

Smokeless tobacco and oral cancer: A rare case report

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Abstract: Smokeless tobacco (ST) is tobacco that is not burned. It is also known as chewing tobacco, spit or spitting tobacco, dip, chew, and snuff. It is usually placed in the oral or nasal cavities against the mucosal sites that permit the absorption of nicotine into the human body. While the use of ST has oral consequences and may also be found to affect other parts of the body, such as the cardiovascular system, the most serious consequence is oral cancer. The most harmful cancer-causing substances in ST are tobacco-specific nitrosamines (TSNAs). The aim of this work is to present a rare clinical case of a female patient monitored at the department of oral surgery for mandibular gingival carcinoma caused by ST. In this context, we emphasize the importance of early diagnosis of such lesions and the need of counselling patients on the harmful effects of ST and to encourage them to quit smoking.

Keywords: Carcinogenicity; smokeless tobacco; mouth neoplasms; nitrosamines

INTRODUCTION

Smokeless tobacco (ST) is tobacco consumed orally, not smoked. It has been in use for as long as other forms of tobacco consumption and its use have increased [1]. There are two main types of ST: chewing tobacco and snuff. Tobacco chewing is the practice of placing a portion of leaf, plug, cake, or thread twines of tobacco between the cheek and gingiva after it has been chewed [2].

The most harmful chemicals in ST are tobacco-specific nitrosamines (TSNAs), which are formed during the growing, curing, fermenting, and aging of tobacco. They are widely considered to be among the most important carcinogens in ST products and cigarette smoke [3].

A study from the International Agency for Research on Cancer concluded that ST users have an 80% higher risk of developing oral cancer [2]. This article intends to describe a case of oral squamous cell carcinoma (SCC) of mandibular gingiva with bone invasion caused by ST in a female patient who has been using chewing tobacco for 67 years. This direct association between oral cancer and chewing tobacco is rarely discussed in the literature. A bibliographic research on PubMed using the following Boolean formula ("Tobacco, Smokeless"[Mesh]) AND "Mouth Neoplasms"[Mesh] revealed only 11 case reports of oral cancer caused by ST since ten years among humans.

CASE REPORT

A 74-year-old female patient with a history of asthma and hypertension was referred to department of oral surgery with a complaint of painful ulceration of the anterior and left posterior mandibular gingiva. She stated that the non-healing lesion had been present for two years and enlarged progressively. The patient also revealed that she has been using chewing tobacco since the age of seven. Extraoral examination showed a painless bony hard swelling of the left mandibular parasymphysis, homolateral numbness of the lip and chin and submandibular lymphadenopathy. Moreover, there was an actinic cheilitis of the lower lip (Fig 1a). Intraoral examination revealed slightly elevated ulcero-vegetative lesion of the left mandibular gingiva (Fig 1b). The ulcerative gingiva was prone to bleeding when palpated. In addition, there were a condyloma acuminata on the left retro commissural region (Fig 1c) and leukoplakia on the inside of the right cheek.



Fig-1: (a) Extraoral examination showing actinic cheilitis; (b) intraoral examination revealing slightly elevated ulcerative gingival mass, extending from the left second molar region to the right first molar region; (c) condyloma acuminata on the left retro commissural region; (d) leukoplakia.

The panoramic radiograph revealed a destruction of the alveolar bone extending from the left second molar region to the first right molar region (Fig 2a). Computed tomography (CT) scans showed a large

destruction of the mandibular bone (Fig 2b) and revealed that bilateral cervical lymph nodes were enlarged (Fig 2c).

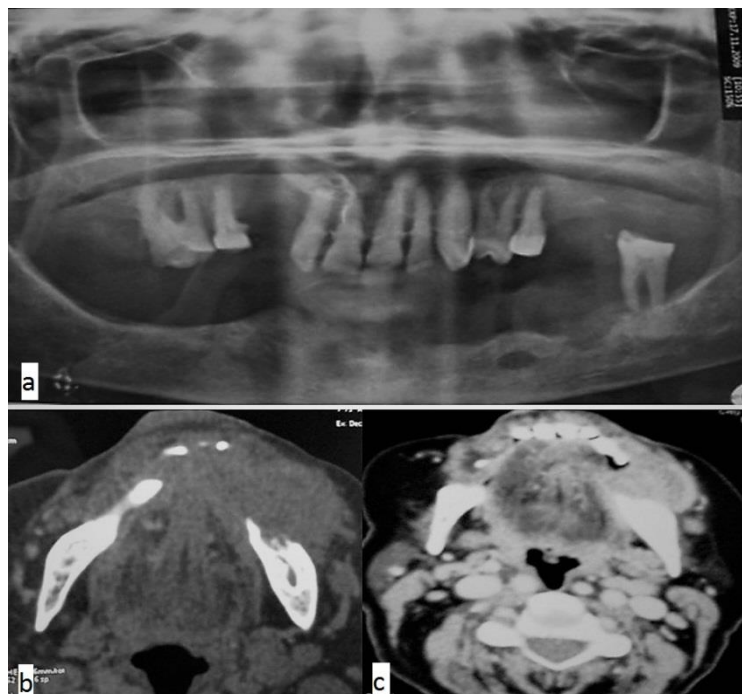


Fig-2: (a) Panoramic radiograph revealing a destruction of the alveolar bone; (b) computed tomography (CT) scan: hard-tissue window showing an aggressive destruction of mandibular alveolar bone; (c) soft-tissue window revealing bilateral cervical lymph nodes were enlarged.

The result of incisional biopsy showed that the lesion was invasive moderately differentiated squamous

cell carcinoma (Fig 3). The neoplasm classified as T4N2cM0, based on mouth cancer TNM classification

criteria of the UICC/AJC (American Joint Committee for Cancer Staging).

