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Original Article

Adequacy of Surgery of Head and Neck Cancers

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ABSTRACT

Objective: To assess the proportion of adequate surgery in head and neck cancers.

Study Design: Prospective longitudinal study.

Place and Duration of Study: Medical Oncology Department, Jinnah Postgraduate Medical Center, Karachi Pakistan, from Jan to Dec 2020.

Methodology: One fifty-nine patients aged over 20-65 years, of either gender with a confirmed diagnosis of squamous cell carcinoma of the Head and neck were included. Surgery was performed upfront in all patients without any preoperative/ induction chemotherapy. Data regarding socio-demographic and histopathology findings were noted. Surgery was labelled as inadequate when the number of resected lymph nodes recovered was less than 36, and the margins of the tumour were <5 mm (inadequate).

Results: Of 159 patients, the average age was 46.57±9.73 years. Less than 36 lymph nodes were recovered in 84 patients (52.8%) after neck dissection. A total of 64 patients had inadequate margins (40.3%), 77 had adequate margins (48.4%), and 18 had positive margins (11.3%) on histopathological examination. Overall, 56 patients had adequate surgery (35.2%), and 103 had inadequate surgery (64.7%).

Conclusion: More than half of the patients with Head and neck squamous cell carcinoma had inadequate surgery. Hence, inadequate surgery can lead to poor loco-regional disease control, increased chances of recurrence and overall poor prognosis.

Keywords: Adequate surgery, Adequate margins, Carcinomas, Head and neck cancers, Perineural invasion.

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INTRODUCTION

Head and neck cancers are highly prevalent malignancies worldwide and occur more commonly in developing countries during the consumption of tobacco, alcohol and cigarettes.[1] In Southeast Asia, Head and neck cancers comprise about 1/3 of all cancers, and the higher incidence is among individuals who consume smokeless tobacco. Other causes include betel quid, salted foods, occupational exposure to asbestos, wood dust, etc. Approximately 90% of the oral cavity cancers are squamous cell carcinomas (SCC).[2,3]

Surgical resection is an integral part of the multimodal treatment approach for HNCs, and the ultimate aim of resection is to achieve the target of loco-regional control with adequate surgical margins and resection of an adequate number of lymph nodes.[4] Because of its sensitive anatomical location, after treatment, the patient may become unable to swallow, breathe, chew, and speak for variable periods, so multidisciplinary care is required, which includes an oncologist, ENT oncological surgeon, radiation oncologist, speech therapist, etc.[5,6]

Histologically, a margin of greater than 5 mm is said to be adequate, less than 5 mm is considered inadequate and less than 1 mm is said to be a positive margin.[7,8] Histologic status of surgical margins strongly predicts prognosis in various malignant tumours. Histopathological findings showing margin involvement suggest that resection was inadequate and that the patient needs to undergo either adjuvant radiotherapy and chemotherapy or re-excision of the primary site.[9] While re-excision is the preferred option, it insists on the importance of the removal of the tumour with adequate margins.[10]

Hence, the motive of this study was to evaluate how adequately surgical excision is being performed in tertiary care setups in Karachi, Pakistan. In this cosmetically and functionally delicate area, surgery is the backbone of the treatment plans, and inadequately managed disease could lead to poor loco-regional control, recurrence, and exposure to radiation and chemotherapy. Our research can help improve surgical

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management and overall prognosis of Head and Neck cancers.

METHODOLOGY

The prospective longitudinal study conducted at the Medical Oncology Department, Jinnah Postgraduate Medical Center (JPMC) Karachi, Pakistan, from January to December 2020 after approval from Ethical Review Board (ERC#: NO.F.2.81/2020-GENL/48132/JPMC). The sample size was calculated using an OpenEpi sample size calculator, taking statistics of clear margin as 42.9%.[6]

Inclusion Criteria: Patients aged 20-65 years of either gender with confirmed diagnoses of SCC of Head and neck (HNSCCs) were included using a non-random consecutive sampling approach.

Exclusion Criteria: Patients with salivary gland tumours, CNS tumours, nasopharynx tumours, tumours of lacrimal glands and ophthalmological tumours were excluded. All histologies except Squamous Cell Carcinoma were also excluded.

