keratinized stratified squamous epithelium, partially with mild to moderate pleomorphic nuclei, hyperchromatic, coarse chromatin, mitoses present, cytoplasm eosinophilic, with partially clear intercellular bridging and keratin pearl infiltration between groups of moderate striated muscle cells lymphocytes, and lymph angioinvasion. The description above supports the diagnosis of well-differentiated squamous cell carcinoma accompanied by lymph angioinvasion.

After a postoperative histopathology examination, the patient was referred to a hematologist-oncologist for the first cycle of chemotherapy, which consisted of six visits. The patient is currently undergoing the second cycle. A long-term clinical evaluation is needed to prevent the recurrence.

DISCUSSION

The appearance of OSCC is usually linear to aging because it is related to the length of the exposure and causes genetic changes, including chemical or physical irritants, viruses, or hormonal changes. Of oral cancers, tongue cancer commonly occurs in 20- to 44-year-olds, while cancers of other anatomical features like lips, gingiva, palate, and dorsal tongue appear less commonly. Recent data showed that 9% of younger patients, under 40 years old and non-

smokers, suffered from oral cancer.⁵ The reason behind this is due to the impaired immune system,⁵ but further explanation needs to be explored.⁶ In the present case, a 49-year-old female patient presented an OSCC due to mechanical trauma caused by sharp teeth. In the literature, it is mentioned that tongue cancer can be seen in young patients, under 45 years old, mainly in females who abstain from tobacco and alcohol.⁷ Mechanical trauma, like sharp teeth and other etiologies such as fractured fillings and ill-fitting dentures, can induce the development of OSCC.^{8,9} The pathogenesis is debatable, but the characteristic of the trauma must be low intensity and persistent.¹⁰ The lateral of the tongue is the highest area close to trauma, because, during the physiological function of a normal swallowing pattern, this area is trapped between dental arches approximately three times per minute.¹⁰ This trauma can promote epithelial cell transformation,¹¹ alone or in association with other risk factors, and has also been reported to be implicated in the development of OSCC.¹² The persistent trauma can induce the disruption of the normal physical architecture of the extracellular matrix, promoting oncogene expression, increasing the hyperproliferative status, and creating an inflammatory microenvironment.¹² However, the exact pathogenesis is questionable and the traumatic event alone is unable to develop an OSCC¹³ without the presence of genetic alteration such as loss of heterozygosity.¹²

Although the mouth is visually accessible for examination, the diagnosis of OSCC is frequently delayed because it may be difficult to distinguish clinically from other diseases. Over 50% of OSCC patients have metastases both local or distant during the diagnosis.¹⁴ This patient

was identified by a general practitioner who suspected a malignant lesion on the lateral side of the tongue because of the clinical appearance, from the induration around the ulceration, raised border and asymptomatic.^{15,16} The general practitioner directly referred the patient to an oral and maxillofacial surgeon to receive the correct diagnosis and treatment. No regional lymph nodes were palpable. OSCC usually involves the submandibular, submaxillary, submental, digastric, and upper cervical nodes, and has metastatic lung involvement.¹⁷ But in this case, thorax radiography or chest x-ray (CXR) was performed on the patient and showed no metastatic involvement to the lungs or any lymphatic spread. The need for rapid diagnosis of OSCC is critical because early diagnosis can reduce mortality, and general practitioners have a better chance of detecting this disease at the early stage.¹⁸

The World Health Organization (WHO) proposed that general dental practitioners could perform oral cancer screenings based on inspection and palpation as part of an essential oral examination. Oral cancers may or may not cause pain, whereas a common symptom of ulceration is pain that usually resolves within 7–14 days. The classical features of an oral cancer lesion a persistent ulceration with hardening and peripheral infiltration and may be associated with red or whitish staining. In the present case, persistent ulceration with peripheral induration was noticed. The ulceration was located on the lateral border of the tongue.¹⁹ The predominant location is the lateral border of the tongue or oral floor because this area is often in continuous contact with teeth.¹⁰ After enlarging, OSCC may become a raised nodule and develop into ulceration with induration resulting from fibrosis, infiltration, and inflamed tissue. In several months, OSCC may form into an indurated ulcer with a rolled border.²⁰

MRI radiograph results showed a malignant mass, but the definitive diagnosis was not concluded yet. Treatment of OSCC remains mainly surgical, depending on the anatomic site, with adjuvant radiotherapy added for advanced-stage disease.²¹ The patient, in this case, underwent hemiglossectomy surgery on the right side of the tongue with the keyhole method followed by chemotherapy; it should be the optimal surgery for the early cancer stage. The selection of appropriate treatment modalities depends on tumor factors such as size (T-stage), location and multiplicity, proximity to the bone, pathological features, histology grade, and depth of invasion.²²

Hemiglossectomy or glossectomy type IIIb (compartmental) is the primary treatment option for oral cancer patients with one-sided tongue involvement.^{3,23,24} The specimen includes intrinsic and extrinsic muscles ipsilateral to the lesion, resected up to healthy tissue with appropriate safety margins (at least 1.5 cm), and the lingual artery must be ligated and removed en bloc with the lingual and hypoglossal nerves. The ipsilateral base and the tip of the tongue are preserved.²³ The surgery was performed under general anesthesia. The hole left by the excision of the cancer was small and repaired by suturing

the tongue immediately. Pain and discomfort after the procedure were managed with medication; this patient was given antibiotics, anti-inflammatory, and analgesic drugs. A long-term clinical evaluation is needed to determine OSCC recurrence.

The prognosis of OSCC in the oral cavity depends on several factors, including size, location, histopathology, metastasis, and the patient's age.²⁵ Lymph node involvement and tumor size are the most important prognostic factors. This case had no lymph node involvement or further metastasis to the lungs, so the stage was: T1-2 N0 M0, which means the OSCC was expected to have a better prognosis. Generally, oral cancer has a poor prognosis; when carcinoma has metastasized to the lymphatic gland, the survival rate will decrease. In this case, the general practitioners were able to diagnose quickly. The patient received appropriate treatment by direct referral to an oral maxillofacial specialist and continued by chemotherapy so that metastasis could be prevented, and poor diagnosis could be avoided. In conclusion, OSCC is usually diagnosed at an advanced stage, which has a poor prognosis. Mechanical trauma, like sharp teeth, could also be the main etiology of developing OSCC. Early diagnosis of OSCC is helpful to increase the survival rate of the patient.

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