

Incidence of Metastasis of Oral Squamous Cell Carcinoma in Submandibular Gland among N⁺ Cases of Neck Dissection: A Research Protocol

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ABSTRACT

Introduction: Oral Squamous Cell Carcinoma (OSCC) is one of the most common malignant diseases of head and neck region. Management of OSCC involves removal of the Submandibular Gland (SMG) along with lymph nodes. The submandibular salivary gland is routinely removed, considering metastatic involvement from OSCC. Many studies showed there is no or rare involvement of the submandibular gland.

Aim: To find the incidence of metastasis of oral squamous cell carcinoma in the submandibular salivary gland during neck dissection.

Materials and Methods: This cross-sectional, observational, descriptive study will be conducted in the Department of Oral

and Maxillofacial Surgery, Sharad Pawar Dental College and Hospital, Sawangi, Maharashtra, India. The research started from November 2018. Data will be compiled in tabular form in term of descriptive statistics with frequency and proportion of submandibular gland involvement. It will be conducted on 90 operated cases of OSCC in whom one or both the submandibular glands will be removed during neck dissection. The outcome parameters will be the nature and site of lesion, clinical nodal status, clinical stage of disease, preoperative and postoperative histopathological examination of lesion, histopathological examination of resected lymph nodes and proportion of involvement of submandibular gland.

Keywords: Lymph nodes, Neck dissection, Xerostomia

INTRODUCTION

Squamous cell carcinoma of the oral cavity is one of the most common tumours of the head and neck region [1]. Worldwide oral squamous cell carcinoma is the sixth most common malignant disease, and the number of new oropharyngeal cancer cases is 3,00,000 annually, which is attributed to 3% of total cancer cases [2]. In India, OSCC ranks among the top three types of cancers [3]. Oral cancer in India is high, that is, 20 per 100,000 population and accounts for over 30% of all cancers in the country [4]. The involvement of cervical lymph nodes is the most important factor impacting the survival of the patient [5-7]. True status of preoperative neck nodes cannot be assessed by Ultrasound (USG), Computed Tomography (CT) or Magnetic Resonance Imaging (MRI). Even a single metastatic neck node may reduce a patient's survival chances [8,9].

Current surgical treatment includes surgical excision of the primary lesion with wide margins and appropriate neck dissection. Neck metastasis is most frequently observed in levels I, II, and III but rarely in level IV. According to Rouviere H and Tobies MJ, five lymph node groups are present in this region: preglangular, prevascular, retrovascular, retroglangular and intracapsular [10]. The Submandibular Glands (SMG) are located in level-Ib, where rich lymphatic tissues surround them. It was demonstrated that the submandibular gland does not have any intraparenchymal lymph nodes [11] and that the tumour involvement in the SMG must be through extension from a locally involved lymph node or the primary tumour [12]. Among these, the prevascular and retrovascular nodes are the most important because they are the primary afferent draining nodes of the oral cavity. In about 5-7% of floor of the mouth and tongue cancers perivascular node involvement is seen [13]. True infiltration of the SMG by Oral Squamous Cell Carcinoma (OSCC) is quite uncommon [14]. Still, SMGs are frequently excised as a part

of neck dissection because of their proximity to the primary lesion and afferent lymph nodes.

The SMGs are responsible for approximately 70% to 90% of unstimulated salivary volume, especially at night, removal of one SMG as part of the neck dissection causes significantly decreased unstimulated salivary flow and an increased incidence of subjective xerostomia, even though the patient does not receive postoperative radiotherapy [15-17]. Preservation of atleast one gland will prevent these complications [18]. Since the 1950s, more conservative approaches in neck dissection have been proposed that spare non lymphatic structures [19,20]. The study will aim to evaluate the incidence of metastasis of OSCC in submandibular gland for deriving guidelines pertaining to preservation or excision of the gland during neck dissection.

MATERIALS AND METHODS

This cross-sectional, observational, descriptive study will be conducted in the Department of Oral and Maxillofacial Surgery, Sharad Pawar Dental College and Hospital, Sawangi, Maharashtra, India. The research started from November 2018. The Institutional Ethical Committee had approved the study [DMIMS(DU)/IEC/2018-2019/7274].