Patients were included after consecutive sampling approach. Verbal informed consent was obtained from all the eligible patients. Surgery was performed upfront in all patients without any preoperative induction/chemotherapy. Data was noted on the pre-designed proforma. Detailed findings of histopathology, including site and size of the tumour, nodal status, metastasis, stage and grade of tumour, were noted. The histopathological examination was carried out to assess the margin status. Surgical margins were labelled as adequate when no tumour was found within 5 millimetres of the resection margin, inadequate (close) when the tumour was presented with 1-5 millimetres and positive (involved) when the distance was less than 1 millimetre. Surgery was labelled as inadequate when several resected lymph nodes recovered were less than 36, and the margins of the tumour were <5 millimetres (inadequate).

Statistical Package for Social Sciences (SPSS) version 25.0 was used for the data analysis. Quantitative variables were expressed as Mean±SD and qualitative variables were expressed as frequency and percentages.

RESULTS

Of 159 patients with HNSCCs, the mean age was 46.57±9.73 years (range: 22-70 years). Most of the patients were males 132(83%), urban residents 140(88.1%), outdoor workers 133(83.6%) and Urdu-speaking 75(47.2%), respectively. Of 159 patients, 71 were smokers (44.7%), 82 were Gutka consumers (51.6%), 38 were panned consumers (23.9%), 5 were betel nut consumers (3.1%), and 15 were answer users (9.4%), respectively (Table-I). The buccal mucosa was the commonest site of the tumour 92(57.9%), followed by the tongue 62(39%), respectively.

Table-I: Socio-Demographic Profile of Patients (n=159)

Variables	Mean±SD
Age in years	46.57±9.73
	n(%)
Gender	
Male	132 (83)
Female	27 (17)
Residence	
Urban	140 (88.1)
Rural	19 (11.9)
Occupation	
Indoor	26 (16.4)
Outdoor	133 (83.6)
Ethnicity	
Sindhi	19 (11.9)
Urdu	75 (47.2)
Punjabi	52 (32.7)
Pashto	1 (0.6)
Baloch	12 (7.5)
Addiction history	
Smoking	71 (44.7)
Gutka	82 (51.6)
Pan	38 (23.9)
Betel nut	5 (3.1)
Naswar	15 (9.4)

On radiological assessment, 91 patients had stage III tumours 91(57.2%); in the initial biopsy, most had grade II tumours 135(84.9%). Of 159 patients, fewer than 36 lymph nodes were recovered in 84(52.8%) after neck dissection. A total of 64 patients had inadequate margins (40.3%), 77 had adequate margins (48.4%), and 18 had positive margins (11.3%) on histopathological examination. About 56 patients had perineural invasion (35.2%), and 43 had lymphovascular invasion (27%). On pathological examination, 75 patients had stage III tumours (47.2%), and 110 had grade III (61.6%). Fifty-six patients had adequate surgery (35.2%), and 103 had inadequate surgery (64.7%) (Table-II).

DISCUSSION

One of the challenges of cancer resection in the Head and neck is the complete removal of the tumour from the primary site. The failure to do so may result in a 2-fold increase in the likelihood of local-regional

Table-II: Characteristics of tumor and frequency of adequate surgery (n=159)

Variables	n (%)	Variables	n (%)
Site of tumor		Lymphovascular invasion	
Tongue	62(39)	Yes	43(27)
Buccal Mucosa	92(57.9)	No	116(73)
Oropharynx	5(3.1)	Perineural invasion	
Stage (Radiology)		Yes	56(35.2)
I	6(3.8)	No	103(64.8)
II	22(13.8)	Stage (Pathological)	
III	91(57.2)	I	6(3.8)
IV	40(25.2)	II	31(19.5)
Grade (Biopsy)		III	75(47.2)
I	8(5)	IV	47(29.6)
II	135(84.9)	Grade	
III	16(10.1)	I	2(1.3)
Recovered lymph nodes		II	47(29.6)
<36	84(52.8)	III	110(69.2)
≥36	75(47.2)	Surgery	
Surgical margins		Adequate	56(35.2)
Positive	18(11.3)	Inadequate	103(64.7)
Inadequate	64(40.3)		
Adequate	77(48.4)		

recurrence.[10] The goal of Head and Neck cancer treatment is, therefore, to remove the tumour with clear margins safely and to preserve the associated morbidity with minimal cosmetic disfigurement. Surgery is challenging in the head and neck region as this anatomical site has neurovascular bundles and important cosmetic features.