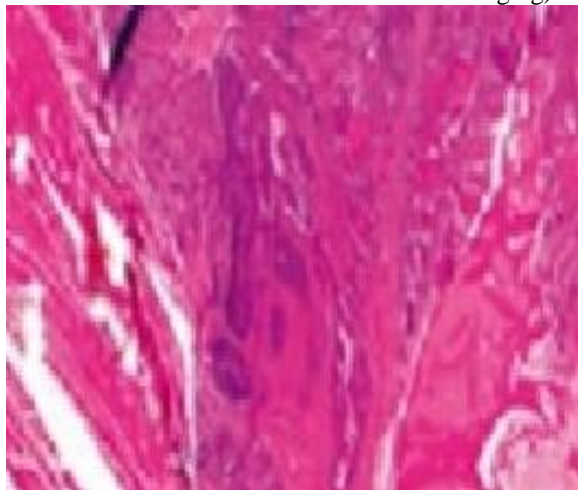


Fig-3: Photomicrograph showing keratin pearls and individual cell keratinization with surrounding fibrous stroma evoking moderately differentiated oral squamous cell carcinoma (H&E; magnification ×40).

The surgical treatment included resection of the mandible from left angulus to the right first molar region (Fig 4). Radical neck dissection on the ipsilateral side and elective neck dissection on the contralateral

side were performed. However, two months later the patient was readministered for resumption of carcinomatous resection and she succumbed to her illness.



Fig- 4: Panoramic radiograph showing reconstruction of the mandible.

DISCUSSION

The term ST, also known as dip, plug, chew, or spit tobacco, refers to both chewing tobacco (coarse cut) and snuff (fine cut). Three types of ST are commonly manufactured: loose-leaf chewing tobacco, moist snuff, and dry snuff [4]. In developing countries, tobacco is mostly chewed with other ingredients [2]. Chewing tobacco is practised in different ways. The main ingredients are usually areca nut (betel), betel leaf, lime, and tobacco [1]. In some countries traditional values do not favor smoking by the young or by women, but there is no such taboo against using ST. Thus, most women who use tobacco use it in smokeless forms as in our clinical case.

Tobacco-related lesions (smokeless tobacco-related and nicotine stomatitis) comprised 4.7% of all lesions found in 17,235 people examined as part of the

third National Health and Nutrition Examination Survey (NHANES). ST users had one of the highest odds of having a lesion present (odds ratio, 3.9) [5].

The use of ST is associated with a spectrum of oral cavity lesions, including leukoplakia, erythroplasia, tobacco-associated keratosis, oral submucous fibrosis (OSF), and carcinoma in situ (CIS), verrucous carcinoma and invasive squamous cell carcinoma (SCC) [2].

Histologically, these “smokeless tobacco lesions” are characterized by hyperkeratinisation and vacuolization of the epithelium, acanthosis, and proliferation of inflammatory cells [6].

In fact, oral ST contains numerous carcinogens, including polonium 210, tobacco-specific

N-nitrosamines (TSNAs), volatile aldehydes, and polycyclic aromatic hydrocarbons [7]. TSNAs are the most abundant carcinogens identified in ST [2, 8]. Moreover, approximately twice as much as nicotine is absorbed per dose from ST than cigarettes (4 vs. 2 mg); orally absorbed nicotine also stays longer in the bloodstream [2]. Thus, this can explain local and systemic toxicity of ST.

A 2015 study of NHANES Data showed that adults who used only ST products had higher levels of biomarkers of exposure to nicotine and a cancer-causing toxicant (the tobacco-specific nitrosamine NNK) compared with those who used only cigarettes [9].

In experimental in-vitro systems, ST has shown effects on cell proliferation, apoptosis, and activation of inflammatory mediators. In animal models, evidence of carcinogenesis has been reported for the chewing tobacco and snuff products commercially available for human consumption [10]. Thus, in 2006, the IARC concluded that ST is carcinogenic in human beings, causing cancer of the oral cavity and pancreas [11].

While carcinogenicity of ST to humans is well established, the oral lesions that precede development of cancer are less well characterized. Thus, a clinical examination of the oral mucosa should be routinely carried out for every patient presenting at a dental office especially for those with history of using ST to detect lesions suspected of being premalignant or even oral cancer at a very early stage. For that purpose, different means are available to facilitate the detection of suspicious lesions for an oral cancer such as toluidine blue (TB) staining, autofluorescence, DNA analysis, biomarkers, spectroscopy, and newer adjuncts (VeLscope, Vizilite system) [2]. These means are used in addition to incisional biopsy which provides accurate diagnosis.

The prognosis of ST lesions varies widely depending on the type of lesion, stage of detection, and extent of involvement of the oral cavity and airway. To reduce the risk of progression to oral cancer, ST use should be minimized, with or even stopped.

CONCLUSION

This paper emphasizes the undeniable toxicity of ST. Their use can have adverse health consequences. It contains carcinogenic nitrosamines, rapidly delivers large doses of nicotine and can induce dependence and morbidity. Thus, tobacco use is claimed the commonest pre-disposing factor for the development of oral premalignant lesion and cancer [12]. However, the effects of ST on health, less well known than those of smoked tobacco, deserve to be emphasized in order to improve the management of patients consuming this type of tobacco. For this, government, non-government,

maxillofacial surgeons, dentists, and other health professionals should discourage ST users to use tobacco products, and help them quit [2].

Weaning ST consumption is difficult. It is a highly addictive product. Hence, more research and eventual implementation of health promotion programs will help populations addicted to ST use and contribute to the control of oral cancer.

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