Sample size calculation:

Formula

$$n = \frac{Z_{\alpha/2}^2 \times p \times (1-p)}{d^2}$$

Where,

- n=sample size
- $Z_{\alpha/2}$ =Level of significance at 5%=1.96
- P= Prevalence of submandibular gland involvement in Oral Squamous cell carcinoma in Asian population [21]=0.15

$d = \text{Error of Margin} = 7\% = 0.07$

$n = 1.96 \times 1.96 \times 0.15 \times 0.85 \div 0.07 \times 0.07 = 99.96$ or 100

The patient selected for the study will be requested to sign a consent form. The patients will be examined clinically, findings will be recorded on the case sheet, and then will undergo required investigations. In all operated cases, the excised gland will be processed for grossing of the gland and histopathological examination. This data will be collected and recorded in a case sheet.

Inclusion criteria: Histopathological proven cases of OSCC with surgery as the primary treatment modality, and resection of primary lesion with clinically N+ neck and atleast one submandibular gland are required to be removed, will be included in the study.

Exclusion criteria: Patient with inoperable tumour, history of Chemotherapy (CT) or Radiotherapy (RT), proven distant metastasis, direct involvement of submandibular gland by OSCC of floor of mouth will be excluded from the study.

Study Procedure

All patients will undergo excision of primary lesion with wide margins and neck dissection at different levels depending upon the individual case, followed by primary closure or reconstruction with local, locoregional, or microvascular free tissue transfer depending upon respective defects and feasibility of surgery. The unilateral or bilateral SMG will be excised in all the cases. The SMG, excised nodes, and the primary lesion will be preserved in 10% formalin and ten times volume solution. It will be sent for histopathological examination, and the findings will be analysed.

STATISTICAL ANALYSIS

Data will be entered in Microsoft Excel sheet version 2016 and presented in descriptive statistics (percentage and proportion).

DISCUSSION

The study conducted by Chen TC et al., showed Floor of the mouth and buccal mucosa are the most common primary sites for OSCC in which submandibular gland involvement is seen. But, OSCC arising on the tongue, gingivobuccal sulcus, gingiva, and the mandibular region also have shown infiltration of the submandibular gland. also, further they showed that that SMG infiltration occurs mostly in higher stages of OSCC and hence, is associated with a larger size of the primary tumour and higher nodal stage [21]. In a study by Basaran B et al., six cases of tongue OSCC had SMG involvement, of which three showed direct invasion, two showed invasion through metastatic lymph nodes, and one showed direct metastasis. Also, five cases with OSCC of the floor of mouth had SMG involvement, of which, four showed direct invasion and one invasion through metastatic lymph nodes. One case with OSCC in buccal mucosa had SMG involvement by invasion through metastatic lymph nodes, and one case of lip OSCC showed direct invasion. Most of these patients were of stage III and stage IV [22].

Ashfaq K et al., studied data of the 110 consecutive patients, operated for oral cavity tumours showed 2% frequency of SMG involvement in early oral cavity tumours and concluded that SMG metastasis from early oral cavity tumours is rare; any neoplastic involvement of the gland usually occurs via direct spread [23]. Fives C et al., retrospectively reviewed data of 177 patients with oral cancer undergoing neck dissection and showed 1% frequency of SMG involvement, as well as the incidence and mechanism of SMG involvement in floor of mouth cancer. They concluded that there are no intraglandular lymph nodes, and possibility of lymphatic metastasis to the SMG are less [24].

Agarwal G et al., studied the records of 112 individuals who had their necks dissected for OSCC. They had 115 neck dissections, both therapeutic and preventive (three patients had bilateral neck dissections). In none of the cases, there was histologic evidence of metastasis to the SMG. It was found that preserving the SMG may be safe [25].

CONCLUSION(S)

This study in future expected to help the clinicians in decision-making, whether to remove the SMG or not. The unnecessary removal of the gland will be averted and in turn will help in a better quality of life of the patients.

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