A survey conducted in the United States among American Head and Neck Society members stated that a surgical margin of greater than 5 millimetres is sufficient. In contrast, some stated surgical margins greater than 1 millimetre are also safe.[11] This variation can be observed in head and neck surgeons globally. Some authors showed that surgical margins greater than 5 millimetres are adequate in the pharynx and oral cavity.[12] Whereas Liao *et al*. said greater than 7 millimetres of surgical margins are safe for an oral cavity to provide a good prognosis.[13] Another research showed that less than 5 mm surgical margins are significant predictors for loco-recurrence.[14] Yamada *et al*. suggested that 5 mm of clear surgical margin should be the reference of the oral Squamous Cell Carcinoma (OSCC) surgery.[15] A meta-analysis also suggested that a 5 mm margin is the least acceptable surgical margin size in Oral Squamous Cell Carcinoma.[16] Hence, the 5 mm distance has remained the frequent consensus distance for Oral squamous cell carcinoma as also reported by National Comprehensive Cancer Network Head and Neck Cancers guideline.[15,17] In the present study, we considered surgical margins greater than 5 mm clear, safe and adequate. Our findings showed that 48.4% of the patients with HNSCCs had adequate margins.

Overall, our analysis shows more (>60%) cases of inadequate surgery than other related studies.[6,18] Another research showed that 6% of Oral Squamous Cell Carcinoma patients managed with surgery had positive margins, and 30 per cent had a surgical margin of 0.1-2.2 mm. These findings may be due to the extent of the resection and how the specimen is oriented, handled and preserved. A further determinant that may influence the margins after surgery is the shrinkage of normal tissue, and tissues from different anatomical locations may experience varying shrinkage rates.[19] In one study, overall survival in Head and Neck Cancers was found to be 35 months if lymph nodes dissected were<15, 63 months if dissected lymph nodes were 15-39 and 73.4 months if dissected lymph nodes were >40.[20] This showed the clinical significance of a number of examined lymph nodes. According to one more study, the number of lymph nodes examined rather than involved lymph nodes is associated with improved survival. A minimum of 10 lymph nodes should be removed, and with each additional lymph node, mortality is decreased until the number of resected lymph nodes reaches up to 35. No significant advantage was observed beyond 35 lymph nodes.[21] So, it is determined that an adequate number of lymph nodes should be removed in order to completely and

precisely stage the cancer, which will ultimately decide the prognosis and need for adjuvant treatment.

Further studies should be conducted to evaluate whether surgical margins and recovered lymph nodes have prognostic significance. More studies should be conducted to evaluate the proportion of adequate surgeries in different areas of Pakistan in order to evaluate and predict the overall prognosis of head and neck cancers in Pakistan. As in our setup, a huge number of patients come with inadequate surgery, which leads to unnecessary exposure to chemotherapy and radiotherapy. Thus, when conducting cancer surgery, it should be kept in mind that the removal of the tumour with adequate margins and dissection of an adequate number of lymph nodes is necessary to achieve successful loco-regional control, improve overall survival and decrease the extra burden on tertiary care hospitals delivering post-operative radiotherapy and chemotherapy.

CONCLUSION

More than half of the patients with Head and Neck Squamous Cell Carcinoma had inadequate surgery. Hence, inadequate surgery can lead to poor loco-regional disease control, increased chances of recurrence and overall poor prognosis. We need more tertiary care setups that can provide the best surgical management with better healthcare facilities to achieve better control over this highly prevalent malignancy.

Conflict of Interest: None.

Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

TA & GH: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

AT & KM: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

MA & SS: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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